

Fascinating Fringes  
of  
**Medicine**

From Oddities to Innovations

Campion Quinn, MD



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**Campion Quinn, MD**

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This book is dedicated to my grandson, Maximillian Campion Tavarez

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## About the Author

Dr. Quinn, a distinguished internist, geriatrician, and emergency medicine physician with a profound appreciation for medical history, embarked on the ambitious journey of penning this book. Within the realms of human illness lies a subject brimming with fascination and fear, a dichotomy that has driven the evolution of medical treatments across different civilizations and eras. These treatments, ranging from archaic practices like bloodletting and concoctions made from deceased frogs to modern marvels such as mRNA vaccines and laser eye surgery, are emblematic of the scientific sophistication prevailing within the cultures that embraced them.

The genesis of this book lies in the desire to delve deeply into this profoundly human subject matter, one that unites us all by virtue of our shared vulnerability to illness. In scrutinizing the extremities of ailments and the valiant quests for remedies, we unravel the tapestry of our humanity. We are confronted with the very best of ourselves — the resilience, innovation, and unwavering determination exhibited by individuals in their battles against maladies. Simultaneously, we are confronted with the darker aspects, such as the historical persistence of misguided treatments and the exploitation of the vulnerable by charlatans.

By meticulously curating tales of medical oddities, unusual treatments, groundbreaking discoveries, and the dichotomy between heroic medical interventions and dubious practices, this book aims to present a multifaceted view of the medical landscape. It endeavors to provide readers with a comprehensive understanding of the intricate relationship



between human societies, their beliefs, and the evolution of medical science. As we traverse through the annals of medical history, we confront our collective past and envision a more enlightened future, cognizant of the advancements and challenges that lie ahead.

In essence, this book serves as an invitation to engage with the intricacies of our medical history, to comprehend the diverse paths we have taken in our pursuit of health, and to reflect upon the journey that has brought us to the sophisticated medical landscape of today.

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# **Chapter 1**

## **Introduction**

Welcome to a fascinating journey into the weird and unusual world of medical facts. In this book, we will explore the remarkable and sometimes bizarre aspects of the human body, diseases, treatments, and the extraordinary discoveries made by medical science. Prepare to be amazed as we delve into peculiar conditions, unforgettable characters, unexpected remedies, and the astonishing capabilities of our own biology. From strange historical practices to mind-boggling scientific breakthroughs, this collection of medical oddities will leave you both intrigued and enlightened. So, fasten your seatbelts and get ready to embark on a captivating adventure through the realm of weird and fascinating medical facts that will challenge your understanding of the human body and its mysteries.

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## Chapter 2

# Interesting Medical Phrases and Terms

### How are some doctors like ducks?

The term “quack” is used to describe fraudulent or ignorant medical practitioners who pretend to possess medical skill, knowledge, qualifications, or credentials they do not actually have. While not related to fowls, the origins of the word “quack” can be traced back to the Dutch word “kwakzalver, or quacksalver” that meant a hawker of salve. A salve was an ointment used to promote healing. The 17th century word, Quacksalver, was used to describe people who sold nostrums, that is, ineffective medical cures of dubious origin (Figure 1). Over time, the term evolved to refer to those who falsely claimed to possess medical expertise.

In the past, especially during the 1700s in Europe, cities like London and Paris had weak regulations against unqualified practitioners, leading to a proliferation of quackery. Qualified medical practitioners often used the term “quack” to discredit those whom they disagreed with, particularly unqualified individuals. The term was employed to highlight the lack of genuine medical skill or knowledge possessed by these fraudulent practitioners. The use of the term “quack” helps to differentiate between legitimate medical professionals and those who engage in deceptive practices. It serves as a cautionary label for individuals who make false claims about their abilities to diagnose, treat, or cure diseases, aiming to protect the public from potential harm and ensure they seek reliable medical care.

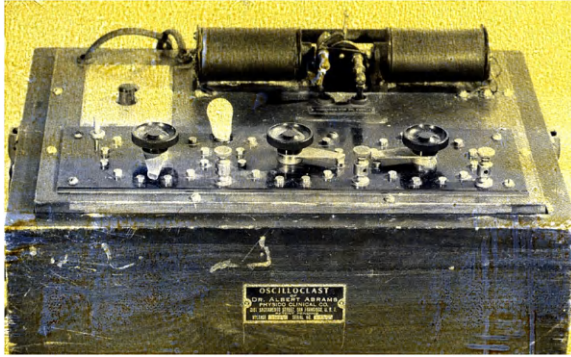


**Figure 1.** A quack’s nostrum. (Image obtained from Wikimedia Commons, the free media repository)

The prevalence of quackery and the need to safeguard patients’ well-being led to the establishment of regulations, professional standards, and licensing requirements in the medical field to protect the public from unqualified or fraudulent individuals.

## Weird Al’s Dynamizer

Dr. Albert Abrams was a quack and a fraud operating out of San Francisco, California. At the turn of the last century, he was famous for inventing many medical machines such as the “oscilloclast” (Figure 2) and the “radioclast” as well as the medical technique called “spondylotherapy.” Albert Abrams developed a unique diagnostic system that relied on basic resistance boxes, that he called Reflexophones, linked together. The process began with a “dynamizer,” a device holding a patient’s blood sample



**Figure 2.** Oscilloclast. (Image obtained from Wikimedia Commons, the free media repository)

on two electrodes and grounding it, while the third electrode is linked to a “rheostatic dynamizer.” This setup was further connected to a “vibratory rate rheostat” and then to a “measuring rheostat.” The final link was an electrode placed on the forehead of a healthy individual. This individual was Dr. Abrams’ assistant, who, for the purposes of these diagnoses, he was designated the “reagent.” The assistant was instructed to face west while standing on a rubber mat in very dim light. During the diagnosis, Abrams would repeatedly strike the abdomen of the “reagent” with a rubber mallet to identify resonant or non-resonant areas. The location of these responses and the specific resistance measured in Ohms determined the disease diagnosis. Abrams claimed that his method could diagnose all diseases and even ascertain a person’s religion from a single blood drop. Alternatives to blood, like handwriting samples, hair strands, or photographs, were also deemed usable. As treatment, Abrams used a device called an oscilloclast, set to the same frequency as the diagnosed disease. This device, sometimes called the “wave smasher,” was believed to eradicate disease vibrations, offering a cure for multiple serious illnesses diagnosed in each patient.

In a skeptical response to Abrams’ claims, the medical community sent a drop of rooster blood to be analyzed using the Dynamizer. Astonishingly, the “patient” was allegedly diagnosed with a range of conditions including malaria, syphilis, diabetes, and cancer. This strange and



outlandish approach to medical diagnosis highlights the extent to which Abrams went to deceive and defraud people with his bogus machines and practices. His methods were eventually exposed as fraudulent, but they serve as a captivating example of the lengths some quacks would go to exploit the public's trust and desperation for medical solutions.

### **Radithor gives you glowing good health or “Don't you come home Bill Bailey”**

William Bailey, an American patent medicine inventor (i.e., Quack) and salesman, is known for his association with the promotion and sale of dangerous radioactive products. Despite being a Harvard University dropout and lacking a medical degree, Bailey falsely presented himself as a Doctor of Medicine. One of his notable creations was a product called “Radithor,” which he began prescribing to his patients in 1918 (Figure 3). Essentially, Radithor was a solution of radium mixed with regular water, and Bailey claimed it could provide invigoration to individuals who felt tired or fatigued. He marketed and sold these radioactive products, preying on the trust and desperation of people seeking relief from coughs, flu,



**Figure 3.** Vial of Radithor. (Image obtained from Wikimedia Commons, the free media repository)

and other common ailments. Radithor was just one of the items he promoted, as he also developed other radioactive products such as a belt-clip for portable “energy” and a radioactive paperweight to supposedly energize lethargic businessmen. Bailey’s most notable patient was Eben Byers, a wealthy industrialist, who tragically fell victim to the harmful effects of Radithor. Byers consumed a staggering 1,400 bottles of Radithor before experiencing severe health consequences. His jaw eventually deteriorated and fell off, and he ultimately died from radiation poisoning. The autopsy revealed that the radium had created massive holes in his brain and skull. This shocking case involving William Bailey and Radithor highlights the dangers of medical quackery and the devastating consequences that can arise from the promotion and use of unproven and hazardous treatments. It serves as a cautionary tale about the importance of evidence-based medicine, rigorous scientific research, and the need for regulatory oversight to protect public health and safety. The story of William Bailey’s involvement in the sale of radioactive products serves as a stark reminder of the harm that can be inflicted when unqualified individuals exploit public trust for personal gain, disregarding the potential risks and consequences to those seeking medical help.

## **Tweezers**

The humble tweezers are a very old medical tool. The origins of the surgical instrument, known as the “tweezers,” can be traced back to ancient Egypt. Archaeologists found evidence of early forms of tweezers made from seashells that were used for a variety of purposes, including removing hair and splinters. Over time, tweezers evolved and became an essential tool in surgery, allowing doctors to grasp and manipulate small objects with precision. Today, modern tweezers are made from a variety of materials, including stainless steel and titanium, and come in many different shapes and sizes to suit various medical procedures.

The word “tweezer” is believed to have originated from the French word “etwee,” which means a small case or container used to hold small items such as needles, buttons, or tweezers. The word “etwee” itself may have come from the Old French word “estuie,” which means a small box or container. Over time, the word “etwee” evolved into

“tweezer” in English and came to refer specifically to the small pincers used for grasping and manipulating small objects, including during medical procedures.

## **40 days and 40 nights**

The word “quarantine” comes from the Italian phrase “quaranta giorni,” which means “forty days.” In the 14th century, ships arriving in Venice from foreign ports were required to anchor for 40 days before they could dock in the city. This was done as a precaution against the spread of the bubonic plague, which was rampant in Europe at the time. Interestingly, the practice of quarantining ships may have inadvertently led to the discovery of a cure for scurvy. In the 18th century, British sailors were required to spend months at sea, often without access to fresh fruits and vegetables. This led to a high incidence of scurvy, a disease caused by a lack of vitamin C. However, when British ships began stopping in ports in the Mediterranean for quarantine, sailors were able to obtain fresh citrus fruits, which were found to prevent and cure scurvy. So, while the practice of quarantine may have originated as a way of preventing the spread of disease, it also had unexpected benefits for the health and well-being of sailors at sea.

## **You can say that again**

“Hippopotomonstrosesquipedaliophobia” is actually a word used to describe the fear of long words! It is a bit ironic, as the word itself is quite long and difficult to pronounce. The term was coined as a humorous way to describe the fear of long words, and while it is not an official medical term, it has gained some popularity in internet culture and even in some psychology circles. People who suffer from this fear may experience anxiety or panic attacks when confronted with long or complicated words.

## **Let’s give him a hand**

The term “apotemnophilia” has intriguing origins rooted in the Greek language. It combines two components, “apotemno” and “philia,” to

describe a unique psychological phenomenon. Derived from Greek, “apotemno” consists of “apo-” meaning “away” or “off,” and “temno” meaning “to cut.” This combination paints a vivid image of separation or detachment through cutting. Conversely, “philia” in Greek represents an attraction or affinity for something. When these elements are merged, the term “apotemnophilia” encapsulates a distinctive desire or attraction to cut away a part of one’s own body.

This psychological disorder pertains to individuals who possess a strong urge to amputate a healthy body part, despite being physically well. It goes beyond mere curiosity or interest, manifesting as a profound desire for self-amputation. The term “apotemnophilia” captures the essence of this condition by evoking the image of cutting away, highlighting the unique and intense nature of this psychological experience.

Apotemnophilia, sometimes called, Body Integrity Identity Disorder (BIID), is a condition characterized by a mismatch between the individual’s mental body image and their physical body. Individuals with this disorder perceive themselves as being “complete” or “right” only if they were to amputate a healthy limb. This makes it a unique disorder among others as the focus is not on the dissatisfaction with how the body part looks (as in body dysmorphic disorder), but on the belief that the individual’s identity would be more congruent without that particular body part. The person sometimes has a sense of sexual arousal connected with the desire for loss of a limb, movement, or sense. This can lead to an intense desire for amputation of a specific, healthy body part, a desire so strong that individuals may resort to self-harm to achieve it.

## **Cows gave us more than milk**

The origin of the word “vaccine” comes from the Latin language, derived from the word “vacca” meaning “cow.” This association between vaccines and cows comes from the English physician Edward Jenner’s pioneering work on smallpox vaccination in the late 18th century.

Smallpox is caused by the variola virus and was a highly infectious and deadly disease that affected millions of people throughout history. The disease was characterized by a fever, rash, and the development of painful, fluid-filled blisters that could cover the entire body (Figure 4).



**Figure 4.** Upper body of man with smallpox. (Image obtained from Wikimedia Commons, the free media repository)

Smallpox had a profound impact on world history, particularly in the Americas. When European explorers and colonizers arrived in the Americas, they brought with them a range of diseases to which the native populations had no immunity, including smallpox. The disease quickly spread among the indigenous populations, killing an estimated 90% of the people in some regions. It is believed that the introduction of small pox to South America was instrumental in the fall of Aztec and Incan empires. The impact of smallpox on the Americas was so significant that it is considered one of the factors that allowed European colonization to take place. The loss of so many people weakened the indigenous societies, making it easier for Europeans to establish control. In response to the devastation caused by smallpox, efforts were made to develop a vaccine.

In 1796, the English physician Edward Jenner discovered that vaccination with cowpox, a similar but a much less severe disease, could protect against smallpox (Figure 5). Jenner made the critical observation that milkmaids who had been exposed to cowpox, a relatively mild disease, seemed immune from contracting the far more deadly smallpox. Jenner hypothesized that injecting people with cowpox would protect them from



**Figure 5.** Dr Jenner performing his first vaccination on James Phipps, a boy of age 8, on May 14th, 1796. (Image obtained from Wikimedia Commons, the free media repository)

smallpox by stimulating their immune system to produce antibodies against the variola virus that causes smallpox. To test this, in 1796, Jenner inoculated an 8-year-old boy named James Phipps with pus taken from a cowpox lesion on a milkmaid's hand. Months later, Jenner exposed the boy to smallpox, but he did not develop the disease. This discovery led to the widespread use of vaccination and eventually to the eradication of smallpox as a disease in 1980. The impact of smallpox on world history serves as a reminder of the devastating effects that infectious diseases can have on society, and the importance of vaccination in preventing and controlling the spread of disease.

This landmark experiment was the first scientific demonstration of vaccination and opened the door to the development of vaccines against many other infectious diseases. By inoculating people with a small, weakened dose of a disease, vaccines train the immune system to fight off viruses and bacteria without making the person sick. The term "vaccine" was coined to honor Jenner's pioneering work using cowpox to protect against smallpox.

## **Send in the clowns**

Coulrophobia is a term for the morbid fear of clowns. It is a very real and common phobia that affects many people. Recently, a heightened



**Figure 6.** A photograph illustrating a scary clown. (Image obtained from Wikimedia Commons, the free media repository)

awareness of this phobia has been caused by popular movies such as “It” and “Joker” which depict unsettling clown characters (Figure 6). The term coulrophobia is derived from the Greek word “coulro,” which refers to stilt walkers and it first appeared in the 1990’s. Interestingly, this fear is not limited to humans, as even some animals seem to share a dislike of clowns! In a study published in the journal *Animal Cognition*, researchers found that domestic dogs were more likely to show signs of fear and anxiety when presented with images of clowns than with images of regular people. It is unclear exactly why this is the case, but it is possible that the exaggerated facial features and unusual behavior of clowns may be unsettling to both humans and animals alike.

## **Racism is not new**

People known as “blue bloods” do not have grape-colored blood. The phrase “blue blood” refers to nobility or royalty and has its origins in

medieval Spain. In Spanish, “sangre azul” literally translates to “blue blood.” This term was used to describe the noble families of Castile, who claimed to be pure-blooded descendants of Visigoths. During the Moorish conquest of Spain, the Moors, who were Islamic North African Berbers and Arabs, ruled over much of the Iberian Peninsula. However, the nobility of Castile believed their bloodline remained “pure” or untouched by Moorish or other foreign influence. The idea of blue blood comes from the ability to see the bluish colored veins through their pale white skin of the nobility. This coloration was not visible through the darker skin of their Moorish neighbors. This difference was enhanced by the nobility keeping their skin pale by not having to work outside in the sun.

The notion of “pure” or “blue” blood stemmed from the Visigothic claim that their royalty was directly descended from the Germanic Goth tribes that contributed to the fall of the Roman Empire. The Castilian nobility believed that intermarriage with Moors, Jews, and other groups would “taint” or degrade their noble blood. This concept of “clean lineage” gave rise to class divisions between nobility and commoners. Being of verifiable noble birth (and thus untainted blood) entitled a person to certain privileges denied to commoners. Hence, blue blood became associated with royalty, aristocracy, and the transmission of high social rank.

## **Doctor ... how old are you?**

The “Killing Season” is a rather macabre term used in the United Kingdom to describe a period of perceived increased mortality in hospitals, traditionally coinciding with the arrival of newly qualified junior doctors on the first Wednesday of August.

The basis for this phenomenon is the belief that hospital patients face heightened risks during this period due to the limited experience of recently graduated medical students. It has been reported that there is an increased 6% probability of patients dying in August and a mortality rate of 8% for patients not requiring surgery or suffering from cancer. Interestingly, the term is typically attributed to new doctors taking longer to perform tasks (such as ordering tests or finding the right equipment) because of their unfamiliarity with the system, rather than making basic errors like incorrect dosages.



In US hospitals, this phenomenon is called “The July Effect.” The theory of the July effect posits that the influx of newly graduated interns, residents, nurses, and other new medical workers in July in American hospitals can lead to a decrease in the quality of care, potentially leading to higher mortality rates. The evidence supporting this belief is mixed, with some studies finding an increase in patient deaths in hospitals training new doctors in July, while others studies do not. Overall, while the concept might be alarming, it underscores the importance of adequate training, supervision, and support for new medical professionals as they transition into their roles.

## **A poor excuse for anesthesia**

The phrase “bite the bullet” has its roots in the 19th century when battlefield medicine was a relatively primitive practice. During this time, there were no anesthetics to numb the pain of surgery, and medical procedures were often carried out on conscious patients. To help cope with the intense pain, soldiers were sometimes given a bullet to bite down on during surgery. The idea was that biting down on a bullet would help to distract the patient from the pain and prevent them from screaming or making noise that could alert the enemy or distract the surgeon. In some cases, soldiers were even given a wooden stick to bite down on instead of a bullet. While the practice of giving soldiers a bullet to bite down on during surgery is often associated with the American Civil War, it actually dates back much further. For instance, the practice was used during the Napoleonic Wars, and there are even references to soldiers biting on leather straps during surgery in ancient Greece and Rome.

Today, the phrase “bite the bullet” is often used figuratively to describe any situation in which a person must endure pain, hardship, or difficulty with bravery or stoicism. Despite its violent origins, the phrase has become a common expression in the English language and is widely understood to mean “tough it out” or “persevere through hardship.”

## **Not just for after thanksgiving**

The phrase “cold turkey” is commonly used to describe the abrupt and complete cessation of drug or alcohol use. This phrase is believed to

have originated in the early 20th century and is thought to have been used first in reference to withdrawal from opioids, such as heroin and morphine. When someone suddenly stops using an addictive substance, they can experience a range of physical and psychological symptoms known as withdrawal. These symptoms can include chills, sweating, nausea, vomiting, and body aches, among others. One of the most visible symptoms is the appearance of goosebumps or “turkey skin,” which gave rise to the phrase “cold turkey.”

The phrase “cold turkey” may also have originated from the idea of a person’s skin looking cold and clammy, like the skin of a cold turkey that has been refrigerated. Another theory suggests that the term comes from the phrase “talking cold turkey,” which was used in the 1920s to describe speaking frankly and openly about drug addiction. Today, the phrase “cold turkey” is used more broadly to describe any situation in which someone stops a habit abruptly and without warning. While the origins of the phrase are somewhat gruesome, it has become a common expression in the English language and is widely understood to mean quitting abruptly and completely.

## **We wear pink on Wednesdays**

The phrase “in the pink” is a common expression used to describe someone who is healthy, fit, and in good physical condition. While the phrase is often associated with human health, its origins can be traced back to the world of horse racing.

In the late 19th and early 20th centuries, horses were a vital part of transportation and commerce. At that time, a horse’s value was determined by its performance, also, horse racing for entertainment was a common pastime. Owners and trainers were always on the lookout for horses that were in peak physical condition and had a healthy appearance, as these horses were believed to be more likely to win races. Horses that were in excellent condition were said to be “in the pink of condition,” with pink skin, shiny coats, and good muscle tone. This phrase became a common expression among horse owners and trainers, and it eventually made its way into the broader culture.

Today, the phrase “in the pink” is commonly used to describe someone who is healthy, fit, and in good physical condition. While the origins

of the phrase are rooted in horse racing, it has become a part of everyday language and is widely understood to mean being in good health and feeling well.

## **OMG, where is my phone**

Nomophobia, the fear of being without a mobile phone or computer, is becoming increasingly common today. One study found that over 50% of people experience some level of anxiety when their phone battery is low, or they do not have access to their phone.

Interestingly, nomophobia may not be limited to humans — some primates have also shown signs of attachment to technology. In a study published in the journal *Current Biology*, researchers found that captive chimpanzees became visibly anxious when their touchscreen devices were taken away, even if they were given other forms of enrichment. This suggests that the desire for technology may be rooted in our evolutionary history and not just a modern phenomenon.

## **Even in the best of families**

The phrase “skeleton in the closet” originated from the practice of physicians using human skeletons for anatomical study and research. In the 19th century, medical schools and research institutions relied heavily on the study of human anatomy, however, obtaining skeletons for this purpose was often difficult and expensive. Many medical schools and research institutions would obtain skeletons by purchasing them from grave robbers or from individuals who had donated their bodies to science. Once the skeletons were obtained, they were often kept in closets or other storage areas to protect them from damage or theft.

While the practice of using human skeletons for anatomical study and research was not inherently shameful or embarrassing, it was considered taboo in some circles. Some people believed that the use of human remains in this way was disrespectful or sacrilegious, and the possession of human skeletons was sometimes associated with criminal activity. Over time, the phrase “skeleton in the closet” came to be used

more broadly to describe any embarrassing or shameful secret that someone might wish to keep hidden. Today, the phrase is a common expression in the English language and is widely understood to mean a secret or piece of information that someone is ashamed of or does not want others to know about.

## **Go ahead ... eat it**

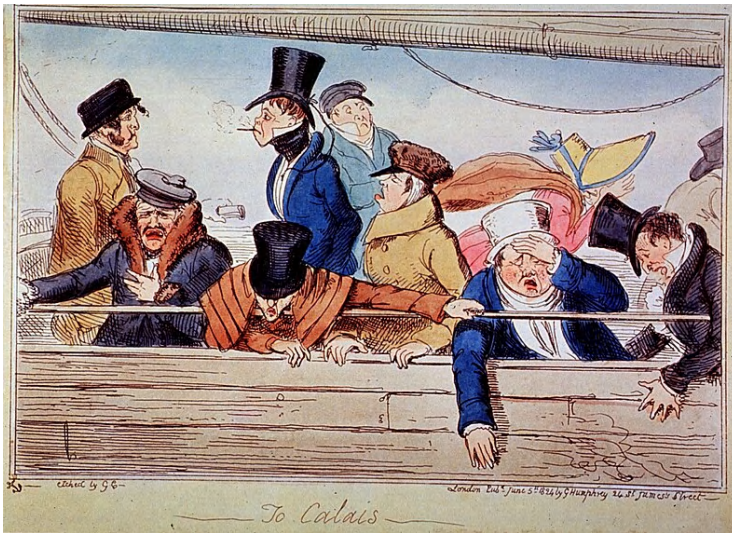
Medical researchers have conducted scientific studies to investigate the “Five-Second Rule.” They wanted to determine whether or not it is safe to eat food that has been dropped on the floor.

One such study was conducted by researchers at Clemson University in South Carolina, who found that bacteria could transfer to food almost instantly upon contact with a contaminated surface. The researchers tested a variety of foods, including bread, buttered toast, and gummy candy, and found that all of the foods became contaminated with bacteria within seconds of being dropped on the floor. However, the researchers also found that the type and amount of bacteria that transferred to the food varied depending on the type of surface it was dropped on. Carpeted surfaces tended to have higher levels of bacteria than hard surfaces like tile or stainless steel.

While the five-second rule is generally not recommended by health experts, it is worth noting that the risk of getting sick from eating food that has been dropped on the floor is relatively low. However, if the food has been dropped on a particularly dirty or contaminated surface, it is best to err on the side of caution and throw it away.

## **The forecast is “Mal de Mer”**

While the phrase “under the weather” does not have direct medical origins, its association with the feeling of sickness can be traced back to the phenomenon of seasickness. Seasickness is a type of motion sickness that occurs when a person is on a boat or ship (Figure 7), and it can cause a range of symptoms such as nausea, vomiting, and dizziness. In the past, sailors who were feeling seasick were often directed



**Figure 7.** People illustrated to be suffering from seasickness. (Image obtained from Wikimedia Commons, the free media repository)

to stay on the side of the ship facing the wind and rain, as this was believed to help ease their symptoms. This side of the ship was referred to as being “under the weather,” as it was less sheltered and exposed to the elements. Over time, the phrase “under the weather” came to be used more broadly to describe anyone who was feeling unwell or sick, regardless of the cause. While the origins of the phrase are rooted in the maritime tradition of sailing, it has become a common expression in the English language and is widely understood to mean feeling ill or unwell.

## **I can’t read his handwriting**

The symbol “Rx,” (Figure 8) used as an abbreviation for “prescription,” has a long history. It is believed to originate from the Latin word “recipere,” which means “to take.” In the context of a prescription, “Rx” could be interpreted as “take this.” It instructs the patient to take the medicine or treatment as directed by the healthcare provider.



**Figure 8.** The astronomical symbol of the planet Jupiter. (Image obtained from Wikimedia Commons, the free media repository)

Another theory suggests that “Rx” is derived from the symbol for the Roman god Jupiter. In ancient times, physicians would invoke Jupiter in their written instructions, hoping the god would bring health and wellness to the patient. The symbol for Jupiter was similar to “Rx,” and it is possible that over time, the symbol evolved into the “Rx” we use today. Regardless of its exact origins, “Rx” is now universally recognized as a symbol for a medical prescription.

## **Scripts**

The physician’s prescription pad has its origins in the early 20th century when doctors began to use standardized prescription forms to write out medication orders for their patients. Prior to this time, prescriptions were often written on scraps of paper or other improvised materials, which could be difficult to read or interpret.

The first prescription pads were simple forms that included space for the patient’s name and address, the medication name and dosage, and the doctor’s signature. Over time, these forms became more standardized, with additional fields for information such as the patient’s date of birth, the pharmacy where the prescription should be filled, and any special instructions or warnings.

Today, the prescription pad is a ubiquitous tool in medical practice, and it is a critical part of the prescription process. By providing doctors with a standardized format for writing medication orders, prescription

pads help to ensure that prescriptions are accurate, legible, and easy to understand, which can help to reduce the risk of medication errors and improve patient safety.

In the future, prescription pads may be phased out completely as computer systems are set to replace clinical documentation and communication as they have done with office notes and consultation notes.

## **Medical tongue twisters**

The medical field is full of unusual and fascinating terminology. One such example is “xerostomia,” which is a fancy way of saying “dry mouth.” Another interesting term is “sphenopalatine ganglioneuralgia,” which is the scientific name for “brain freeze,” the painful sensation you get when you eat or drink something cold too quickly.

However, perhaps the most intriguing medical term of all is “pseudopseudohypoparathyroidism.” This mouthful of a term refers to a rare genetic condition that can cause a variety of symptoms, including short stature, rounded face, and shortened fourth and fifth fingers. Despite its intimidating name, pseudopseudohypoparathyroidism is usually not life-threatening and can be managed with appropriate medical care.

So, the next time you are reading a medical article or listening to your doctor, keep an ear out for some of these unusual and intriguing terms. You might be surprised at what you learn!

## **As sting sings ...**

The phrase “canary in a coal mine” is often used metaphorically to refer to a person or thing that serves as an early indicator or warning sign of potential danger. However, in a historical context, canaries were used in coal mines as a form of early detection for the presence of dangerous gases, particularly the colorless, odorless gas carbon monoxide. The reason behind this unusual practice was that canaries are more sensitive to toxic gases than humans. Miners would bring canaries with them into the mines in small cages. If the canaries showed signs of distress or, tragically, succumbed to the toxic gases, it served as an alarming sign for the miners

to evacuate the area immediately. These tiny birds acted as the miners' silent heroes, sacrificing their lives to protect human lives. The use of canaries as early warning systems in coal mines only stopped in 1986 when electronic carbon monoxide detectors became ubiquitous. Nonetheless, the concept of the "canary in a coal mine" remains a powerful metaphor for being vigilant and responsive to early signs of potential hazards or problems.

## **Consumption junction**

Phthisis (pronounced thai-suhs) is an old term used to describe a severe and progressive form of tuberculosis, particularly affecting the lungs. The term "phthisis" originates from the Greek word meaning "consumption, or wasting away" highlighting the wasting and debilitating nature of the disease. With advancements in medical understanding and treatment, the term "phthisis" is no longer commonly used, and tuberculosis is now better managed and controlled through effective medication and public health measures.

## **Fear of water**

The term "hydrophobia," which was often used in the past to describe the fear of water that can occur in people with rabies, comes from the Greek words "hydor" (water) and "phobos" (fear). This symptom is caused by spasms in the muscles of the throat and can make it difficult or impossible for the person to swallow, which can lead to a fear of water.

## **Rock me Carl Linnaeus**

Did you ever wonder why scientists give organisms two Latin or Greek names, such as *Homo sapiens* for man, or *Canis lupus* for dogs? The story goes back to an 18th century Swedish botanist, physician and zoologist named Carl Linnaeus. Linnaeus developed the system of "binomial nomenclature." Binomial nomenclature means giving an organism two names, the genus and the species, which is the basis of our modern system



of classifying organisms and categorization of species. The science of classification and categorization is called taxonomy. Linnaeus' taxonomy has a critical role in the naming and categorizing of disease-causing organisms, which in turn significantly aids our understanding and treatment of various diseases.

For example, the bacterium that causes tuberculosis is named *Mycobacterium tuberculosis*. Under the Linnaean system, "Mycobacterium" is the genus name, and "tuberculosis" is the species name. This classification not only enables precise communication about the disease among healthcare professionals worldwide but also guides researchers in understanding its characteristics based on its taxonomic relations. Similarly, the SARS-CoV-2 virus, which is responsible for the COVID-19 pandemic, is classified under this system. "Betacoronavirus" is the genus, and "SARS-CoV-2" is the species name.

This precise classification system aids in tracing the evolutionary relationships between different organisms, understanding their biology, and predicting their behavior or response to certain treatments. Thus, Linnaeus' taxonomy continues to play a crucial role in medicine and biomedical research, centuries after it was first introduced.

## **A surgeon's hands**

The word "surgeon" comes from the Middle French word "cirurgien," which in turn comes from the Latin word "chirurgia," meaning "surgery" or "handiwork." The Latin term was derived from the Greek word "kheirourgia," which also means "handiwork," and was used to describe the art of working with the hands, particularly in a medical context. The term "surgeon" was originally used to refer to a medical practitioner who specialized in performing surgical procedures, and the term has been in use in English since the 14th century.

## **Dem bones, dem bones, dem dry bones**

Military doctors are sometimes colloquially called "sawbones" due to historical associations with battlefield surgery and amputations. This

nickname has its origins in the early days of military medicine when surgery was a common and crucial part of medical practice on the battlefield. During conflicts like the American Civil War, military surgeons often had to perform amputations to save lives, and they would use saws and other tools for these procedures. As a result, they became known as “sawbones” or just “bones.” This is why the character Dr. McCoy is referred to as “Bones” on the TV series *Star Trek*. Interestingly, the phrase “saw bones” first appeared in print in 1837. Charles Dickens used it in his novel “*The Pickwick Papers*.”

It is important to note that this term is largely historical and not commonly used today. Modern military medical professionals are highly trained physicians and surgeons who provide a wide range of medical services to military personnel, including trauma care, primary care, and specialized medical care, and they are typically referred to by their appropriate medical titles and specialties.

## **I’m going to the scalpel and ...**

The scalpel (Figure 9), the small straight thin bladed knife, is one of the most commonly used surgical instruments today, has its roots in prehistoric times. Archaeological evidence suggests that prehistoric humans used sharp flint or obsidian blades to perform surgical procedures such as amputations and trepanations (cutting holes in the skull). Over time, these crude blades were replaced by metal instruments, and the modern scalpel as we know it today was developed. The first metal scalpels were made in ancient Rome and were often used for bloodletting and other surgical procedures. Today, scalpels come in a variety of shapes and sizes, and the blades are made from high-quality stainless steel for precise cutting and reduced risk of infection.



**Figure 9.** Scalpel. (Image obtained from Wikimedia Commons, the free media repository)

The word “scalpel” comes from the Latin word “scalpellum,” which means “a small knife” or “chisel.” The Latin term is derived from the verb “scalpare,” which means “to carve” or “to scratch.” This is appropriate, as a scalpel is a small, sharp surgical knife used for precise cutting and incisions during surgical procedures. The word “scalpel” has been used in English since the 1740s and is now a common term in the medical field.

## Chapter 3

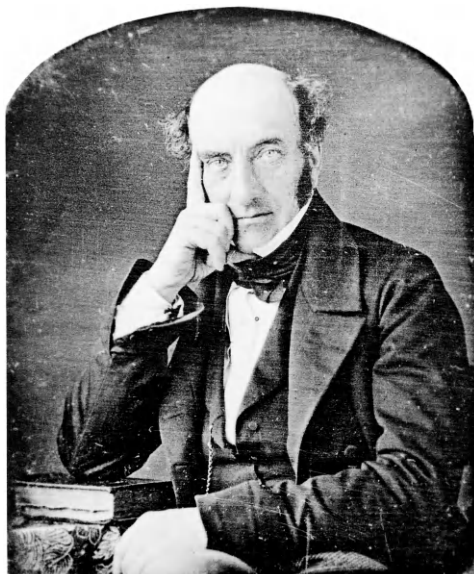
# People Who Contributed to Medical Discoveries

### **You may feel some discomfort ...**

Robert Liston was a pioneering Scottish surgeon in the 19th century (Figure 10). He was known for his remarkable speed and impressive surgical skills. However, he is also famous for a particularly tragic incident that resulted in three deaths.

In 1846, Liston was performing an amputation on a patient's infected leg. At the time, all surgery was performed without anesthesia. Part of a surgeon's skill was in his ability to perform the amputation rapidly, to reduce the patient's pain and limit the blood loss. Patients were held down to a table by assistants while the surgeon worked. As he began to make his incision with his surgical knife, he accidentally severed the fingers of his assistant, who was holding the patient's leg steady. Amid the blood and chaos that followed, Liston was able to successfully amputate the patient's infected leg, which fell to the floor without the assistant there to help. However, the tragedy did not end there. The patient died shortly after the operation from gangrene, a common and deadly infection at the time. The assistant, meanwhile, developed a gangrenous infection in his hand and later died from sepsis. To top it off, a spectator in the audience reportedly died of shock upon witnessing the procedure, resulting in the 300% mortality rate.

This tragic incident highlights the importance of safety measures and careful attention to detail in surgery, as well as the need for continued



**Figure 10.** Image of Robert Liston. (Image obtained from Wikimedia Commons, the free media repository)

advances in medical technology and techniques to prevent such outcomes from occurring in the future.

## **Hunter Hunts**

John Hunter, was a renowned English anatomist and surgeon, who had a reputation for collecting unusual specimens for his private museum. In the 1780's, Charles Byrne lived in London. Byrne was a large man, standing at least 7' 7" with some reports having him at 8' 4". He was known as the Irish Giant. He became famous in England and large audiences paid to see him. Hunter became obsessed with obtaining Byrne's body for his bio-medical collection. Despite Hunter's prestige and social connections, he never actually met Charles Byrne in person. All his attempts to meet Byrne and persuade him to donate his body to science were unsuccessful. It was said that all of London knew of the doctor's obsession with attaining the giant's corpse. Byrne had no interest in adding to Hunter's macabre collection. To prevent his corpse from being dissected, Byrne arranged that, upon his death, his body was to be sealed in a lead coffin and be



**Figure 11.** Skeleton of Charles Byrne in the Hunterian Museum. (Image obtained from Wikimedia Commons, the free media repository)

buried at sea. However, when Byrne died, at the age of 21, Hunter bribed a member of his funeral party to obtain his body. Byrne's body was taken at night from the funeral parlor by Hunter's associates. With the body removed from the coffin, bricks were placed inside to simulate weight of Byrne's body and the brick-filled coffin was buried at sea. Back on land, Hunter dismembered Byrne's body and boiled it down to create Byrne's skeleton. Byrne's skeleton was displayed in the Hunterian Museum in London, for two centuries (Figure 11). In the past decade, human rights groups have advocated for the removal of the skeleton from the museum and having it interred at sea, per Byrne's wishes. Amid this criticism, Byrne's skeleton was officially "retired" from public display by the Hunterian museum in January 2023. The story is a haunting reminder of the lengths to which people will go to satisfy their curiosity and desire for knowledge.

## Old Center Shot

Jacob Miller's survival during the Civil War was a truly miraculous and remarkable tale. Serving in Company K of the 9th Indiana Infantry, he was a veteran of numerous battles, but it was during the Battle of Chickamauga on September 19, 1863, that he endured a life-threatening injury. A Confederate musket ball struck him squarely in the forehead, creating a jagged hole and entering his brain (Figure 12). Despite being left to die on the battlefield by his colleagues, Miller regained consciousness and, in excruciating pain, managed to crawl through the dead to a Confederate field hospital. At the field hospital, doctors assumed he was so badly injured he would not survive. Frustrated at this inattention and fearful of becoming a prisoner, Miller embarked on a 15-mile journey to Chattanooga, with one eye so swollen he could barely see.

Even with the constant pain, impaired memory, and fits of madness that followed, Miller's determination to survive was evident. He sought medical help and lived for decades with an open wound in his forehead



**Figure 12.** Portrait of Jacob Miller. (Image obtained from Wikimedia Commons, the free media repository)

and the bullet still lodged in his skull. To add insult to this grave injury, his nickname in his hometown became “center shot.” Several years later, some pieces of the bullet fell out after he coughed, and although he never fully recovered, he continued to live with an open bullet wound in his forehead. Miller’s story became well-known when he gave an interview to a newspaper in Joliet, Illinois, in 1911, where he vividly recalled the events of that fateful day. When asked how he could remember the events surrounding his injury so vividly when his everyday memories were so hazy, he replied “My answer is I have an everyday reminder of it in my wound and constant pain in the head, never free of it while not asleep. The whole scene is imprinted on my brain as with a steel engraving.” Despite the challenges and pain, he endured, Miller married, had a son, and received a pension from the government due to his wartime injuries. He passed away on January 13, 1917, at the age of 88, leaving behind a legacy of resilience and bravery in the face of unimaginable odds.

## **It’s electrifying or Zeno’s paradox**

On July 8, 2013, a man from Brooklyn, New York, died after urinating on the electrified third rail of the subway. The fatal incident involving Matthew Zeno underscores the perils of urinating in public. Human urine is primarily made up of water and dissolved salts, which can serve as a good conductor of electrical currents. As a result, a stream of urine could become a dangerous pathway for high-voltage electricity from sources like the third rail to reach a person’s body.

Upon accidentally contacting the electrified third rail, Zeno was struck with a staggering 625 volts of electricity. His friend, in an attempt to help him, also suffered an electric shock. This situation reinforces the potential danger posed not only by urine acting as a conduit, but also by direct contact with the rail.

However, it is important to note that the immediate electric shock is not the only threat. Such an event can result in severe burns, muscle spasms, and even induce heart attacks, as evidenced by Zeno’s unfortunate fate. Urinating on the third rail of a subway track is always a bad idea. It poses a considerable risk that could lead to severe injuries or even death.



Therefore, pedestrians should exercise extreme caution and always avoid it for their safety.

## **Radiologists, Not Pianists**

In the wild early days of radiology, pioneering doctors bravely yet foolishly thrust their bare hands directly into the path of the invisible beast known as X-radiation. Like modern Icaruses, they flew too close to the sun in pursuit of a medical discovery. From the 1890s through the 1910s, the freshly unleashed power of Wilhelm Roentgen's X-ray beams entranced researchers seeking to reveal the hidden inner workings of the human body. Unfortunately, amidst all the fascination, their own bodies were being slowly and insidiously damaged. In order to judge if the X-ray tube was ready to use, early radiologists would place their hands directly in the beam of X-rays and wait until they felt their hands become warm and slightly tingly. This repeated direct exposure of unprotected hands to X-ray tubes during imaging experiments caused radiodermatitis, blisters, numbness, ulcerations, and many other far worse consequences. Yet they carried on. The bombarding radiation slowly mutated fingernails and hair follicles, yielding grotesque localized deformities straight out of a sci-fi flick (Figure 13). Clarence Dally, Thomas Edison's trusted assistant, was working with X-ray tubes for months. The exposure resulted in progressive amputations of both hands and then arms before succumbing to radiation-induced cancer. Many other pioneering doctors suffered similar fates, willingly sacrificing their hands and health as payment to establish the diagnostic power of medical radiation that we rely on today. Tragically, basic safety measures like lead gloves and exposure limits were not instituted or standardized until much later. Driven by hubris and the thirst for discovery, these doctors flew too close to the radioactive sun before fully grasping its dangers. Though their hands aged and withered like time-lapse photography, they advanced radiology by exposing its ability to illuminate our innermost structures. While their boldness in pursuit of new knowledge continues to light the way forward, their painful cost reminds us to proceed cautiously.



**Figure 13.** Hands of a radiologist burned by radiation exposure. (Image obtained from Wikimedia Commons, the free media repository)

## **Head Transplant**

Head transplant, also known as a full-body transplant or a cephalosomatic anastomosis, is a theoretical surgical procedure that involves transplanting a person's head onto another body. This procedure has been successfully performed on animals, such as monkeys, but has never been performed on a human.

Dr. Sergio Canavero is an Italian neurosurgeon who made headlines in 2017 when he claimed to have successfully performed the first human head transplant on a cadaver. However, his claims were met with widespread skepticism from the scientific community, who pointed out numerous flaws in his methodology and raised ethical concerns about the procedure. Despite this, Canavero has continued to advocate for the development of head transplant technology and has proposed numerous controversial ideas, such as the idea of using virtual reality to prepare patients for the procedure.

## **Now you play the guard and I'll play the prisoner**

The Stanford Prison Experiment was a psychological study conducted in 1971 by Stanford University professor Philip Zimbardo. The study aimed to investigate how the dynamics of power and authority affect human

behavior, by simulating a prison environment. The experiment involved 24 young, healthy, psychologically normal men from the community. They were randomly assigned to be either prisoners or guards. The prisoners were locked in cells in the basement of a building on the Stanford campus. The guards were instructed to keep the prisoners from escaping. The study quickly devolved into an abusive and psychologically distressing situation, with guards subjecting prisoners to a variety of cruel and dehumanizing tactics. The experiment was eventually terminated early, after only six days, due to the extreme emotional distress experienced by the participants.

The Stanford Prison Experiment remains a controversial and heavily criticized study, due to concerns about ethical issues such as the lack of informed consent and the psychological harm inflicted upon participants. Nonetheless, the study has been influential in shaping our understanding of the role of social context and situational factors in shaping human behavior.



**Figure 14.** Portrait of Anton Chekov. (Image obtained from Wikimedia Commons, the free media repository)

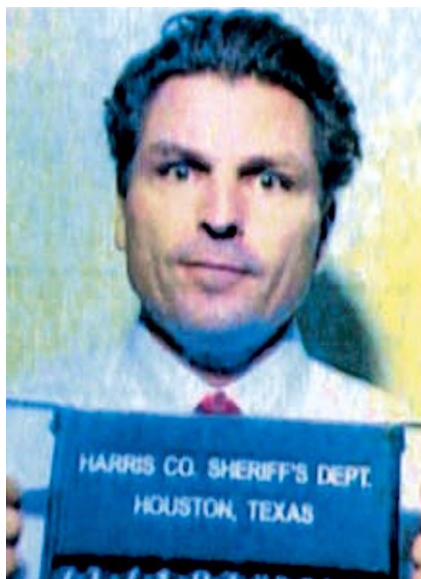
## **Get your kicks on Ward 6**

Anton Chekhov was a physician who practiced medicine in rural areas of Russia while also pursuing his writing career (Figure 14). While working as a physician, Chekhov kept detailed notes on his observations of patients and their conditions, which he used as inspiration for many of his literary works. One of the most interesting facts about Chekhov's medical career is that he once treated a young man who had a bizarre and mysterious illness that left him paralyzed and unable to speak. Chekhov was unable to diagnose the cause of the man's illness, but he was struck by the patient's stoic acceptance of his condition and his determination to communicate through writing. Years later, Chekhov wrote a short story called "Ward No. 6" that was based on his experiences treating this patient. The story explores themes of mental illness, institutionalization, and the complex relationships between doctors and patients, and is considered one of Chekhov's most powerful works.

## **Better late than never**

Eric Scheffey, also known as "Dr. Evil," was a Houston orthopedic surgeon notorious for his malpractice cases. During his career, Scheffey was sued 78 times, with allegations of the death of at least five patients and serious injury to hundreds more (Figure 15).

While it is not explicitly stated which specific surgeries resulted in the most harm, a significant issue appears to be Scheffey's inability to effectively control bleeding during procedures, a condition known as hemostasis. His patients often required massive transfusions to replace blood loss. Unlike most orthopedic surgeons, whose patients would only lose about 100 ccs of blood, Dr. Scheffey often left the operating room covered in his patient's blood, earning him the nickname "Eric the Red." Despite these alarming statistics and his reputation for erratic behavior and drug abuse in the medical community, it took a staggering 24 years for state regulators and the medical community to intervene and put an end to Scheffey's practice. In 2005, the state finally revoked Scheffey's license and ordered him to pay a record-breaking \$845,000 fine. This points to the gaps and potential delays in the medical regulation system,



**Figure 15.** Dr. Eric Sheffey. (Photograph taken by the Huston Texas Sheriff's department.)

especially concerning surgeons who continue to practice despite multiple malpractice suits. This example serves as an important reminder of the need for vigilance and swift action in addressing malpractice to protect patients' health and safety.

## **The limping Emperor**

Emperor Claudius, whose full name was Tiberius Claudius Caesar Augustus Germanicus, reigned as the Roman emperor from AD 41 to AD 54. He belonged to the Julio-Claudian dynasty and was the fourth Roman emperor. Claudius was born on August 1, 10 BCE, in Lugdunum (present-day Lyon, France). He ruled until his death on October 13, 54 CE, in Rome, Italy. Claudius had many impressive accomplishments. For example, during his reign, Claudius extended Roman rule in North Africa and made Britain a province through the Roman conquest of Britain. He was also known for his scholarly pursuits and wrote extensively on history. He accomplished this despite suffering from many physical disabilities including tremors in his head and hands, a limp, a

runny nose, and sometimes foaming at the mouth. Even his name, Claudius, is derived from the Latin word “claudus,” which means “lame” or “limping.” Historians have speculated that he may have had cerebral palsy or Tourette’s syndrome, but there is no definitive diagnosis. Despite his disabilities, Claudius was able to rise to power and rule the Roman Empire.

## **The game’s afoot**

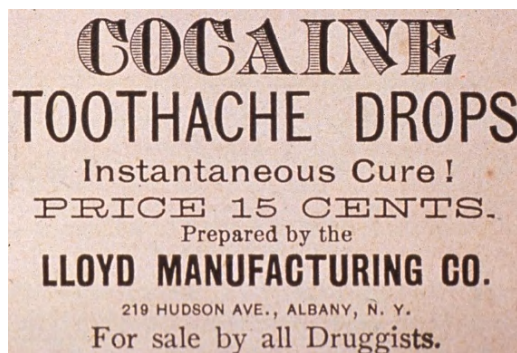
Arthur Conan Doyle, the author of the Sherlock Holmes stories, was also a trained physician who practiced medicine for many years before devoting himself to writing full-time. One of the most interesting facts about Conan Doyle’s medical career is that he played a key role in popularizing the use of the stethoscope in England (Figure 16).

In the early 1890s, Conan Doyle became convinced of the value of the stethoscope for diagnosing and treating medical conditions, which led him to write a series of articles and letters to medical journals promoting its use. At the time, many British doctors were skeptical of the stethoscope, which had been invented in France decades earlier, and Conan Doyle’s advocacy helped to convince many physicians of its usefulness.

Conan Doyle’s medical expertise also informed his writing, and he often drew on his experiences as a physician to create vivid and realistic descriptions of medical conditions and treatments in his Sherlock Holmes stories. For example, in “The Adventure of the Crooked Man,” Holmes uses his knowledge of medicine and anatomy to help solve a murder case.



**Figure 16.** A modern stethoscope. (Image obtained from Wikimedia Commons, the free media repository)



**Figure 17.** Advertisement for cocaine toothache drops. (Image obtained from Wikimedia Commons, the free media repository)

## **Tooth Drops banned by the DEA**

Cocaine tooth drops were invented in the 19th century, with some of the earliest formulations dating back to the 1860s (Figure 17). The drops were a popular local anesthetic at the time, as cocaine was believed to have powerful numbing properties. In fact, they were once endorsed by none other than Thomas Edison, the inventor of the light bulb. Edison was a strong believer in the power of cocaine as a local anesthetic and even invested in a company that produced cocaine-based tooth drops. Edison claimed that the tooth drops were “perfectly harmless” and even recommended them to his friends and family.

However, as we now know, cocaine is highly addictive and can cause serious health problems, including tooth decay and damage to the nasal passages if breathed in. While the use of cocaine tooth drops is now considered to be an outdated and dangerous medical practice, it is a fascinating example of the ways in which scientific knowledge and medical practices have evolved over time.

## **A thing of beauty is a joy forever ...**

John Keats (1795–1821), the famous English Romantic poet, trained as an apothecary (pharmacist) and later as a surgeon’s apprentice, before devoting himself to poetry full-time (Figure 18). One of the most interesting



**Figure 18.** Portrait of John Keats. (Image obtained from Wikimedia Commons, the free media repository)

facts about Keats’s medical career is that he was both a practitioner of medicine and a patient himself. Keats was known to be sensitive and susceptible to illness, and his experiences with illness and suffering had a profound impact on his poetry. In 1819, Keats contracted tuberculosis, which was then an incurable disease, and he spent much of his remaining years struggling with the illness. Despite his failing health, Keats continued to write some of his most powerful and enduring poetry, including “Ode to a Nightingale” and “To Autumn.”

Keats’s experiences as both a physician and a patient influenced his writing in many ways, including his use of vivid and visceral descriptions of illness and pain. In his poem “La Belle Dame sans Merci,” for example, Keats depicts a young knight who has been left sick and helpless by a mysterious illness. The poem has been interpreted as a commentary on the ravages of disease and the human struggle against mortality. Keats’s legacy as a poet and physician continues to inspire and influence readers around the world, and his insights into the human condition remain as powerful and relevant today as they were during his lifetime.



## **And how was your day, Honey?**

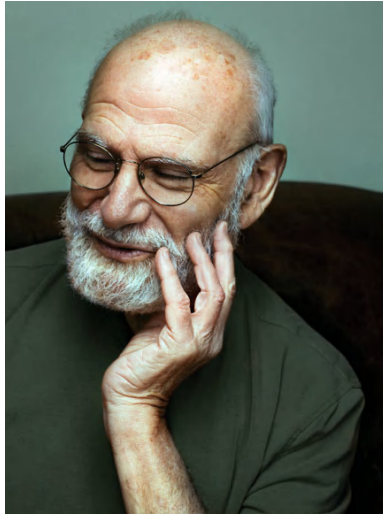
In the realm of extraordinary medical stories, there is one that stands out for its sheer courage and determination. It revolves around a woman named Inés Ramírez Pérez, a mother from Oaxaca, Mexico with no medical training. She accomplished the unimaginable by performing a successful caesarean section on herself. Her remarkable story showcases the astonishing strength of the human spirit in the face of adversity.

At midnight on March 5th of 2000, Inés found herself alone and in excruciating pain. She had already endured 12 hours of continuous agony from child labor. Her husband, unaware of her distress, was at a bar enjoying his evening. Undeterred by the lack of medical expertise, Inés took matters into her own hands. With a kitchen knife in one hand and three glasses of hard liquor for courage, she embarked on a life-saving mission. In the face of immense pain and the absence of professional guidance, Inés made the audacious decision to perform a caesarean section on herself to deliver her baby. Armed with sheer determination and fueled by an unyielding maternal instinct, Inés began the procedure. She skillfully dissected her own abdomen, delivering her newborn baby boy, who emerged crying and breathing, a testament to the astonishing triumph of this self-performed surgery.

Inés Ramírez Pérez's act of bravery and resourcefulness captured global attention, earning her a place in medical history as the only known woman to perform a successful caesarean section on herself, with both mother and baby surviving. Her remarkable feat challenges our understanding of medical possibilities and highlights the boundless potential of the human spirit in the face of adversity.

## **Oliver Sacks Awakens**

Oliver Sacks (Figure 19), the British neurologist and author of "The Man Who Mistook His Wife for a Hat," is one of the most well-known writers who was also a physician. One of the most interesting facts about Sacks' medical career is that he used his experiences working with patients as inspiration for many of his literary works. Sacks was particularly interested in studying and understanding the human brain, and his insights into the workings of the mind informed his writing in many ways. In "The



**Figure 19.** Oliver Sacks. (Image obtained from Wikimedia Commons, the free media repository)

Man Who Mistook His Wife for a Hat,” for example, Sacks tells the story of a patient with a neurological disorder that caused him to struggle with visual perception and recognition. In his memoir, *Awakenings*, published in 1973, Sacks wrote about his patients who had been victims of the encephalitis lethargica epidemic. Encephalitis lethargica is a disease characterized by high fever, headache, double vision and delayed mental and physical responses. Many of its sufferers were left in a coma. Sacks’ patients were often bed bound and minimally responsive. They recovered with the use of a new drug called L-DOPA. Sacks’ experiences as a physician also influenced his writing in more personal ways. In his book “A Leg to Stand On,” Sacks recounts his own experience of suffering a severe leg injury while hiking and undergoing a challenging journey of recovery and rehabilitation.

## **Alexis the chicken hearted**

Alexis Carrel (Figure 20), a French surgeon, and biologist, was born on June 28, 1873, and passed away on November 5, 1944. He was awarded the Nobel Prize in Physiology or Medicine in 1912 for his pioneering



**Figure 20.** Alex Carrel. (Image obtained from Wikimedia Commons, the free media repository)

work in vascular suturing techniques and his contributions to tissue culture and surgery. Carrel, along with his associates, embarked on a groundbreaking mission to unlock the secrets of long-term tissue cultivation. Their remarkable endeavor led them to create and nurture a thriving lineage of chick heart tissue cultures at the iconic Rockefeller Institute in New York City. For over three decades, from 1912 to 1946, these remarkable cultures defied the boundaries of time, pulsating with life and ceaselessly dividing, revealing the immense potential of tissue culture techniques in their quest to unravel the mysteries of cellular growth and regeneration.

This beating culture of an embryonic chicken heart was maintained in a Pyrex flask for over 30 years, much longer than the normal lifespan of a chicken. The results of this experiment challenged the belief at the time that cells have a limited lifespan.

Carrel's work on immortal chick heart tissue cultures had a significant impact on the understanding of cell immortality. His experiments convinced many biologists to accept the idea that immortality is an intrinsic property of all cells, not just those involved in the germ line for passing genetic material to offspring. Carrel's findings sparked further research into cell biology and contributed to the development of tissue culture techniques that are widely used in scientific and medical research today.

The longevity of the cultured chicken heart tissue in Carrel's experiment demonstrated the potential for sustained cell growth and provided insights into the mechanisms underlying cell division and replication. It laid the foundation for future investigations into cell aging, regeneration, and the potential for tissue engineering and regenerative medicine.

Overall, Carrel's experiment with the chicken heart tissue was a groundbreaking contribution to the field of cell biology and has had a lasting impact on our understanding of cellular immortality and tissue culture techniques.

## **Sometimes it's good to be scared**

The famous medical textbook "Gray's Anatomy" was written by Henry Gray, a British anatomist, and Henry Vandyke Carter, an English surgeon and anatomist. One interesting fact about the creation of this book is that it was a collaboration between two colleagues who had vastly different levels of experience and expertise. At the time the book was being written, Gray was a relatively young anatomist who had just finished his medical studies, while Carter was a gifted anatomical artist and a highly experienced surgeon with a deep understanding of human anatomy. Despite their different levels of experience, the two men worked closely together to create a comprehensive and highly detailed textbook that is still used by medical students and professionals around the world today.

In fact, the success of "Gray's Anatomy" is largely due to the combination of Gray's writing skills and Carter's anatomical expertise. Gray was a talented writer who was able to explain complex medical concepts in clear and concise language, while Carter was able to provide highly accurate and detailed illustrations of the human body.

## **Doctors can write?**

In the fascinating world where medicine intertwines with the realms of creativity and storytelling, a remarkable group of physicians have ventured beyond the confines of the clinic and embraced the art of writing. From Anton Chekhov's poignant narratives to Arthur Conan Doyle's

enigmatic detective tales, these physicians-turned-writers have gifted us with literary masterpieces that explore the human condition, blending medical insights with the power of storytelling. Here is a list of physicians who became famous writers:

1. Anton Chekhov (1860–1904): Chekhov was a Russian physician and playwright who is considered one of the greatest short-story writers in world literature. His works, such as “The Seagull” and “Uncle Vanya,” have had a significant impact on the literary world.
2. Arthur Conan Doyle (1859–1930): Doyle was a Scottish physician and writer best known for creating the iconic detective character Sherlock Holmes. His Sherlock Holmes stories and novels, including “A Study in Scarlet” and “The Hound of the Baskervilles,” have captivated readers for generations.
3. William Carlos Williams (1883–1963): Williams was an American poet and physician. He is associated with the modernist movement in poetry and was known for his innovative and imagistic style. Some of his notable works include “Paterson” and “The Red Wheelbarrow.”
4. Mikhail Bulgakov (1891–1940): Bulgakov was a Russian writer and playwright who trained as a physician. He is famous for his novel “The Master and Margarita,” a satirical and fantastical work that explores themes of totalitarianism and artistic freedom.
5. Oliver Sacks (1933–2015): Sacks was a British neurologist and writer known for his compelling and humanistic accounts of neurological disorders. His books, including “The Man Who Mistook His Wife for a Hat” and “Awakenings,” have helped bring awareness and understanding of various neurological conditions to the general public.
6. Walker Percy (1916–1990): Percy was an American physician and writer who explored philosophical and existential themes in his works. His novel “The Moviegoer” won the National Book Award for Fiction in 1962.

These physicians-turned-writers demonstrate the creative and intellectual depth that can be found in the intersection of medicine and literature. Their contributions to both fields have enriched our understanding of the human condition and the power of storytelling.

## Looking at Breasts

The stethoscope was invented by a French physician named René Laennec in 1816. Prior to the invention of the stethoscope, doctors relied on a technique called percussion to listen to sounds inside the body. This involved tapping the patient's chest or abdomen with the fingers and listening for changes in sound that could indicate the presence of fluid or air. However, Laennec found that percussion was not always effective, particularly when trying to listen to sounds in the chest. As a result, he developed a new tool that could amplify internal sounds and make them easier to hear. This tool was the stethoscope, which was initially made from a hollow wooden tube, one end of which was applied to the patient's body and the other end into the doctor's ear (Figure 21). The word stethoscope comes from two Greek words, *stethos* meaning "breast" and *skopein* meaning "look at." The binaural stethoscope, which is the design most used today with two earpieces for listening, was invented by Arthur Leared in 1851. His design was further improved by George Cammann in 1852 for commercial production, which standardized the design of stethoscopes that has been largely maintained up to the present day.

The stethoscope quickly became a critical tool in medical practice, and it revolutionized the way that doctors examine and diagnose patients. It allowed doctors to listen to sounds inside the body with much greater



**Figure 21.** Laennec's stethoscope. (Image obtained from Wikimedia Commons, the free media repository)

clarity and accuracy, and it helped to pave the way for new discoveries in the field of medicine. Today, the stethoscope remains an essential tool in medical practice, and it is used by doctors and other healthcare professionals around the world to diagnose a wide range of conditions, from heart disease and lung disorders to digestive problems and more.

## Otoscope

The otoscope, a medical device used to examine the ears, was invented by a German physician named Friedrich von Tröeltsch in the mid-19th century. Prior to the invention of the otoscope, doctors used a variety of improvised tools to examine the ear, including candles, mirrors, and even small animals such as mice.

Von Tröeltsch's otoscope was a significant improvement over these earlier methods, as it allowed doctors to view the inner ear in much greater detail. The device consisted of a handle, a light source, and a speculum, which could be inserted into the ear canal to provide a clear view of the eardrum and other structures within the ear. Since its invention, the otoscope has become a critical tool in medical practice, and it is used by doctors and other healthcare professionals to diagnose a wide range of ear-related conditions, from infections and inflammations to hearing loss and more. It has also been instrumental in the development of new treatments and therapies for ear-related disorders, and it continues to play a vital role in medical research and education today.

## Ein bisschen verrückt

Dr. Werner Theodor Otto Forßmann, a German physician, once inserted a catheter into his own heart to develop cardiac catheterization! In 1929, Dr. Forßmann was working as a surgical assistant and was interested in finding a way to examine the heart without performing open-heart surgery, which was extremely risky at the time. To do this, he inserted a catheter into his own arm and threaded it through his veins until it reached the right side of his heart, which he was able to visualize using X-ray imaging.

Despite the obvious risks, Dr. Forßmann went ahead with the experiment and was able to demonstrate the safety and efficacy of cardiac catheterization. Did Forßmann stop there? Nein! He went on to catheterize his own heart eight more times that year, taking x-rays and measurements while it was inside his heart. His pioneering work laid the foundation for modern cardiology and has saved countless lives by allowing doctors to diagnose and treat heart conditions without invasive surgery. Interestingly, Dr. Forßmann's self-experimentation did not go unnoticed — he was initially criticized by his colleagues for taking such a risky and unconventional approach. However, over time his work was recognized as groundbreaking, and he was awarded the Nobel Prize in Physiology or Medicine in 1956 for his contributions to the field of cardiology.

## **Way too into his work**

Walter Freeman was the American neurologist who developed the neurosurgical procedure called the transorbital lobotomy. He was so enthusiastic about the technique that he was also known for driving around the United States in a van he called the “Lobotomobile.” Freeman would travel from state to state, performing lobotomies on patients in mental hospitals, often without their consent or proper medical oversight. He believed that the procedure was a quick and effective way to treat mental illness and improve patients' quality of life.

The results of Walter Freeman's lobotomies varied, with some cases yielding disastrous outcomes. Freeman performed a significant number of lobotomies, with more than 3,500 procedures by the late 1960s. However, the practice fell out of favor in the mid-1950s with the introduction of less extreme mental health treatments such as antidepressants and antipsychotics.

While Freeman's methods were highly controversial and are now widely discredited, he was a colorful figure in the history of medicine and his legacy continues to be debated. The “Lobotomobile” is just one example of the unorthodox methods and larger-than-life personality that Freeman was known for.



## **Peekaboo**

Dr. William Beaumont, an American Army surgeon, made groundbreaking discoveries about the digestive system by studying a patient with a hole in his stomach. In 1822, Beaumont was stationed at Fort Mackinac on Mackinac Island, Michigan when he encountered a young French-Canadian fur trader named Alexis St. Martin who had been shot in the stomach with a musket. Despite his injuries, St. Martin survived but was left with a permanent hole in his abdominal wall and stomach, which allowed Beaumont to observe the inner workings of his digestive system in real time.

Over the course of several years, Beaumont conducted numerous experiments on St. Martin's stomach, including inserting food and liquids through the hole in the abdominal wall and then observing their digestion. His research allowed him to make important discoveries about the role of gastric juices in digestion and helped to advance the field of gastroenterology. Until Beaumont's experiments, it was thought that food was digested only through the mashing, pounding and squeezing of the teeth, tongue, and stomach muscles. It is worth noting that modern medical procedures, such as gastroscopy, utilize a small camera on a flexible tube to visualize the inside of the stomach. Today, Beaumont is considered one of the founding fathers of modern gastroenterology, and his pioneering work on the digestive system is still studied and admired by medical professionals around the world.

## **Jawohl cocaine!**

The German physician August Bier (Figure 22) once injected himself with cocaine to develop a new method of anesthesia. This occurred as Bier was seeking a way to provide pain relief during surgery without the use of ether or chloroform, which were highly flammable and could cause serious side effects. After experimenting with various substances, Bier settled on cocaine, which was known for its anesthetic properties. To test his new method, in 1898, Bier injected a large dose of cocaine into his spinal cord and then had a friend perform minor surgery on his arm. The procedure was a success, he felt no pain at all! These self-experiments with cocaine in his own spinal fluid allowed Bier to explore the effects and

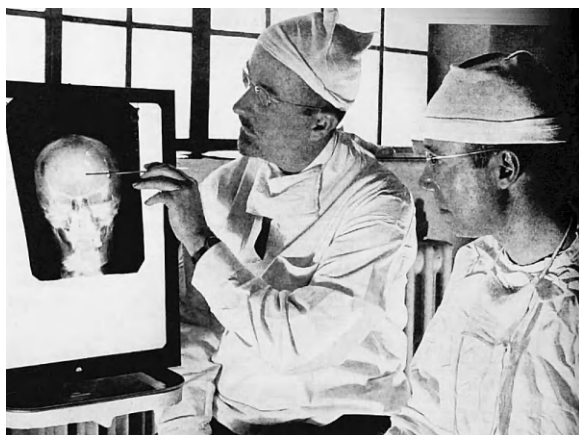


**Figure 22.** August Bier. (Image obtained from Wikimedia Commons, the free media repository)

effectiveness of spinal anesthesia, contributing to the development of regional anesthesia techniques. Later that day, Bier administered a spinal anesthetic using cocaine to his assistant, Hildebrandt. After injecting cocaine into his spine, Hildebrandt experienced a temporary loss of movement and sensation in his lower extremities. To demonstrate the effectiveness of the anesthesia, a series of increasingly intense stimuli were applied. These included the insertion of a needle into Hildebrandt's leg to the depth of the femur, a strong hit to the shins with a metal hammer, the vigorous tearing out of pubic hair, and significant pressure and pulling applied to the testicles. Fortunately, Hildebrandt felt none of it, though he may have wondered by Bier was being so thorough. Bier's new method of spinal anesthesia went on to revolutionize the field of surgery, making many types of procedures safer and more comfortable for patients. While the use of cocaine for anesthesia has fallen out of favor due to its addictive properties and potential for abuse, Bier's groundbreaking work paved the way for the development of safer and more effective anesthetics.

## **Ice Ice Baby**

Walter Freeman (Figure 23), a prominent American neurologist and psychiatrist, was involved in the treatment of Rosemary Kennedy, the sister of President John F. Kennedy. However, it is important to note that the



**Figure 23.** Dr. Freeman. (Image obtained from Wikimedia Commons, the free media repository)

specific details and nature of Freeman’s involvement in Rosemary Kennedy’s treatment are a matter of historical debate and controversy.

In 1941, at the age of 23, Rosemary Kennedy underwent a procedure known as a prefrontal lobotomy, which was intended to alleviate her behavioral and emotional difficulties. The lobotomy was performed by Walter Freeman and his surgical partner, James W. Watts, using a technique called the transorbital lobotomy or “ice pick” lobotomy. This procedure involved inserting a sharp instrument through the eye socket and into the brain to sever neural connections. The results of Rosemary Kennedy’s lobotomy were devastating. The procedure left her with severe intellectual and functional impairments, essentially robbing her of her independence and ability to communicate effectively. Rosemary Kennedy’s case is often cited as an example of the ethical and medical controversies surrounding the use of lobotomies, particularly in cases where the procedure was performed without informed consent or with inadequate consideration of potential risks and long-term consequences.

It is worth noting that Walter Freeman was a prominent advocate and practitioner of lobotomies during the mid-20th century and played a significant role in popularizing the procedure in the United States. However, his methods and approach have since been widely criticized, and lobotomies are no longer considered a legitimate or ethical medical treatment for psychiatric conditions.

## **Painless Horace**

Horace Wells' discovery of the anesthetic properties of nitrous oxide is a fascinating story that highlights the power of curiosity and experimentation in scientific discovery. Prior to Wells' discovery, dental procedures were incredibly painful and often resulted in patients suffering for days or even weeks after the procedure. Wells, who was a practicing dentist himself, was determined to find a way to alleviate his patients' pain. Wells first witnessed the anesthetic properties of nitrous oxide at a traveling carnival show, where a man inhaled the gas and began to laugh uncontrollably. Later in the show, the man fell and injured himself, but appeared to feel no pain. This observation piqued Wells' curiosity and led him to experiment with nitrous oxide in his dental practice.

On December 11, 1844, Wells used nitrous oxide to extract a tooth from one of his patients, who reported feeling no pain during the procedure. Encouraged by this success, Wells began using nitrous oxide regularly in his dental practice and even gave public demonstrations to showcase the effectiveness of the gas as an anesthetic. Despite Wells' early success with nitrous oxide, his reputation was tarnished when a public demonstration in which he used the gas on a patient went awry. The patient, who was not properly sedated, began to cry out in pain during the procedure, and the audience turned against Wells, accusing him of being a fraud. Wells' career suffered as a result of this incident, and he eventually became addicted to chloroform and committed suicide in 1848.

However, Wells' discovery of the anesthetic properties of nitrous oxide was not in vain. His experiments paved the way for the development of other anesthetics, such as ether and chloroform, and helped to revolutionize the field of dentistry and medicine as a whole. Today, nitrous oxide is still used as a mild sedative and analgesic in dental and medical procedures.

## **John “Pacemaker” Hopps**

John Hopps's accidental discovery of the pacemaker is a fascinating example of how scientific breakthroughs can often come from unexpected places. Hopps was an electrical engineer who was working on a machine to regulate the body's temperature when he stumbled upon the discovery that would change the field of cardiology forever. In 1949, while working

on his temperature-regulating machine, Hopps was using an oscilloscope to monitor electrical activity in a dog's heart. To his surprise, he noticed that the heart rate of the dog began to slow down when he applied a high-frequency electrical current to it. Intrigued by this observation, Hopps began to experiment with the electrical stimulation of the heart and eventually developed the first cardiac pacemaker. The first pacemaker that Hopps developed was a large and unwieldy device that was powered by a vacuum tube and required an external power source. However, the device proved to be effective in regulating heart rate and was eventually refined and made smaller by other researchers in the field.

Today, pacemakers are small, implantable devices that use electrical impulses to regulate the heartbeat in people with certain heart rhythm disorders. They are a life-saving technology that has improved the quality of life for millions of people around the world. Hopps's accidental discovery made a significant impact on the field of cardiology and led to the development of other technologies, such as implantable defibrillators and heart pumps, that have helped to extend and improve the lives of people with heart conditions.

## **Acid Rock**

A medical discovery made inadvertently is the discovery of the hallucinogenic properties of LSD or lysergic acid diethylamide. In 1943, Swiss chemist Albert Hofmann was working on the synthesis of a new drug when he accidentally ingested a small amount of LSD-25. Hofmann reported experiencing intense hallucinations and vivid sensory experiences, which led him to investigate the psychoactive properties of the drug further. Hofmann's accidental discovery of LSD's hallucinogenic properties revolutionized the field of psychiatry and led to the development of a new class of drugs known as psychedelics. In the 1950s and 1960s, LSD and other psychedelics were studied extensively for their potential therapeutic applications in the treatment of mental health disorders, such as depression and anxiety.

Although the use of psychedelics in psychiatry declined after they were made illegal in the 1970s, recent research has shown promising results in the use of psychedelics, such as psilocybin (the active ingredient

in magic mushrooms) and MDMA (also known as ecstasy), in the treatment of conditions such as PTSD, major depression, and addiction. Hofmann's accidental discovery of the hallucinogenic properties of LSD has had a lasting impact on the field of psychiatry and has challenged our understanding of consciousness and the mind. It is a reminder that unexpected discoveries can sometimes lead to significant breakthroughs in science and medicine.

## **The Pill**

A fun and interesting fact about another medical discovery made by accident is the discovery of the contraceptive pill. In the 1950s, American biologist Gregory Pincus was conducting research on fertility when he stumbled upon the discovery that would revolutionize contraception. Pincus was experimenting with hormones in rats and discovered that high doses of progesterone prevented ovulation. He began to explore the potential of using hormones to prevent pregnancy in humans and eventually collaborated with gynecologist John Rock to develop the first oral contraceptive pill.

During clinical trials, the researchers found that the pill was highly effective at preventing pregnancy, with a success rate of 98%. The discovery of the contraceptive pill not only gave women greater control over their reproductive health, but also had a significant impact on social and cultural attitudes towards sexuality and gender roles. The accidental discovery of the contraceptive pill highlights the power of serendipity in scientific discovery and its potential to transform society. Today, the contraceptive pill is one of the most widely used methods of birth control around the world, with an estimated 100 million women using it as a form of contraception.

## **Play that funky music ...**

Another medical discovery made by accident is the discovery of the pain-relieving properties of music during surgery. In the 1970s, an orthopedic surgeon named Dr. George S. Klein was performing surgery on a patient who was awake and listening to music through headphones. To his

surprise, Dr. Klein noticed that the patient appeared to be in less pain and required less anesthesia than his other patients. Intrigued by this observation, Dr. Klein began to investigate the potential of using music as a form of pain relief during surgery. He conducted a series of studies that found that listening to music before and during surgery can significantly reduce anxiety and pain levels in patients, allowing them to require less anesthesia and experience fewer complications during and after surgery.

Today, music therapy is used in a variety of medical settings to help manage pain, reduce anxiety, and improve mood in patients. From pre-operative music therapy to post-operative rehabilitation, the healing power of music has been shown to have a wide range of benefits for patients. The accidental discovery of the pain-relieving properties of music is a testament to the power of observation and the potential for unexpected discoveries to transform the field of medicine. It also highlights the importance of holistic and patient-centered care, recognizing that factors such as emotional well-being and personal preferences can have a significant impact on overall health outcomes.

## **Clyde Crash Cart**

A fun and interesting fact about the medical contributions of nurses is the invention of the crash cart by nurse Anita Dorr in the 1960s. Dorr was a nurse in a cardiac care unit and observed that when a patient went into cardiac arrest, it took too long to gather the necessary equipment to resuscitate them. This delay in treatment often led to poor outcomes for the patient. Dorr decided to act and created a portable cart that was stocked with all the necessary equipment and medications needed to respond quickly to a patient in cardiac arrest. She called it the “crash cart” and it soon became a staple in hospitals around the world, improving the response time and outcomes of patients experiencing cardiac arrest.

The invention of the crash cart by nurse Anita Dorr is just one example of the many contributions that nurses have made to the field of medicine. Nurses are often the first point of contact for patients in medical settings, providing compassionate care, administering medications, and monitoring vital signs. They play a critical role in patient care and are essential members of the healthcare team.



**Figure 24.** A man undergoing a polygraph. (Image by standret on Freepik)

## Lie Detector

The polygraph, also known as a lie detector (Figure 24), dates to the late 19th century. The concept of detecting deception through physiological indicators can be traced to the work of Italian criminologist Cesare Lombroso, who believed that certain physical characteristics such as a sloping forehead, ears of unusual size, asymmetry of the face, prognathism, excessive length of arms, asymmetry of the cranium, and other “physical stigmata,” were associated with criminal behavior.

In the early 20th century, several researchers began exploring the idea of using physiological measurements to detect lies. One of the pioneers in this field was William M. Marston, an American psychologist who developed the systolic blood pressure test in the 1910s. This test involved measuring changes in blood pressure while a person answered specific questions, with the assumption that lies would elicit a physiological response of high blood pressure. The modern polygraph as we know it today was further developed in the 1920s by John Augustus Larson, a medical student at the University of California, Berkeley. Larson incorporated additional physiological measures such as respiration and galvanic skin response (changes in electrical conductivity of the skin) into the lie detection process.

The polygraph gained popularity in the mid-20th century, particularly in the field of law enforcement. It was used in criminal investigations and as a tool for screening potential employees, especially in sensitive positions



such as law enforcement and government agencies. However, its reliability and validity have been the subject of ongoing debate and controversy.

Over the years, advancements have been made in polygraph technology, including the introduction of computerized systems for data collection and analysis. Despite these advancements, the accuracy and effectiveness of the polygraph in detecting deception remain contentious issues. Many experts argue that while the polygraph can detect physiological changes, it is not foolproof and can be influenced by various factors such as anxiety or countermeasures employed by individuals. Due to these limitations, the use of polygraph results as evidence in courts varies across jurisdictions. Some countries allow polygraph evidence, while others consider it inadmissible. In recent years, alternative methods of deception detection, such as neuroimaging techniques, have emerged as potential alternatives to the polygraph.

## **Yes, Virginia, there is an Apgar Score**

Virginia Apgar was a professor of anesthesiology at Columbia University (Figure 25). She noticed that there was no standardized way of quickly and accurately assessing the health of newborn infants.

To address this problem, Apgar developed a scoring system that evaluated five factors in newborns: appearance, pulse, grimace, activity, and respiration. The score, which ranges from 0 to 10, is determined by evaluating each factor on a scale of 0 to 2, with a maximum score of 10 indicating a healthy newborn.

The Apgar score was initially intended to be a temporary assessment tool. Virginia Apgar originally developed the score in 1952 as a quick and simple way for doctors and nurses to assess the health of newborns in the first few minutes after birth. However, the score was so effective and easy to use that it soon became the standard for assessing the health of newborns worldwide and is still used today, more than 70 years later. The Apgar score has also had an impact beyond the field of neonatology. The five factors that are evaluated in the score have been used as a model for evaluating the health of patients in other medical settings as well. The Apgar score has been adapted for use in assessing the health of patients undergoing surgery and for evaluating the general health of critically ill patients.

Another interesting fact about the Apgar score is that Virginia Apgar was not initially recognized for her contributions to medicine. Despite her



**Figure 25.** Virginia Apgar. (Image obtained from Wikimedia Commons, the free media repository)

groundbreaking work in neonatology, she was denied a promotion at her hospital due to her gender and eventually left the field of medicine to pursue a career in public health. It was only until later in her life that she was recognized for her contributions and received numerous awards and honors, including induction into the National Women’s Hall of Fame.

## **EKG**

The EKG was invented by a Dutch physiologist named Willem Einthoven in the early 20th century. “EKG” stands for “Elektrokardiogramm,” which is the German word for electrocardiogram. Though he was Dutch, Einthoven published his research in German, so the abbreviation “EKG” became widely used in German-speaking countries. Einthoven’s invention of the EKG revolutionized the field of cardiology by allowing doctors to non-invasively and accurately measure the electrical activity of the heart. The EKG has since become a vital tool for diagnosing and monitoring a wide range of heart conditions, from arrhythmias to heart attacks.

## **EEG**

EEG stands for “electroencephalogram.” It is a medical test that measures and records the electrical activity of the brain. The test involves placing small electrodes on the scalp and recording the electrical impulses generated by the neurons in the brain. The resulting recording, called an EEG, can provide valuable information about the brain’s functioning, and can be used to diagnose a variety of neurological conditions, including epilepsy, sleep disorders, and brain tumors, among others. The EEG was initially met with skepticism by the medical community. In the early 20th century, the idea of measuring electrical activity in the brain seemed far-fetched to many doctors and scientists, and the first EEG recordings were dismissed as mere artifacts or noise.

The inventor of the EEG, a Polish physician named Władysław Dega, struggled to convince his colleagues of the validity and potential of his invention. He spent years refining the technology and improving the accuracy of the readings, but it was not until the 1930s that the medical community began to recognize the value of the EEG as a diagnostic tool for neurological disorders.

Today, the EEG is widely used in clinical practice and has revolutionized the field of neuroscience by providing a non-invasive way to measure brain activity in real time. The EEG has been instrumental in diagnosing and monitoring a wide range of neurological conditions, from epilepsy to Alzheimer’s disease.

## **MRI**

The MRI, known as magnetic resonance imaging, was developed in part thanks to the discovery of nuclear magnetic resonance by two American physicists, Felix Bloch and Edward Purcell, in 1946. Bloch and Purcell discovered that the nuclei of atoms could be made to emit electromagnetic signals when exposed to a magnetic field. This discovery was largely theoretical and had no immediate practical applications, but in the 1970s, scientists began to experiment with nuclear magnetic resonance to produce detailed images of the body’s internal structures. The resulting technology, which combined nuclear magnetic resonance with computer imaging, became the MRI.

One of the early pioneers of MRI technology was a British physicist named Sir Peter Mansfield. Mansfield's research focused on developing faster and more efficient MRI scanning techniques, which allowed doctors to produce detailed images of the body in a matter of minutes rather than hours. Mansfield's work earned him the Nobel Prize in Physiology or Medicine in 2003, along with American physicist Paul Lauterbur, who was also instrumental in the development of MRI technology. Today, the MRI is a widely used medical tool that allows doctors to diagnose and monitor a variety of conditions, from soft tissue injuries to neurological disorders.

## Roentgen rhymes with thinkin', sort of

The discovery of X-rays for medical diagnosis was accidental! In 1895, German physicist Wilhelm Conrad Roentgen was experimenting with cathode rays when he noticed a mysterious glow coming from a nearby screen coated with a fluorescent material. He realized that the cathode ray



**Figure 26.** The first X-ray image. (Image obtained from Wikimedia Commons, the free media repository)

tube was emitting a type of ray that could penetrate through many substances, including human tissue.

Roentgen quickly realized the potential of this discovery for medical diagnosis and began experimenting with using these rays, which he called “x-rays,” to produce images of the human body. He famously took the first x-ray image of his wife’s hand, which revealed the bones and structure of her hand in remarkable detail (Figure 26).

Roentgen’s discovery revolutionized the field of medicine, allowing doctors to see inside the body without the need for invasive procedures. X-rays quickly became a standard tool for diagnosing a wide range of medical conditions, from broken bones to tumors.

## **Chemo**

Chemotherapy was discovered during World War II. Its discovery was inspired by the use of mustard gas as a chemical weapon. During World War II, a large group of people were exposed to mustard gas, a toxic gas that caused severe blistering and burns on the skin and in the respiratory system. This occurred when an allied ship anchored in the harbor in the southern Italian town of Bari, was bombed by the German Airforce. This ship contained a large amount of mustard gas stored in its hold. When the gas was released a large number of soldiers, sailors and civilians were exposed. US Researchers that were dispatched to study the effects of mustard gas discovered that it had a surprising side effect — it suppressed the production of white blood cells in the body. This led scientists to wonder if a similar effect could be used to combat leukemia, a cancer that is characterized by high levels of white blood cells, which at the time was largely untreatable.

Researchers began experimenting with a variety of chemicals that might have a similar effect on cancer cells, eventually settling on nitrogen mustard, a compound derived from mustard gas. In 1942, two American pharmacologists, Louis Goodman and Alfred Gilman, successfully used nitrogen mustard to treat a patient with lymphoma, a type of cancer of the immune system.

The success of nitrogen mustard as a chemotherapy agent led to further research into the use of other chemicals to treat cancer, and eventually to the development of a wide range of chemotherapy drugs that are still used today to treat cancer.

## Shining examples of work-related injuries

The Radium Girls were a group of female factory workers in the early 20th century who were exposed to large amounts of radium while painting watch dials with luminous paint (Figure 27). They worked for the United States Radium Corporation in Orange, New Jersey. One interesting medical fact about the radium girls is that their suffering and deaths played a crucial role in advancing the understanding of radiation toxicity and radiation safety.

The girls' work involved licking the tips of their paintbrushes to create a fine point, which led to them ingesting significant amounts of radium over time. Many of them developed serious health problems, including bone fractures, anemia, and cancer, and some died because of their exposure to radium. Their bodies were so radioactive at the time of their deaths that these women had to be buried in lead lined coffins to protect the funeral workers. Their suffering and deaths drew public attention to the dangers of radium exposure and led to significant improvements in workplace safety standards and radiation protection measures. The case of the Radium Girls also led to the establishment of the first set of occupational health standards in the United States, which aimed to protect workers from exposure to harmful substances and promote workplace safety.

Despite the tragic circumstances of their deaths, the radium girls' legacy lives on as an example of the importance of workplace safety and



**Figure 27.** Woman applying radium to a clock face with a brush. (Image obtained from Wikimedia Commons, the free media repository)

the need for responsible handling of hazardous materials. Their story also highlights the crucial role that medical research and scientific inquiry can play in improving public health and advancing our understanding of the world around us.

## Medical Eponyms

Lou Gehrig (Figure 28), the famous baseball player, is associated with a disease that is now commonly known as “Lou Gehrig’s disease,” or amyotrophic lateral sclerosis (ALS). Gehrig was a beloved player for the New York Yankees in the 1920s and 1930s. Nicknamed “The Iron Horse,” he was known for his strength, durability, and strong work ethic. However, in 1939, Gehrig was forced to retire from baseball due to symptoms that were later diagnosed as ALS. Despite his diagnosis, Gehrig remained an inspiration to many, and his farewell speech at Yankee Stadium, in which he famously declared himself “the luckiest man on the face of the earth,” remains one of the most memorable moments in baseball history. Although



**Figure 28.** A photograph of Lou Gehrig. (Image obtained from Wikimedia Commons, the free media repository)

there is still no cure for ALS, the disease has become closely associated with Gehrig's legacy, and his name continues to inspire research and advocacy efforts aimed at finding a cure for this devastating condition.

Hans Asperger, an Austrian pediatrician, is associated with a condition now known as Asperger's syndrome, which is a type of autism. Asperger's syndrome is characterized by difficulty with social interaction, as well as restricted interests and repetitive behaviors. Although Asperger first described the condition in a 1944 paper, it was not widely recognized until the 1990s, when it became increasingly recognized as a distinct form of autism.

Thomas Hodgkin (Figure 29), a British physician, is associated with a type of cancer now known as Hodgkin's lymphoma. Hodgkin's lymphoma is a type of cancer that affects the lymphatic system and is characterized by enlarged lymph nodes and the presence of abnormal cells called Reed-Sternberg cells. Although the disease was first described by Hodgkin in the 19th century, it was not until the 20th century that effective treatments were developed, including radiation therapy and chemotherapy. In addition to his contributions to the understanding of Hodgkin's



**Figure 29.** A photograph of Thomas Hodgkin. (Image obtained from Wikimedia Commons, the free media repository)



lymphoma, Hodgkin was also a pioneer in the field of public health and played a key role in the establishment of the British Medical Association. Today, his name is closely associated with this rare and often treatable form of cancer, and his legacy continues to inspire new research and treatment options for patients with Hodgkin's lymphoma.

## **Semmelweis, Semmelweis every morning you greet me ...**

Dr. Ignaz Semmelweis was a Hungarian doctor who made a significant discovery that saved countless lives. In the mid-19th century, Dr. Semmelweis worked at a maternity ward in Vienna, Austria. At the time, a deadly disease known as "childbed fever," was rampant among new mothers, and the mortality rate was alarmingly high. Child bed fever or puerperal fever is called by a bacterial infection in the mother's reproductive tract following birth. Dr. Semmelweis noticed that the mortality rate at his hospital was much higher than at a nearby hospital that was staffed mainly by midwives. He began investigating the difference and discovered that the main difference was that the midwives washed their hands regularly before examining patients, whereas the doctors did not. Dr. Semmelweis hypothesized that the doctors were spreading infection by not washing their hands between patients. To test his theory, he instituted a handwashing policy at his hospital, and the mortality rate dropped significantly, falling from 18% to 2%. Despite his success, Dr. Semmelweis was met with resistance from his colleagues, who believed that his theory was ridiculous. He was eventually dismissed from his position and faced ridicule from the medical community. It was only years later, after his death, that his theories were proven to be correct, and handwashing became standard practice in medicine. Dr. Semmelweis's discovery saved countless lives and revolutionized the way doctors thought about hygiene and infection control.

## **Oh yeah? Hold my beer ...**

Dr. Leonid Rogozov was a Soviet physician who was stationed at a research station in Antarctica in 1961. While at the station, Dr. Rogozov

began experiencing severe fever, abdominal pain and other symptoms of acute appendicitis. Unfortunately, the station was located over 1,000 miles from the nearest hospital and bad weather made it impossible to evacuate him by plane. With no other options, Dr. Rogozov made the bold decision to perform the surgery on himself. He enlisted the help of a meteorologist and a truck driver to assist him, but he knew that he would have to perform the surgery while awake and using only local anesthesia. Dr. Rogozov spent two hours performing the surgery, which involved making an incision in his own abdomen and removing his inflamed appendix. He later wrote in his diary that the experience was “unbearable pain” and that he had to pause several times to rest. Despite the difficult circumstances, Dr. Rogozov was able to successfully perform the surgery, and he recovered fully from his appendicitis. His story made headlines around the world and is still studied by medical professionals today as an example of extreme surgical skill and bravery. Dr. Rogozov went on to have a successful medical career and was awarded numerous honors for his contribution to science and medicine.

## **Like a bladder stone**

A bladder stone is a hardened mineral deposit composed of various substances including calcium, oxalate, and phosphate that can crystalize from urine. They occur when the bladder is unable to empty completely. This usually occurs because of an enlarged prostate gland. Bladder stones can lead to excruciating pain in the abdomen and pelvis, as well as frequent urinary tract infections and even more difficulty emptying one’s bladder.

In 1651, a Dutch blacksmith named Jan de Doot faced an excruciating dilemma. Afflicted by a urinary bladder stone and haunted by harrowing experiences he had when previous surgeons or “stone cutters” removed his bladder stones, he resolved to take matters into his own hands, quite literally. Jan made a daring choice that would go down in medical history — he decided to perform the surgery on himself.

Fearing the agony of traditional treatments, Jan orchestrated an audacious plan. He sent his wife away on a peculiar errand and called upon his brother for assistance. Bracing himself for the pain, Jan initiated the

procedure, determined to be the master of his fate. With remarkable courage, he used a knife to make a deep incision in his perineum. The perineum is that area in the body between the scrotum and anus.

Jan's resolute endeavor involved a blend of surgical skill and steely determination. With a knife in hand and his brother's support, he cut into his flesh without any anesthesia, and entered his urinary bladder. He aimed to access the troublesome bladder stone. In an astonishing display of self-surgery, he successfully extracted the stone, though not without tearing his bladder in the process. The stone, a formidable four ounces in weight, tumbled to the ground, symbolizing Jan's triumph over excruciating agony. Only after this extraordinary feat did Jan finally seek the aid of a healer. The healer skillfully stitched up Jan's wound, sealing the chapter of this unparalleled surgical saga. Remarkably, Jan's bold act proved successful, granting him a newfound lease on life, with records suggesting he lived for at least five years after this harrowing ordeal.

Jan de Doot's tale of resilience and surgical audacity was documented in "Observationes medicae" in 1672, chronicling 230 medical cases of



**Figure 30.** Jan de Doot holding his bladder stone and the knife he used for his self-surgery.

the time. His incredible stone, reported to be the size of a hen's egg (Figure 30), became an emblem of his courage and resourcefulness. Jan had the stone encased in gold, preserving it as a testament to his extraordinary feat.

## **Sleep deprivation pioneers: The endurance of Randy Gardner and Peter Trip**

It is said that humans are the only animals that willingly delay sleep. In fact, the exploration of human endurance and the limits of sleep deprivation has long fascinated scientists and the general public alike. Two individuals, Peter Trip and Randy Gardner, have etched their names into the annals of history with their remarkable sleep deprivation experiments conducted in the mid-20th century. While both shared the goal of staying awake for extended periods, their journeys and motivations were distinct.

Peter Trip, a popular radio DJ based in New York City, sought to combine entertainment and philanthropy in his quest to remain awake. Trip's experiment was known as the "Wakeathon."

Beginning on April 8, 1959, Peter Trip's journey into sleeplessness lasted for 201 hours and 10 minutes, equivalent to over 8 days and 9 hours. Trip's motivations were not purely scientific; he aimed to raise funds for charity, particularly the March of Dimes, which fought polio and birth defects. Trip broadcast his show live, from a glass booth in Times Square, so everyone could see him awake and performing. Listeners pledged donations for each hour he managed to stay awake. Medical doctors and psychologists examined him frequently to make sure he was safe. While Trip's feat was not without its challenges. His sleep-deprived state led to hallucinations, mood swings, and extreme exhaustion, all under the watchful eye of medical professionals. After several days, Trip began to hallucinate, seeing people who were not there and stating that other people had "cobwebs on their faces" and that his shoes were "full of spiders."

In 1964, a 17-year-old high school student from San Diego, California, named Randy Gardner embarked on a daring experiment that would challenge the very essence of human sleep patterns. Gardner's goal was clear: he aimed to stay awake for as long as possible, pushing the boundaries of

sleep deprivation to an unprecedented level. With a large helping of teenage hubris, he felt he could best Trip's record. Gardner's experiment began on January 25, 1964, and continued for a staggering 264 hours, approximately 11 days. His motivation was twofold — personal curiosity and a desire to contribute to scientific understanding. Throughout the experiment, Gardner was closely monitored by a team of medical professionals led by Dr. William C. Dement, a renowned sleep researcher. The effects of sleep deprivation on Randy Gardner were profound. As the days wore on, he experienced extreme fatigue, mood swings, memory lapses, and vivid hallucinations. Gardner's resilience demonstrated the dramatic toll that sleep deprivation takes on physical and mental well-being. His record-breaking feat was eventually recognized by the Guinness World Records, solidifying his place in history.

Peter Trip and Randy Gardner, though conducting their experiments in the same era, approached sleep deprivation from different angles. Gardner's experiment was driven by curiosity and a desire to contribute to scientific knowledge, whereas Trip's "Wakeathon" had a strong philanthropic component, raising funds for a charitable cause. Both experiments showcased the severe consequences of sleep deprivation on the human body and mind. Hallucinations, mood swings, and extreme fatigue were common denominators in their experiences. While Gardner holds the Guinness World Record for the longest recorded period without sleep, Trip's feat remains a significant example of the effects of sleep deprivation in the public eye. The sleep deprivation experiments of Randy Gardner and Peter Trip serve as enduring symbols of human endurance and the limits of wakefulness. Gardner's scientific curiosity and Gardner's philanthropic endeavor brought attention to the profound effects of sleep deprivation. These individuals' journeys into sleeplessness continue to captivate our imaginations and remind us of the vital importance of sleep for our physical and mental well-being. Randy Gardner and Peter Trip, pioneers in their own right, have left an indelible mark on the history of sleep research and the fascination with the human ability to defy the need for rest.

## **Timber!**

The story of the chain saw's evolution from a surgical instrument to a powerful tool in the timber industry is a testament to human ingenuity and

adaptability. Two Scottish doctors, John Aitken and James Jeffray, played pivotal roles in this transformative journey during the late 18th century. Their pioneering work not only impacted the fields of surgery and medicine but also laid the groundwork for the modern chainsaw we are familiar with today.

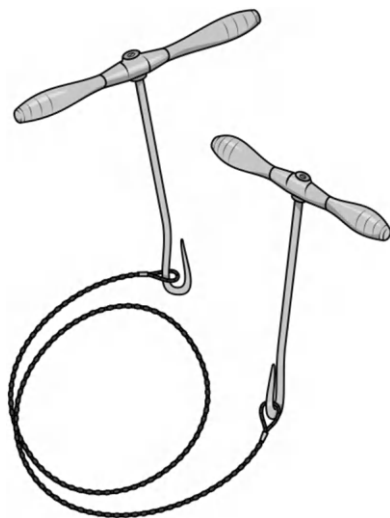
In the late 18th century, the practice of medicine faced significant challenges, particularly in the realm of surgery. John Aitken, a Scottish physician with a penchant for innovation, developed an early prototype of a chain saw around 1783 to 1785. Aitken's motivation was to improve the precision and efficiency of surgical procedures, specifically symphysiotomy (the division of the pubic symphysis in childbirth) and the excision of diseased bone. Aitken's contribution: Aitken's chain saw featured a fine serrated link chain designed to cut on the concave side, making it suitable for surgical precision. His innovative approach was detailed in his work, *Principles of Midwifery or Puerperal Medicine* (1785), where he illustrated and explained the concept. He even utilized this novel tool in his dissecting room, pushing the boundaries of surgical technology.

Dr. James Jeffray, another Scottish physician, independently conceived the idea of the chain saw for medical applications around the same time. However, it was not until 1790 when he could bring this concept to fruition, leading to significant contributions in the field of surgery. Publication of Surgical Advancements: In 1806, James Jeffray published *Cases of the Excision of Carious Joints* alongside the observations of H. Park and P. F. Moreau. This publication was a crucial milestone in the evolution of surgical techniques. Park and Moreau had successfully executed the excision of diseased joints, particularly the knee and elbow. Jeffray emphasized that the use of the chain saw allowed for smaller incisions, reducing the risk to adjacent neurovascular bundles.

While the concept of using chain saws in surgery was a heroic and innovative one, it came with complications that limited its widespread adoption among obstetricians (Figure 31). However, Jeffray's ideas gained acceptance over time, especially with the advent of anesthesia, which made surgical procedures less painful and risky. As the 19th century progressed, mechanized versions of the chain saw emerged. The chain saw, once a valuable surgical instrument, began to find applications outside of the medical field. Its utility was recognized in the timber industry, where it could efficiently cut through logs and trees. In the later 19th



**Figure 31.** A chainsaw osteotome, an instrument used for cutting bone, owned by 19th century German physician Bernhard Heine. (Image obtained from Wikimedia Commons, the free media repository)



**Figure 32.** Gigli saw. (Image obtained from Wikimedia Commons, the free media repository)

century, the chain saw in its existing form began to be phased out in surgery. It was replaced by the Gigli twisted wire saw (Figure 32), which offered greater control and precision in surgical procedures. However, the chain saw had already made its mark in history as a crucial surgical tool during much of the 19th century.

## Chapter 4

# Did You Know This About Your Body?

### **It's cheaper than aspirin**

The human body can produce its own natural painkillers called endorphins. Endorphins are a group of hormones that are produced by the body in response to pain, stress, and physical activity. They are often referred to as the body's natural painkillers because they can help to alleviate pain and induce feelings of pleasure and well-being.

Endorphins work by binding to the same receptors in the brain that are targeted by opioid pain medications, such as morphine and codeine. However, unlike opioid drugs, endorphins are not addictive and do not produce harmful side effects. Endorphins are released during activities such as exercise, sex, and even eating spicy food. This is why some people experience a “runner's high” after a long run or feel a sense of euphoria after eating a particularly spicy meal.

In addition to their pain-relieving properties, endorphins also play a role in regulating mood, appetite, and the immune system. So, the next time you're feeling stressed or in pain, remember that your body has its own built-in pain relief system that can be activated through simple activities like exercise or enjoying a spicy meal.

### **It's the best medicine**

Sharing a joke with someone or attending a comedy club brings laughter, which can be good for the heart. According to a study published in the



journal *Heart*, laughter can improve blood flow and reduce inflammation in the body, both of which are important factors for heart health.

The study involved 20 healthy adults who watched either a comedy or a documentary while their heart health was monitored. The results showed that after watching the comedy, the participants had improved blood flow and lower levels of inflammation compared to those who watched the documentary. This is because laughter triggers the release of endorphins, which are natural painkillers that also promote feelings of well-being. Endorphins also improve the function of the endothelium, which is the inner lining of blood vessels, leading to better blood flow.

So, next time you are feeling stressed or down, watching a funny movie or spending time with friends who make you laugh could actually be good for your heart!

## **The noses have it**

While we are not close to bloodhounds, the human nose can detect over one trillion different scents. This figure is based on a study published in the journal “*Science*” in 2014, which challenged the long-held belief that humans could only detect about 10,000 odors. The study used a mixture of odor molecules to demonstrate that the human sense of smell has a much higher discrimination capacity than previously thought. This is because the human olfactory system is incredibly complex and can distinguish between tiny differences in the chemical composition of different odors. In fact, our sense of smell is so sensitive that we can detect certain scents in concentrations as low as a few parts per trillion!

## **Look deep into my eyes ...**

If you have ever wondered why doctors look into your eyes during a physical exam? It is because your eyes can reveal a lot about your overall health. Your eyes are the only place in the body where blood vessels can be seen without using x-rays or a sonogram. This means that an eye exam can provide important clues about conditions such as diabetes, high blood pressure, and even certain types of cancer. For example, changes in the



**Figure 33.** Retina. (Image obtained from Wikimedia Commons, the free media repository)

blood vessels of the retina (Figure 33) can be an early warning sign of hypertension or diabetes.

## **I am large, I contain multitudes!**

The human body contains approximately 39 trillion microorganisms, collectively known as the microbiome, that play a critical role in our health. The microbiome is made up of bacteria, viruses, fungi, and other microorganisms that live in and on the human body. For a 200 pound adult, the microbiome weighs about 2 to 6 lbs. These microorganisms help to digest food, produce essential vitamins, and regulate the immune system. In fact, disruptions to the microbiome have been linked to a variety of health conditions, including obesity, allergies, and autoimmune diseases.

## **Color my world**

The human eye is a very discriminating organ. It can distinguish between around 2.3 to 7.5 million different colors. The exact number varies from person to person based on factors such as age, gender, and genetics. This

remarkable ability is due to the presence of specialized cells in the retina called cones, which are responsible for detecting color. There are three types of cones, each of which responds to a different range of colors. The combination of signals from these cones allows us to see a vast spectrum of colors, from the deep blues of the ocean to the bright reds of a sunset.

However, there are some people who have a genetic mutation that allows them to see even more colors than the average person. Known as tetrachromats, these individuals have a fourth type of cone in their eyes that allows them to see colors that are invisible to most people. Those who are tetrachromatic can perceive an estimated 100 million color variations. With normal color vision, humans can see approximately one million different colors. While tetrachromacy is rare, it offers a fascinating glimpse into the remarkable complexity of the human eye and the world of color that we perceive.

## What was that?

The human ear can distinguish a wide range of frequencies, from about 20 Hz to 20,000 Hz (Figure 34). This remarkable range is due to the



**Figure 34.** Man with antique ear trumpets. (Image obtained from Wikimedia Commons, the free media repository)

presence of tiny hair cells in the inner ear that are responsible for detecting sound waves. However, as we age, these hair cells can become damaged or die off, leading to a gradual loss of hearing known as presbycusis. The term “presbycusis” is derived from the Greek words “presbys,” meaning “old” or “elderly,” and “akousis,” meaning “hearing.”

## **The bonds of blood**

“Blood is thicker than water” is a common English expression that is often used to describe the importance of family relationships. However, the phrase has its origins in a longer and somewhat different phrase that was common in the 12th century, “The blood of the covenant is thicker than the water of the womb.” This phrase was originally used to emphasize the importance of chosen relationships and bonds over those of biology. However, over time, the phrase was shortened to “blood is thicker than water,” and its meaning shifted to emphasize the importance of familial relationships instead. Interestingly, while the phrase is now widely used as a way of expressing the importance of family ties, its original meaning highlights the importance of chosen relationships and loyalty over those of biology. This serves as a reminder that family can be found in many different forms, and that the bonds we choose to create, and nurture can be just as important as those of blood relations.

## **Tiny muscles**

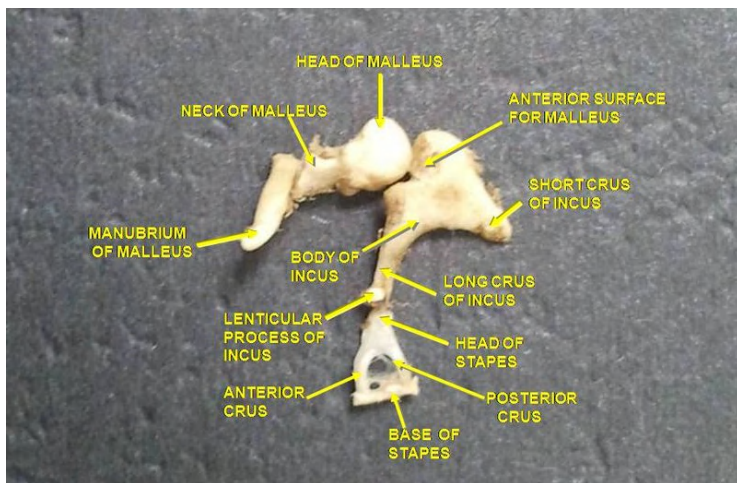
An interesting and weird aspect of human anatomy is the presence of a tiny muscle in the human ear called the tensor tympani. This muscle is believed to have evolved to protect our hearing from loud and sudden noises by dampening the sound waves that enter the ear. When the muscle contracts, it pulls the eardrum inward, which reduces the amount of sound that can enter the inner ear. Interestingly, some people are able to voluntarily contract this muscle, which can create a rumbling or thumping sound in their ears. This ability is known as “ear rumbling” or “tensor tympani syndrome” and is thought to be relatively rare. While it may seem like a strange quirk of the human body, the ability to control the

tensor tympani may have practical applications, such as protecting the ears from sudden loud noises or aiding in relaxation and meditation techniques.

## Smallest Bones

While some of the bones in your hands and feet are very small, it is the human ear that contains the smallest bones in the body. The ossicles are a group of three small bones located in the middle ear and commonly referred to as the auditory ossicles (Figure 35). These bones are named malleus (hammer), incus (anvil), and stapes (stirrup) based on their shape. The primary function of the ossicles is to transmit sound vibrations from the eardrum to the inner ear, specifically the cochlea, where they can be processed as sound signals. The ossicles are incredibly small, with the stapes bone (the stirrup) measuring just 2.8 millimeters in length, about the size of an orange seed!

Your inner ear contains a kind of gyroscope that plays a critical role in our sense of balance. The vestibular system, located within the inner

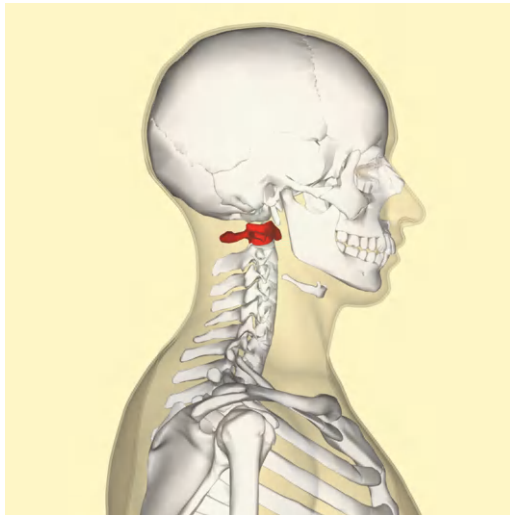


**Figure 35.** Labeled photograph of the ossicles, consisting of the three bones of the middle ear: malleus, incus, and stapes. (Image obtained from Wikimedia Commons, the free media repository)

ear, consists of various structures and sensory apparatus that work together to provide us with a sense of balance and spatial awareness. Just as a gyroscope is designed to detect and measure orientation and angular velocity, the vestibular system continuously monitors the position and movement of our head and body, allowing us to maintain equilibrium. When the vestibular system is damaged, it can lead to symptoms such as dizziness, vertigo, and difficulty with balance.

## **Bearing the weight of the world**

The human atlas bone, also known as the first cervical vertebra, is named after the mythological figure Atlas, a titan in Greek mythology who was said to support the weight of the world on his shoulders, a burden given to him by Zeus as a punishment. The atlas bone is located at the very top of the spine and is responsible for supporting the weight of the skull and allowing for a wide range of motion and flexibility of the head and neck (Figure 36). Unlike the other vertebrae in the spine, the atlas bone does not have a vertebral body, which makes it unique. One of the most interesting features of the



**Figure 36.** The Atlas bone. (Image obtained from Wikimedia Commons, the free media repository)

atlas bone is its shape. It is ring-shaped and has two large, flat surfaces that allow it to articulate with the skull and the second cervical vertebra, known as the axis. This unique shape also allows for the rotation of the head, which is critical for many activities, such as driving, sports, and even simple movements like turning to look over your shoulder. In addition, the atlas bone is also the site of the dens, a small bony projection that protrudes from the axis vertebra and helps to stabilize the head and neck. The atlas bone and the dens work together to provide a stable foundation for the head and neck, while still allowing for a high degree of mobility and flexibility.

## **The new me**

Your body is constantly producing new cells. In fact, within seven years, every cell in your body would have been replaced. This process is called cell turnover, and it is essential for keeping your body healthy. There are two types of cell turnover, acute cell turnover and chronic cell turnover. Acute cell turnover is the process of replacing cells that have been damaged or destroyed. This occurs if you cut your skin, causing your body to start producing new skin cells to repair the damage. Chronic cell turnover is the process of replacing cells that are naturally dying off. This is illustrated in the replacement of new red blood cells after old red blood cells die after 120 days.

Cell turnover is a complex process that is controlled by a number of factors, including hormones, enzymes, and nutrients. When cell turnover is disrupted, it can lead to a number of health problems, including cancer, heart disease, and Alzheimer's disease. There are a number of things that can be done to promote healthy cell turnover, including:

- 1) Eating a healthy diet: A diet that is rich in fruits, vegetables, and whole grains will provide your body with the nutrients it needs for cell turnover.
- 2) Getting enough sleep: Sleep is essential for cell regeneration, and it is recommended to have an average of 7–8 hours of sleep per night.
- 3) Exercising regularly: Exercise helps to stimulate cell turnover and reduce inflammation, and it is recommended to have at least 30 minutes of moderate intensity exercise on most days of the week.
- 4) Managing stress: Stress can disrupt cell turnover. It is recommended to find healthy ways to manage stress, such as through exercise, yoga, or meditation. Following these tips

can contribute to maintaining good health and promote healthy cell turnover.

## **The adaptable brain**

Neuroplasticity is the brain's ability to change and adapt throughout life. It is the ability of the brain to form new neural connections and rewire itself in response to experience. Neuroplasticity allows us to learn new things, recover from injury, and even change our behavior. One interesting fact about neuroplasticity is that it is not limited to the early years of life. The brain can continue to change and adapt throughout adulthood, even into old age. This means that we can continue to learn and grow even as we get older. Another interesting fact about neuroplasticity is that it can be influenced by our environment. The things we do, the people we interact with, and the experiences we have can all shape the way our brains develop. Structural changes in the brain can be seen on MRI after learning new skills. For example, studies have shown increases in the size of the posterior hippocampus in individuals with extensive spatial navigation experience, such as London taxi drivers. This means that we have the power to shape our own brains and our own futures. Neuroplasticity is a fascinating and important concept. It is what allows us to be who we are and to do what we do. It is the key to our ability to learn, grow, and change.

## **A hungry mind**

The brain is one of the most important and complex organs in the human body. Despite weighing only about 2% of the body's weight, it uses approximately 20% of the body's blood supply. This is because the brain needs a lot of oxygen and glucose to function properly, and the blood supply provides these essential nutrients.

In addition to processing information, controlling movement, and regulating emotions, the brain also uses a lot of energy to keep us alive and functioning. It requires a constant supply of oxygen and glucose to keep up with the demands of these complex tasks. However, the blood supply in the brain does more than just provide nutrients. It also helps to

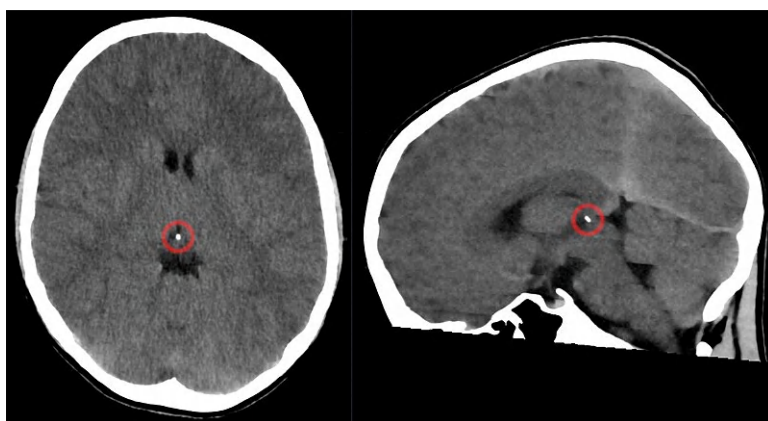


remove waste products from the brain, regulate its temperature, and deliver hormones and other signaling molecules to different parts of the brain. Without this constant supply of blood, the brain would quickly become damaged and unable to function properly.

So, next time you are feeling mentally exhausted, remember that your brain is working hard to keep you going and deserves a break every now and then! Take a moment to appreciate the incredible complexity and importance of this amazing organ.

## I like pineal coladas

The pineal gland is a small, pea-sized gland located in the center of the brain (Figure 37). It is responsible for producing melatonin, a hormone that helps to regulate sleep and wakefulness. The pineal gland is also thought to play a role in other functions, such as mood, memory, and reproduction. However, its exact role in these functions is still not fully understood. One interesting medical fact about the pineal gland is that it is the only gland in the body that produces a hormone that is regulated by light. When the intensity of light in the surrounding environment decreases, the pineal gland produces more melatonin. This helps to promote sleep.



**Figure 37.** MRI scan of the location of the pineal gland, indicated by the white arrow. (Image obtained from Wikimedia Commons, the free media repository)

Another interesting medical fact about the pineal gland is that it is made up of cells that are similar to those found in the retina of the eye. This suggests that the pineal gland may have evolved from the eye. The pineal gland is a fascinating and mysterious gland that inspires scientists to continue learning about its functions and how it affects our health.

## **R. L. Stine made a fortune on these**

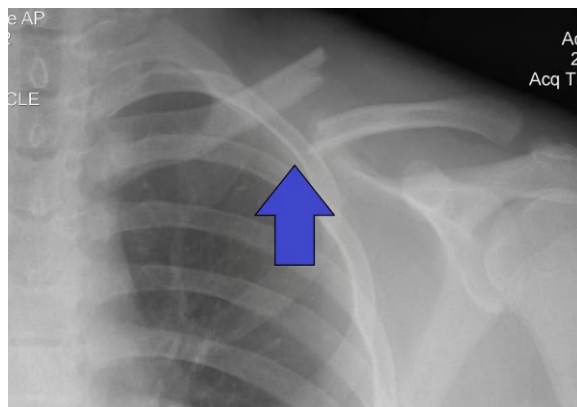
Cutis anserina, also known as goosebumps or piloerection, is caused by the contraction of the small muscles attached to hair follicles called the arrector pili muscles. When these muscles contract, they pull the hair follicles upright, creating small bumps on the skin's surface. This can occur in response to various stimuli, such as cold temperatures, strong emotions like fear or excitement, or as a physiological response to certain medical conditions. The contraction of the arrector pili muscles is controlled by the sympathetic nervous system, which is part of the autonomic nervous system that regulates unconscious bodily functions.

For you “word nerds” out there, the term “cutis anserina” comes from two Latin words: “cutis,” meaning skin, and “anser,” meaning goose. Therefore, cutis anserina literally translates to “goose skin” or “goosebumps” in English. The term “piloerection,” which is the medical term for the same phenomenon, comes from the Latin “pilus,” meaning hair, and “erection,” meaning to stand up or stiffen.

## **Clavicle Rusticana**

The clavicle, a bone in the human shoulder that is shaped like a key, is derived from the Latin word “clavis,” which means “key.” This is attributed to the flattened, horizontal shaft and two rounded ends that resemble the teeth of a key. The clavicle is the only long bone in the human body that lies horizontally, running across the upper part of the chest from the shoulder to the sternum. It plays a crucial role in stabilizing the shoulder joint and allowing for a wide range of arm movements.

Interestingly, the clavicle is also one of the most frequently fractured bones in the body (Figure 38). This is because it is relatively thin and



**Figure 38.** X-ray showing fracture of left clavicle. (Image obtained from Wikimedia Commons, the free media repository)

lacks the protection of surrounding muscles and tissues. However, despite its frequent fractures, the clavicle has a remarkable ability to heal quickly and completely. In fact, most clavicle fractures will heal within 6 to 12 weeks with proper immobilization and rest. Additionally, the clavicle has a high rate of successful healing even when the fracture is displaced or fragmented, which is not always the case with other bones in the body.

## Disc Jockey

Floating like jelly-filled cushions between the bones of the spine, intervertebral discs perform a critical but thankless task. They act as shock absorbers for the back, compressing and flexing to allow smooth movement and prevent bone-on-bone grinding. However, unlike most body parts, these fibrocartilaginous rings lack any direct blood supply. The intravertebral discs are avascular, that is, they contain no veins or arteries. Bereft of nourishing red cells, the discs survive only on sparse morsels of nutrients diffusing in from nearby capillaries. This precarious lifeline leaves them vulnerable to the ravages of injury and age. Once torn or degenerated, options for full repair are scarce. Like an

abandoned island cut off from vital resources, the starved discs deteriorate in isolation.

Medicine aims to ferry aid across these vascular voids through injections or grafts. But for now, the discs remain the largest avascular structures that humans must live with and, all too often, live without. Their condition spotlights a more complex truth — that even the most vital body parts can thrive, or falter based on their access to blood. While most tissues enjoy a gushing river of nutrients, the spine's fragile discs subsist on only a dripping tap.

## **The weight of bacteria**

The number of bacteria in the human body can vary depending on factors such as diet, hygiene, and overall health. However, it is estimated that the average adult human body harbors around 3 to 6 pounds of bacteria. Additionally, it is important to note that not all bacteria are harmful; in fact, many are essential for human health and play a vital role in digestion, immune function, and other biological processes.

## **Pregnancy demands**

During pregnancy, the amount of blood in a woman's body increases, which puts a higher demand on the heart to pump more blood. To compensate for this increased workload, the muscle walls of the heart may thicken, increasing the heart rate slightly. These changes can help the heart to pump blood more efficiently to meet the needs of both the mother and the developing fetus.

Furthermore, women's brains grow during pregnancy! Medical research has shown that pregnancy can actually lead to structural changes in the brain, but these changes do not involve a reduction in brain volume or size. Several studies have found that certain regions of the brain may increase in volume during pregnancy, particularly those involved in social cognition and emotional processing. For example, a study published in *Nature Neuroscience* in 2016 found that pregnant women showed an

increase in gray matter volume in areas of the brain involved in maternal caregiving and attachment. While pregnancy may cause changes in brain structure and function, these changes are usually temporary and resolved after childbirth. There is no evidence to suggest that pregnancy causes a reduction in brain volume or size. In fact, some studies have suggested that pregnancy may even have positive effects on cognitive function and brain health in the long term.

During pregnancy, a woman's uterus expands to over 500 times its original size. At the beginning of pregnancy, the uterus is about the size of a small pear, but by the end of the third trimester, it can grow to the size of a watermelon! This incredible expansion is necessary to accommodate the growing fetus and prepare for childbirth. So, next time you see a pregnant woman with a big belly, you can appreciate the amazing physical changes her body is going through to bring new life into the world!

## **Feel the (heart) burn**

There is no need to get alarmed when you get heartburn sometimes! Here's why...

On one hand, the acid in your stomach is strong enough to dissolve metal. Yes, you read that right! The hydrochloric acid in your stomach has a pH of around 2, which is strong enough to break down proteins and even corrode metal over time. On the other hand, the stomach lining can protect itself from this powerful acid by secreting mucus and bicarbonate, which neutralize the acid and prevent it from damaging the stomach walls. So, while your stomach acid may be capable of dissolving metal, you do not have to worry about it eating away at your insides!

## **Growing nails**

Yes, the nails on your hands do tend to grow faster than the nails on your feet. This is because the blood supply to the hands is generally better than the blood supply to the feet. Nails grow from the nail matrix, which is the tissue at the base of the nail bed where the nail is formed. The nail matrix receives nutrients and oxygen from the blood supply, which helps to promote nail growth. Since the hands are located closer to the heart than the

feet, they receive a better blood supply and therefore have more nutrients and oxygen available to support nail growth. Additionally, the nails on the hands tend to be exposed to less wear and tear than the nails on the feet, which can also contribute to their faster growth rate. On average, fingernails grow at a rate of about 3.5 millimeters per month, while toenails grow at a rate of about 1.6 millimeters per month. However, it is important to note that nail growth rates can vary widely from person to person and can be influenced by factors such as age, genetics, nutrition, and overall health. There is a common belief that the nails on the dominant hand grow faster than the nails on the non-dominant hand, but scientific studies have not found evidence to support this claim. There is also a myth claiming that nails continue to grow after a person has died. However, this is not true. What really happens is, as the skin in the fingers dries out after death and the skin retracts from the nail. While this makes the nail look longer, it is actually only the finger shrinking.

## **Shirts and skins**

The largest organ in the human body is the skin. The skin is a complex and versatile organ that covers the entire external surface of the body, providing a barrier between the body and the external environment. The skin is made up of three main layers: the epidermis, the dermis, and the subcutaneous tissue.

The weight of the skin in the human body can vary widely depending on a person's age, gender, body size, and overall health. On average, the skin makes up about 16% of a person's total body weight. According to a study published in the *Journal of Investigative Dermatology*, the average weight of the skin in adults is around 8 pounds (3.6 kilograms). However, this can vary widely depending on factors such as body size, with larger individuals having more skin and therefore a higher skin weight.

The skin has several important functions, including regulating body temperature, protecting against injury and infection, and sensing touch, pressure, and pain. It also plays a role in vitamin D synthesis and helps to excrete waste products from the body.

Your skin sheds around 50,000 skin cells every minute. Every minute of the day and night, your skin is shedding tiny flakes of dead skin cells

in a process called desquamation. In fact, over the course of a year, you can shed up to 1.5 pounds of skin cells! That's approximately 80 lbs. of dead skin cells in a lifetime. However, do not worry, this is a normal and healthy process. As old skin cells flake off, new skin cells replace them, keeping your skin healthy, smooth, and rejuvenated. So, the next time you notice a little dust on your desk or in your car, remember that some of it is probably made up of your own shed skin cells!

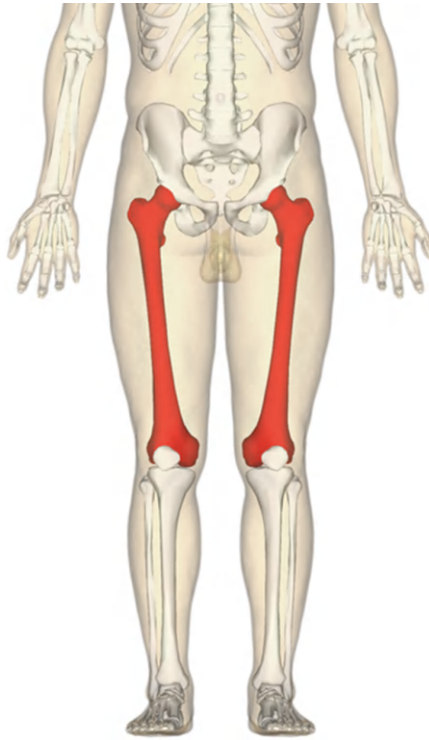
## **Blink 15–20**

The average person blinks around 15 to 20 times per minute or about 28,000 times per day. Blinking is an important reflex that helps to keep the eyes lubricated and protected from dust and other irritants in the environment.

Did you also know that blinking can have a surprising effect on memory? Research has shown that people tend to blink less when they are trying to remember something important or when they are engaged in a challenging mental task. This is because the brain prioritizes information processing over blinking during these activities. However, blinking can also serve as a kind of mental “reset” button, helping to clear the mind and improve focus. So, the next time you find yourself struggling to remember something, try taking a few deep breaths and blinking a few times. It just might help you to clear your mind and improve your memory recall!

## **The thighs have it**

The femur (Figure 39), or thigh bone, is the largest bone in the human body. It is also incredibly strong. In fact, it is so strong that it can support up to 30 times the weight of the person! This means that if you weigh 150 pounds, your femur bone could support over 4,500 pounds — that is similar to carrying around a small car! So, next time you are feeling down about your strength, just remember that your femur has got your back (or rather, your legs) covered!

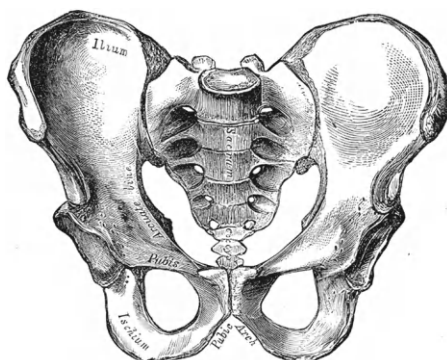


**Figure 39.** Femur. (Image obtained from Wikimedia Commons, the free media repository)

## **Pelvis**

The pelvis is not just one bone. It is made up of four bones joined together by cartilage (Figure 40). These bones include two hip bones called illium, the sacrum, and the coccyx. This unique structure helps to provide support for the weight of the upper body and protects the reproductive and digestive organs. The shape of the pelvis can vary depending on the person's sex. In women, the pelvis is typically wider and shallower than in men. This is because women need a wider pelvis to accommodate childbirth. In fact, the angle of the pubic arch in women is usually greater than 90 degrees, while in men it is typically less than 90 degrees.





**Figure 40.** The human pelvis contains four bones. (Image obtained from Wikimedia Commons, the free media repository)

Your pelvis can move in three different ways: anterior-posterior tilt, lateral tilt, and rotation. These movements can help to increase flexibility in the lower back and hips. For example, an anterior-posterior tilt (also known as a pelvic tilt) can help to stretch the hip flexors and relieve lower back pain. So, the next time you are feeling stiff or sore, try incorporating some pelvic movements into your stretching routine!

## Scapula

The scapula, also known as the shoulder blade, is one of the most mobile bones in the human body. It can move in many different directions, which allows for a wide range of motion in the shoulder joint. In fact, the scapula can move up, down, forward, backward, and even rotate to some extent. This incredible mobility makes it possible for us to perform a variety of tasks, from throwing a ball, reaching up to grab something off a high shelf or dig with a shovel, which is convenient, because the word scapula means spade or shovel in Latin. So, next time you reach for something, take a moment to appreciate the amazing mobility of your scapula!

## The Holy Bone

The sacrum is a compound bone at the base of the spine (Figure 41). It forms the back and center of the pelvis and is the largest bone in the spine.



**Figure 41.** The human sacrum. (Image obtained from Wikimedia Commons, the free media repository)

The origin of the word “sacrum” in medical etymology has been a subject of uncertainty. It was used by the ancient Roman physician Claudius Galen (130–200 CE), who seemingly regarded it as the most significant bone in the spine. The sacrum, which is the largest and densest bone in the vertebral column, also exhibits a remarkable resistance to decay after death. Even when other bones in a corpse have decomposed, the sacrum often endures for a longer period.

In antiquity, when this term was coined, disposing of bodies was less formal, and many corpses and skeletons were left exposed in various states of decay outside city walls. It is likely that observers noticed the sacrum’s enduring presence as one of the last remaining bones in a decomposed body. Some even believed that, on the day of resurrection, the body would reassemble around the sacrum, contributing to the notion of its significance. The formal Latin name for this bone is “os sacrum,” which can be translated as “sacred bone.” However, the earlier Greek origin of the word suggests alternative meanings such as “illustrious,” “prominent,” “mighty,” or “great.” While the interpretation of “sacred” was once accepted, aligning with the belief in some cultures that the human soul resided at the base of the spine, a more historically accurate interpretation is “prominent.” This interpretation refers to the sacrum’s distinction as the largest bone in the vertebral column.

## **Man of Steel**

A surprising medical fact is that human bones are four times stronger than concrete. A cubic inch of bone can, in principle, bear a load of 19,000 pounds. Bones, having a similar compressive strength as steel, yet are 5 times lighter than a steel bar of comparable size. While bones may seem fragile and prone to breakage, they are actually incredibly strong and durable. The strength of bones comes from their composition of collagen, a flexible protein that provides a scaffold for the deposition of calcium, which gives bones their rigidity and strength. This combination of flexibility and strength allows bones to absorb impact and resist deformation, making them an ideal material for supporting the weight of the human body and protecting vital organs. In fact, it would take a force equivalent to that of a small car to break a human femur bone!

## **Hair, more than a love-rock musical**

There are three types of hair that can be found on the human body.

The first type of hair is known as vellus hair. This type of hair is soft, fine, and short, and is found all over the body. Vellus hair is often referred to as “peach fuzz” and is usually less than 2 mm in length. It is more common in children and women, and it serves to regulate body temperature and protect the skin.

The second type of hair is known as terminal hair. This type of hair is thicker, coarser, and darker than vellus hair, and grows on the scalp, face, armpits, pubic area, and other parts of the body. Terminal hair is the hair that we typically associate with growth and length, and it serves to protect and insulate the body.

The third type of hair is called lanugo hair. This is a special type of hair that grows on fetuses during pregnancy. It is very fine, soft, and unpigmented, and it covers the entire body, including the face, trunk, limbs, and even the palms of the hands and soles of the feet. Most of the lanugo hair is shed before birth and replaced by vellus and terminal hair after birth.

It is important to note that while vellus and terminal hair are present on all individuals, the amount, color, and texture of hair can vary widely

between individuals based on genetics, hormones, age, and other factors.

## **Major Bellows**

The human chest can expand and contract up to 5 to 6 liters of air in a single breath. That is equivalent to about 10 to 12 cans of soda! This is because the chest contains the lungs, which are responsible for bringing oxygen into the body and expelling carbon dioxide. When we take a deep breath, the muscles between the ribs and the diaphragm work together to expand the chest and create more space for air. So, the next time you take a deep breath, remember that your chest is doing some heavy lifting to keep you breathing!

## **It's an ill wind ...**

When you cough, you unleash a veritable hurricane. These bursts of air can reach speeds of up to 60 miles per hour (97 kilometers per hour). That is faster than the speed limit on most highways! But coughing is not just about speed — it is a vital reflex that plays a crucial role in keeping your lungs and airways clear. When you cough, your body is working hard to expel irritants and mucus that might be clogging up your respiratory system. It is like a forceful gust of wind sweeping away unwanted particles and secretions. It is nature's way of helping you breathe easier and maintaining a healthy respiratory system.

However, it is important to note that excessive coughing can be a signal of an underlying medical condition. Conditions like asthma or chronic obstructive pulmonary disease (COPD) can trigger persistent and bothersome coughing. If you find yourself coughing excessively or experiencing other respiratory symptoms, it is always a wise idea to seek guidance from a medical professional. So, the next time you let out a powerful cough, remember the incredible speed at which air is propelled from your lungs. It is an amazing reflex designed to keep your respiratory system in top shape and ensure you are breathing freely.

Coughing is not always caused by a problem in your chest. Coughing can be triggered by factors beyond the lungs. While we often associate

coughing with respiratory issues, such as colds or lung infections, there are fascinating non-lung-related causes of coughing as well. One surprising culprit is gastroesophageal reflux disease (GERD), commonly known as acid reflux. When stomach acid flows back into the esophagus, it can irritate the throat and trigger a persistent cough. This shows the intricate connection between our digestive system and respiratory system.

Physical contact with the external ear can cause the stimulation of certain nerves in the ear (auricular branch of the vagus nerve) that can stimulate a reflex called the Arnold's ear-cough reflex, which can cause coughing. Another intriguing cause of coughing is medications. Certain medications, such as angiotensin-converting enzyme (ACE) inhibitors used to treat high blood pressure, can induce a persistent dry cough as a side effect. It is thought to occur due to the accumulation of bradykinin, a substance that can irritate the airways.

In rare cases, even psychological factors can lead to chronic coughing. Psychogenic cough, also known as habit cough, is a persistent cough that has no underlying physical cause. It is believed to be related to psychological stress or anxiety, and the coughing becomes a habitual behavior. These examples highlight the complexity of the human body and how different systems can influence one another. Coughing can be a symptom that goes beyond respiratory conditions, serving as a clue for medical professionals to explore various underlying causes. So, the next time you experience an unexpected cough, remember that it may not always be directly related to your lungs, but rather a fascinating interplay between different parts of your body.

## **A violation of the Geneva Convention**

The average person produces about half a liter of gas (flatulence) per day, and for some people, a lot more. (You know who you are!) That is equivalent to roughly two soda cans, or a party balloon! Passing gas is a normal bodily function that occurs when food is broken down in the digestive tract. The gas produced is a mixture of several gases, including nitrogen, oxygen, carbon dioxide, methane, and hydrogen. While flatulence is often considered taboo or embarrassing to talk about, it is a sign of a healthy digestive system. However, excessive, or foul-smelling flatulence can sometimes be

a sign of an underlying digestive issue, such as lactose intolerance or inflammatory bowel disease (IBD). So, if you are experiencing persistent or problematic flatulence, it is always a good idea to talk to a doctor.

## **Knee high by the fourth of July**

You may have come across the popular belief that our ears continue to grow throughout our lives, but that is just a myth. While it may seem like they are physically growing, the actual cause is a combination of natural aging and the relentless pull of gravity on our bodies. As we age, the cartilage in our ears gradually weakens, causing them to lose their firmness and shape. Simultaneously, the relentless force of gravity contributes to the sagging and elongation of our ears over time. So, the perception of our ears getting bigger is a result of these factors rather than literal growth.

## **Esophagus**

The esophagus is a muscular tube that connects the throat to the stomach. It measures about 10 inches (25 centimeters) long and 1 inch (2.5 centimeters) wide in adults. When you swallow, a series of muscular contractions called peristalsis pushes food down the esophagus and into the stomach. This process takes only a few seconds and occurs involuntarily, meaning you cannot consciously control it. The esophagus has a special sphincter muscle called the lower esophageal sphincter (LES) that prevents stomach acid from flowing back up into the esophagus. When this muscle does not work properly, it can lead to a condition called gastroesophageal reflux disease (GERD), which causes heartburn, acid reflux, and other symptoms.

## **Don't get handsy**

The human hand is made up of 27 bones, 29 joints, and more than 30 muscles. Despite its complex structure, the hand is incredibly sensitive and can perform fine motor skills like writing, typing, and playing musical instruments. The fingerprints on our hands are unique to each individual and are formed by the ridges on the skin's surface. No two people have

the same fingerprints, which makes them an excellent tool for identifying individuals in forensic investigations. A person's hand contains an average of more than 150 different species of bacteria. While some of these bacteria are harmless, others can cause infections and illnesses. Hence, it is always crucial to wash your hands regularly with soap and water to reduce the risk of spreading harmful bacteria.

## **Don't go breaking my heart**

Your heart beats about 100,000 times in one day and about 35 million times in a year. If you are fortunate enough to live to the age of 70, your heart would have accomplished an extraordinary feat by beating approximately 2.5 billion times throughout your lifetime. In addition, the average human heart pumps approximately 2,000 gallons (7,571 liters) of blood per day, which equates to 5,110,000 gallons (19,343,454 liters) by the age of 70. That is enough to fill 77 Olympic size swimming pools.

The human heart's relentless rhythm is a testament to its endurance and resilience, tirelessly pumping oxygen-rich blood to every cell in the body, day in and day out. It is a remarkable reminder of the incredible work our hearts perform to sustain our lives, highlighting the vital importance of caring for and maintaining cardiovascular health throughout our journey. So, cherish each beat of your heart and embrace a heart-healthy lifestyle to keep it strong and thriving for as long as possible.

## **Highways of the heart**

In the intricate highway system of our circulatory system, veins and arteries play distinct roles. Veins, like clever traffic controllers, possess remarkable one-way valves that meticulously guide the flow of blood back to the heart. These valves act as tireless gatekeepers, ensuring that blood journeys in the correct direction, preventing any chaotic backflow or detours.

Conversely, arteries, the vigorous expressways of our circulatory system, do not require such valves. Why? This is because the heart, with its indomitable strength, propels blood into these mighty vessels with a force

that surpasses even the most zealous rush hour traffic. The sheer power of the heart's pumping action propels the blood onward, like an unstoppable torrent, through the vast network of arteries, without the need for additional gatekeepers.

So, next time you marvel at the magnificent efficiency of our circulatory system, remember the ingenious design of veins and arteries. The veins, ever watchful with their one-way valves, guide blood homeward, while the arteries, emboldened by the heart's mighty pulse, carry life-giving blood swiftly and relentlessly to every corner of our amazing bodies.

## **Parathyroid Glands**

The parathyroid glands are the smallest endocrine glands in the body. Despite their small size, these four tiny glands play a crucial role in regulating the levels of calcium and phosphate in the blood. The parathyroid glands are located in the neck, behind the thyroid gland, and are named for their proximity to the thyroid. They are about the size of a grain of rice and each gland is made up of two types of cells: chief cells and oxyphil cells. The chief cells produce parathyroid hormone (PTH), a hormone that regulates calcium levels in the blood by stimulating the release of calcium from bones and increasing the absorption of calcium in the intestines and kidneys.

Interestingly, the parathyroid glands were discovered by accident. In the late 1800s, a Viennese surgeon named Richard Paltauf was performing a thyroidectomy (surgical removal of the thyroid gland) on a patient and noticed that the patient experienced symptoms of tetany (muscle spasms and cramps) after the surgery. Paltauf hypothesized that the symptoms were caused by damage to the parathyroid glands, which he had inadvertently removed along with the thyroid gland. This discovery paved the way for further research into the role of the parathyroid glands in calcium metabolism and the development of treatments for parathyroid disorders.

## **Tent-hut!**

Your height is not as fixed as you might think! Your stature can change throughout the day (Figure 42), like a fascinating dance between gravity,





**Figure 42.** A person's posture that changes throughout the day. (Image by rawpixel.com on Freepik)

your muscles, and cartilage. Picture this: when you wake up in the morning, you stand tall, reaching for the sky, as the cartilage between your bones is well-rested and rejuvenated. However, as the day unfolds, the relentless force of gravity takes its toll, compressing that precious cartilage and causing you to shrink ever so slightly by the time evening arrives. An extreme example of this principle is seen in the change in the height of astronauts after periods of weightlessness. As gravity no longer pulls the body downward, the spinal discs expand, and the vertebrae separate slightly. This leads to a temporary elongation of the spine, causing astronauts to gain precious centimeters in height. In fact, some astronauts have been known to gain as much as 2 inches (5 cm) during their time in space! Unfortunately, this is not a permanent change. The height returns to normal when they come back to earth.

But wait, there's more! The changing height saga does not end there. As we journey through the stages of life, our vertical adventures continue. During the remarkable process of aging, the discs between our vertebrae undergo wear and tear, gradually losing their height and becoming thinner. This gradual thinning can lead to a reduction in overall height over time.

So, next time you notice a slight decrease in your height as the day wanes, marvel at the dynamic nature of your body and the incredible influence of gravity. And as the years go by, remember that your height reflects the remarkable journey you have taken, with each millimeter lost representing the wisdom and experiences gained along the way. Embrace the ever-changing nature of your stature and stand tall, no matter the height you measure.

## **Love hurts ... but not your brain**

Did you know that the brain, the remarkable command center of our bodies, is incapable of feeling pain? Despite its role in processing pain signals from the rest of the body, the brain itself lacks its own pain receptors, meaning it cannot experience pain sensations. Take a moment to think about it: when you accidentally stub your toe or touch a hot surface, it is not actually your hand or foot that feels the pain. Rather, it is the specialized pain receptors in your skin, muscles, and organs that send signals to the brain, where they are interpreted and processed.

Interestingly, this unique characteristic of the brain opens extraordinary possibilities in the field of neurosurgery. Some complex brain surgeries, such as tumor removal or epilepsy treatment, are performed on patients who are awake and alert. You might be wondering why anyone would willingly undergo such a procedure. Well, the absence of pain receptors in the brain allows surgeons to interact with the patient's conscious mind during surgery, ensuring that critical brain functions like speech, movement, and sensation are preserved. During these awake brain surgeries, patients may be asked to perform tasks or respond to specific stimuli, providing valuable feedback to the surgical team. This remarkable approach allows surgeons to precisely navigate delicate areas of the brain while minimizing the risk of causing damage to vital functions.

So, the next time you marvel at the incredible complexity of the brain, remember that while it orchestrates our experiences and perceptions, it remains blissfully unaware of pain. Thanks to this intriguing fact, medical advancements continue to push the boundaries of what is possible in understanding and treating conditions that affect the most intricate organ in our bodies.

## **I iodize you!**

The thyroid gland is the only organ in the body that can absorb iodine. Iodine is an essential mineral that is required to produce thyroid hormones. When iodine is ingested, the thyroid gland takes it up and combines it with the amino acid tyrosine to produce thyroid hormones. These hormones are then released into the bloodstream and transported to different parts of the body, where they play a crucial role in regulating metabolism and other important bodily functions.

Since the thyroid gland is so dependent on iodine, iodine deficiency is a leading cause of thyroid disorders such as goiter, hypothyroidism, and cretinism. In severe cases, iodine deficiency can cause irreversible damage to the thyroid gland and lead to serious health problems. Fortunately, iodine is readily available in many foods, including seafood, dairy products, and fortified table salt. In areas where iodine deficiency is common, iodine supplementation programs have been implemented to ensure that individuals receive adequate amounts of iodine to support proper thyroid function.

The thyroid's unique ability to absorb iodine, led to a common treatment of some thyroid disorders. Radioactive iodine, also known as radioiodine or iodine-131, is a radioactive isotope of iodine that emits gamma rays. It is taken up by the thyroid gland, which is responsible for regulating the body's metabolism and producing thyroid hormones. In the treatment of hyperthyroidism, radioactive iodine is used to selectively destroy the overactive thyroid tissue. The gamma radiation emitted by the iodine-131 targets and damages the cells within the thyroid gland, leading to a reduction in thyroid hormone production. This approach is highly effective and offers a permanent solution for many individuals with hyperthyroidism, providing an alternative to long-term medication use or surgical interventions. Radioactive iodine is also utilized in the management of certain types of thyroid cancer. After surgery to remove the cancerous thyroid tissue, a therapeutic dose of radioactive iodine may be administered. The radioactive iodine is taken up by any remaining thyroid tissue or cancer cells, allowing for targeted destruction of these cells and reducing the risk of recurrence or spread of the cancer. This treatment approach is known as radioactive iodine ablation.

One of the advantages of using radioactive iodine in thyroid disorders is its specificity for the thyroid gland. Due to the high concentration of iodine uptake in the thyroid, the radiation primarily affects the thyroid tissue while sparing surrounding tissues and organs from significant exposure. This targeted approach minimizes potential side effects and complications.

## **Sexy Cavemen**

One interesting and weird aspect of human anatomy is the presence of a bony ridge above the eyebrows known as the supraorbital ridge or brow ridge. This feature is more pronounced in some individuals, such as those of African or Neanderthal descent, and it is believed to have served a variety of functions throughout human evolution. One theory is that the brow ridge helped to protect the eyes from injury and shield them from the sun, while another suggests that it may have played a role in social signaling or aggressive behavior. Today, the brow ridge is considered by many to be a desirable physical trait, and some people undergo cosmetic surgery to enhance or reduce its prominence. While the significance of the brow ridge may have changed over time, it remains a fascinating example of how the human body has evolved to meet the challenges and demands of its environment.

## **Be serious**

An unusual aspect of human anatomy is the presence of tiny, hair-like structures called cilia that line the respiratory tract. These cilia beat in coordinated waves to move mucus and other debris out of the lungs and keep the airways clear. However, certain factors such as smoking or exposure to pollution can damage or destroy the cilia, leading to respiratory problems and an increased risk of infections. In some rare cases, people can be born with a genetic condition called primary ciliary dyskinesia (PCD) that affects the function of their cilia, causing chronic respiratory infections, hearing loss, and other complications. While the tiny cilia in our lungs may seem insignificant, they play a critical role in keeping our respiratory system healthy and functioning properly.

## **Thymus**

An interesting medical fact about the thymus is that it reaches its maximum size in humans during puberty and then begins to shrink and be replaced by fat. The thymus is a small gland located in the upper chest, behind the sternum. It is responsible for producing T cells, a type of white blood cell that plays a crucial role in the immune system. The thymus is most active during childhood and early adolescence, when it is responsible for training and maturing T cells to recognize and fight off infections and foreign invaders. During puberty, the thymus reaches its maximum size, weighing up to 35 grams and about the size of a large grape. However, as we age, the thymus begins to shrink and be replaced by fat. By the age of 75, the thymus may weigh as little as 5 grams. This decrease in thymus size and function is thought to contribute to age-related declines in immune function, making older adults more susceptible to infections and diseases. However, researchers are still exploring ways to harness the power of the thymus to boost immune function and promote healthy aging.

## **Thyroid Gland**

At one time the thyroid gland was thought to serve no purpose and was even considered to be a potential “vestigial” organ by some scientists. However, in 1891, a Swiss physician named Emil Theodor Kocher conducted a series of experiments on dogs that revealed the crucial role of the thyroid gland in regulating metabolism and growth. Kocher discovered that removal of the thyroid gland led to a significant reduction in the metabolic rate of the dogs, which caused them to become lethargic and gain weight. He also observed that the dogs’ growth was stunted without the presence of the thyroid gland. This groundbreaking research led to a better understanding of the thyroid gland’s importance in human health, and ultimately paved the way for the development of treatments for thyroid disorders such as hypothyroidism and hyperthyroidism. Kocher’s work earned him the Nobel Prize in Physiology or Medicine in 1909 and his discovery of the thyroid’s function is still considered a landmark achievement in the history of endocrinology.

## **Pituitary gland**

The pituitary gland is only about the size of a pea. It looked like “phlegm” to early anatomists who named it *pituita*, the Latin word for phlegm. Despite its small size, however, this tiny gland located at the base of the brain controls many important functions in the body by secreting hormones that regulate growth, reproduction, metabolism, and more. In fact, the pituitary gland is so important that it has been dubbed the “master gland” because it controls the function of many other glands in the body, including the thyroid, adrenal, and reproductive glands. It is also responsible for controlling the release of growth hormone, which is essential for proper growth and development during childhood and adolescence. Interestingly, the pituitary gland is not always located in the same place in the brain. In some rare cases, it can migrate to other areas of the brain or even outside the skull. This condition is known as ectopic pituitary gland or “ectopic neurohypophysis.” It can cause a variety of symptoms, including headaches, vision problems, and hormonal imbalances. While rare, it just goes to show how fascinating and complex the human body can be!

## **Excalibur**

A sword in the chest? The sternum is the only long bone in the human body that is not completely ossified (turned into bone) at birth. The sternum (Figure 43), also known as the breastbone, is a long, flat bone located



**Figure 43.** Sternum, anterior view. (Image obtained from Wikimedia Commons, the free media repository)

in the center of the chest. It is a crucial component of the rib cage and provides protection to the heart, lungs, and major blood vessels. While most long bones in the human body, such as the femur or humerus, are fully ossified at birth, the sternum remains partially cartilaginous. The sternum has three parts: the manubrium (a Latin word for handle), the corpus sterni (or the body of the sternum), and the xiphoid (a Greek word for “sword”), which are connected by cartilage. The xiphoid process, the small, pointed piece at the bottom of the sternum, is entirely cartilaginous and may not fully ossify until a person’s mid-20s. This unique feature of the sternum allows for flexibility and mobility, which is essential for breathing and other movements of the chest. However, it also means that the sternum may be more susceptible to injury or trauma, such as fractures or dislocations. Early anatomists thought the sternum looked like a sword and named it accordingly.

## Chapter 5

# Medical Misconceptions

### Fill ‘er up and check the snake oil, please

A favorite treatment sold by medical charlatans was snake oil (Figure 44). The use of snake oil as a folk remedy dates back to at least the early 19th century in the United States. Oil made from the Chinese water snake was brought to America by Chinese laborers who worked on the Transcontinental Railroad. Snake oil sellers claimed that the oil had mystical healing properties and could cure all kinds of ailments, from rheumatism to gout to deafness.

The snake oil sellers were charlatans who traveled around the country peddling their “miracle cure” at medicine shows. They used slick marketing techniques to sell the oil, with exotic backstories about how they learned of the healing secrets from Native Americans or Chinese wise men. Their pitches were almost always exaggerated or outright fabrications.

The ingredients of snake oil were dubious at best. While some may have actually contained rattlesnake oil, others had mineral oil, turpentine, or other less than helpful ingredients. Analyses found very little medicinal value in the oil. Despite this, the exotic nature and mystique around snake oil allowed the sellers to charge exorbitant prices.

As chemical analysis became more advanced in the early 20th century, the contents of snake oils were debunked. The phrase “snake oil” took on the meaning of a fraudulent and useless remedy. Today, it refers to any product or idea that is falsely promoted as a cure-all but is actually





**Figure 44.** An advertisement for the nostrum, Snake Oil Liniment. (Image obtained from Wikimedia Commons, the free media repository)

untested, useless, or even harmful. The quackery of snake oil salesmen also led to increased regulation of medical claims and the establishment of the FDA.

## Old Lace

While arsenic therapy is no longer used, due to its highly toxic nature, it has an interesting history. In the 18th and 19th centuries, arsenic was used

in small doses as a cosmetic, giving women a pale complexion and rosy cheeks. This was known as the “arsenic complexion” and was seen as a sign of beauty and wealth.

However, the practice of using arsenic as a cosmetic fell out of favor when it was discovered that the prolonged exposure to arsenic could cause a range of health problems, including skin lesions, organ failure, and death. Despite this, arsenic continued to be used as a medicine, with doctors prescribing it for a wide range of conditions, including syphilis and leukemia.

Interestingly, arsenic was also used as a poison in the 19th century, with many infamous murderers using it to kill their victims. This led to the development of forensic toxicology, which uses chemical analysis to identify toxins in the body and determine the cause of death. Today, arsenic is rarely used in any capacity due to its highly toxic nature.

## **An alchemy of onions**

In the 16th century, Paracelsus, a Swiss physician and alchemist, believed that “like cures like,” a principle known as the “doctrine of signatures.” This theory led to some truly bizarre medical practices, such as treating baldness with a poultice made from mashed up onions and pigeon droppings. Paracelsus believed that the layers of an onion represented the layers of skin and pigeon droppings, being similar to the texture of hair, could stimulate hair growth. This treatment, though clearly disgusting, was one of many remedies based on the “doctrine of signatures,” which signified that the appearance of a plant or animal was an indication of its medicinal properties.

Thankfully, modern medicine has moved beyond the “doctrine of signatures,” and we now have a much better understanding of the causes and treatments for various ailments. Nonetheless, it is fascinating to look back on the strange and often misguided medical practices of the past and see how far we have come in our understanding of the human body and its workings.

## **A diet of Worms**

In the 19th century, before the invention of modern dental techniques, people suffering from toothaches would sometimes turn to a bizarre and

potentially dangerous practice known as “tooth worming.” Tooth worming involved the use of a small hook or wire to probe and “extract” the imaginary tooth worm that was believed to be causing the pain. This practice was based on the ancient belief that dental pain was caused by tiny worms burrowing into the teeth.

However, in reality, toothaches are caused by a variety of factors, including cavities, infections, and gum disease, and probing the teeth with a wire or hook could actually make the pain worse or lead to infection. Thankfully, modern dentistry has come a long way since the days of tooth worming, and we now have a variety of safe and effective treatments for toothaches and other dental problems. Yet it is fascinating to look back on the bizarre and sometimes dangerous practices of the past and appreciate our progress in understanding dental health.

## Chapter 6

# Medical Myths

### **Mother lied to me**

It was once believed that eating chocolate causes acne. This myth may have originated from a 1960s study that has since been debunked. The study, which was conducted on a small group of young men, found a correlation between chocolate consumption and acne. However, more recent studies have failed to replicate these findings, and most dermatologists agree that there is no evidence to suggest that chocolate causes acne.

Interestingly, other studies have suggested that chocolate may have some beneficial effects on the skin. One study found that the flavanols in dark chocolate could improve skin hydration and reduce the appearance of wrinkles. Another study suggested that consuming cocoa flavanols could protect against ultraviolet damage from the sun. While more research is needed in this area, these findings suggest that chocolate may have some potential benefits for the skin, rather than causing harm.

### **Feed a cold**

Here is an interesting medical fact related to the myth of starving a fever — the phrase “feed a cold, starve a fever” may have originated from a medieval belief that illnesses were caused by an imbalance of the four humors in the body, namely blood, phlegm, yellow bile, and black bile. According to this belief, fevers were caused by an excess of blood in the

body. Hence, starving the fever was seen as a way to reduce the amount of blood in the body and restore balance.

However, modern medicine has shown that eating a healthy, balanced diet is important for supporting the immune system and aiding in recovery from illness, regardless of whether you have a fever or not. In fact, not eating enough when you are sick can weaken the immune system and make it harder for the body to fight off infections. While it is important to stay hydrated and avoid overeating, starving oneself during a fever is not recommended by medical professionals. Instead, it is best to listen to your body and eat when you feel hungry, while choosing nutrient-rich foods that support your immune system.

## **Anti-vax facts**

There is an interesting medical fact regarding the myth that vaccines cause autism. This myth originated from a 1998 study that has since been widely discredited and retracted by the journal that published it. The study claimed to have found a link between the measles, mumps, and rubella (MMR) vaccine and autism, but subsequent studies have found no evidence to support this claim. Despite the lack of evidence, the myth that vaccines cause autism continues to persist, largely due to misinformation and fearmongering on the internet and in popular media. This has led to a decline in vaccination rates in some regions, putting children and vulnerable populations at risk of preventable diseases. It is important to note that vaccines are thoroughly tested and rigorously reviewed for safety and efficacy before they are approved for use. While vaccines can cause side effects, serious adverse reactions are extremely rare. The overwhelming majority of scientific evidence supports the safety and effectiveness of vaccines in protecting against infectious diseases, and medical professionals continue to recommend vaccination as an essential public health measure.

## **Sugar High**

There is an interesting medical fact related to the myth that sugar causes hyperactivity in children. The common ideology that sugar affects

children's behavior has been around for centuries. In the early 20th century, some doctors believed that sugar caused "nervousness" and hyperactivity in children and advised parents to limit their children's sugar intake. However, more recent research has failed to find a causal link between sugar consumption and hyperactivity in children. While sugar can cause a temporary increase in blood sugar levels and energy, this does not lead to sustained hyperactivity or behavioral problems. This is supported by a review of multiple studies that found no evidence to support the idea that sugar causes hyperactivity or other behavioral problems in children. Despite this, the myth persists, and many parents still believe that sugar affects their children's behavior. It is important for parents to understand that while sugar may not cause hyperactivity, a diet high in sugar and low in nutrient-rich foods can have negative effects on children's health and behavior. A balanced diet that includes plenty of fruits, vegetables, and whole grains is important for promoting overall health and wellbeing in children.

## **Snap, crackle, pop — no arthritis**

It is a myth that cracking your knuckles causes arthritis. The popping or cracking sound that occurs when you crack your knuckles is caused by the sudden release of gas bubbles from the fluid that lubricates your joints. While some people believe that cracking their knuckles can lead to joint problems or arthritis later in life, there is no scientific evidence to support this claim. In fact, multiple studies have found no link between knuckle cracking and joint damage or arthritis.

Donald L. Unger, a physician from Thousand Oaks, California, cracked the knuckles of his left hand for over 50 years as part of a personal experiment to investigate the risks of knuckle cracking. He deliberately left his right hand untouched as a control. Unger's self-experimentation was aimed at determining if knuckle cracking led to arthritis or any adverse health effects.

Unger's long-term experiment yielded interesting results. X-rays comparing both hands did not show any difference in terms of arthritis between the hand that was cracked and the one that was not. These findings suggested that there was no evidence to support the notion that

knuckle cracking caused arthritis or other detrimental effects on joint health.

Despite this, many people still find knuckle cracking to be annoying or unpleasant, and some individuals may experience discomfort or pain when they crack their knuckles. While cracking your knuckles is generally considered to be harmless, if it causes pain or discomfort, it is best to avoid the habit. If you are concerned about joint health, maintaining a healthy diet and regular exercise routine can help keep your joints healthy and functioning properly.

## **You'll catch your death ...**

Contrary to what some of us may have been told as a child, being exposed to cold air or cold water does not cause a cold. Colds are caused by a group of viruses called rhinoviruses, which are highly contagious and spread easily from person to person through contact with infected surfaces or through the air. While exposure to cold weather or a draft may weaken the immune system and make you more vulnerable to catching a cold, it is not the direct cause of the infection. Interestingly, the idea that cold weather causes colds has been around for centuries, with some ancient civilizations believing that exposure to cold air or water could cause illnesses. Today, we know that the actual cause of colds is viral, and the best way to prevent the spread of the infection is through good hygiene practices such as washing your hands regularly and avoiding contact with infected individuals.

## **Head cold?**

There is a myth that states that you lose most of your body heat through your head. This myth may have originated from a misinterpretation of an old military study. In the 1950s, the United States military conducted a study in which participants were exposed to extreme cold temperatures while wearing arctic survival suits, but no hats. The researchers found that the participants lost a significant amount of body heat through their heads, leading them to conclude that “40 to 45 percent of body heat is lost

through the head.” However, this conclusion was based on a flawed understanding of the study’s results. In reality, the participants were simply not wearing enough clothing to keep them warm, and the fact that their heads were the only exposed part of their bodies led to a disproportionate amount of heat loss from that area. In truth, heat loss from any part of the body is proportional to the surface area exposed to the cold. Therefore, while wearing a hat can certainly help keep you warm in cold weather, it is not true that you lose most of your body heat through your head.

### **Yes ... you can go swimming after eating!**

Here is an interesting medical fact related to the myth that you should not swim after eating. The origins of this myth can be traced back to an old belief that digestion required a significant amount of blood flow, which could be diverted to the muscles during exercise, leading to cramps or other digestive problems.

However, modern medical research has shown that the amount of blood flow required for digestion is actually relatively small, and that the risk of developing cramps or other problems from swimming after eating is very low. That being said, there are some situations where it may be best to avoid swimming after eating, such as if you have a medical condition that affects digestion, or if you have recently consumed a large meal or consumed alcohol. In these cases, it may be best to wait a bit longer before swimming or to speak with a healthcare provider for specific guidance.



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# Chapter 7

## Uncommon Conditions

### **Sexomania!**

Imagine a mysterious world where desires awaken in the midst of dreams, where the boundaries between consciousness and slumber blur. In this world, people have sex while sleepwalking, and do not remember their actions when they wake. This phenomenon is called *sexsomnia*. *Sexsomnia*, also known as sleep-related sexual behavior or sleep sex, is a condition in which individuals engage in sexual activities while asleep. It falls under the broader category of *parasomnias*, which are abnormal behaviors or experiences that occur during sleep.

Research on *sexsomnia* is still limited, and its exact prevalence is not well-defined. However, several case studies and small-scale research studies have shed some light on the condition. Researchers have found that *sexsomnia* tends to occur during the deepest stages of non-REM sleep when parts of the brain are still active enough to initiate behaviors, while the rest remains asleep. The most common scenarios involve established bed partners, though it can also occur in other slept-in settings like college dorms where people share sleeping quarters. The range of behaviors spans from masturbation, inappropriate groping or fondling, sexual vocalizations, all the way to full sexual intercourse with orgasm. It is most frequently initiated by males during an episode. The *sexsomnia* partner is often shocked or alarmed when waking up to find these unsolicited sexual advances occurring, and the person with *sexsomnia* will have no recollection of it come morning. They may be skeptical when informed about their

actions. It is estimated to impact 1% to 7% of the general population to some extent, though the most extreme full form with intercourse is rarer. Predisposing factors can include severe sleep deprivation, substance use like alcohol or drugs, psychological stress, or an underlying sleep disorder such as sleep apnea.

It is important to note that *sexsomnia* can have significant legal and ethical implications, particularly when it involves non-consensual behavior or harm to oneself or others. In some cases, individuals with *sexsomnia* may not be held legally responsible for their actions if they genuinely were not aware of their behavior while asleep. However, it is crucial for individuals with *sexsomnia* to seek medical evaluation and treatment to manage their condition and prevent any potential harm.

## **Teeth inside tumors?**

Teratomas are called monstrous tumors because they can contain a variety of fully developed tissues and organs within them, including hair, teeth, muscle, and bone. In fact, the word *teratoma* is derived from two Greek words — “*terat*” meaning monster and “*oma*” meaning tumor. The unique characteristic of teratomas arises from their origin from germ cells, which are cells that can develop into the various tissues of the male and female reproductive systems.

Teratomas are rare tumors and are mostly benign. They commonly occur in specific locations such as the tailbone (sacroccygeal teratomas), ovaries (mature cystic teratomas), and testicles. The presence of different types of tissue within teratomas makes them intriguing and highlights their developmental origin from pluripotent germ cells (i.e., cells capable of differentiating into one of many cell types). Furthermore, teratomas can manifest with various symptoms depending on their location and size. For example, sacroccygeal teratomas can cause weakness in the lower extremities, painful urination, constipation, and stomach pain. Ovarian teratomas in adolescents or young adults can lead to extreme pelvic and abdominal pain. The diverse presentations and potential complications associated with teratomas add to their intriguing nature.

## **Go screaming into the night!**

Imagine the endless nights of an Arctic winter. As the sun disappears below the icy horizon, a pall of darkness falls over the frozen landscape. Inside an igloo, an Inuit woman stirs from sleep (Figure 45). Without warning, she lets out an eerie shriek. Tearing off her clothes, she runs naked into the snowy blackness.

Thus begins an episode of *piblokto* (pronounced “peeb - lock - toe”), a dramatic phenomenon once thought to afflict the Inughuit people of northern Greenland. Called “Arctic hysteria” by outsiders, it manifests as a manic outburst, causing the afflicted to scream, cry, or imitate animals for hours on end. Afterward, they recall nothing of these doings. To Western physicians meeting *piblokto* for the first time, it appears to be a madness induced by the harsh Arctic climate. Through the lens of psychiatry, it is more so perceived as a “culture-bound syndrome” — a condition specific to the Inuit, tied to the repression and isolation. However, today, we acknowledge that the truth does not yield to such simple explanations. Although there are doubts about whether *piblokto* is a genuine medical disorder, our overall understanding has been clouded by cross-cultural misunderstandings and questionable interpretations.

The accounts of *piblokto* may reveal more about Western views than about the lives of the Inuit. The earliest came from 19th century Arctic expeditions, bringing impressions of the “primitive” Arctic Other. Researchers struggled to categorize these dramatic episodes using medical models alien to Inuit culture. Instead of a psychiatric condition, many Inuit see *piblokto* as an involuntary entrance into a trance state linked to spirituality. It manifests unpredictably like other sacred experiences. Those in its thrall are not thought to be mad but merely undergoing a phenomenon to be managed by the community. However, sorting truth from fancy is far from easy for a culture still in many ways foreign to us. The Inuit remain circumspect about sharing certain traditions with outsiders. To truly understand *piblokto*, we must push past the boundaries of our own worldviews. Only by bridging this cross-cultural divide can we unravel the mysteries of the Arctic’s endless winter nights.



**Figure 45.** Inughuit woman. (Image by Campion Quinn, MD and Dalle-2)

## **Woody Allen watch out!**

Xylophagia is a unique and lesser-known form of pica, an eating disorder characterized by the consumption of inedible substances. While pica typically involves the craving for and ingestion of various non-food items, xylophagia specifically refers to the consumption of items made of wood, such as paper, pencils, and tree barks. This condition has fascinated medical professionals and researchers for centuries and has been the subject of numerous medical journals and studies.

Pica itself is a perplexing phenomenon, with a wide range of associated factors and conditions. It has been linked to deficiencies in essential minerals like iron and zinc, as well as co-morbid conditions such as Kleine-Levin syndrome, mental retardation, and schizophrenia. Interestingly, pica appears to affect people of all ages and ethnic backgrounds but is more prevalent among individuals from lower socioeconomic classes. Children, pregnant women, and those with learning disabilities are particularly vulnerable to this disorder.

In a recent case, an adolescent girl was reported to have xylophagia. Ms. B, a 16-year-old Hindu girl from a lower socioeconomic background,

had no prior history of psychiatric illness or substance abuse in her family. She initially began by chewing betel nut, following in the footsteps of her family members. However, when left alone at school one day, she inexplicably felt the urge to eat notebook paper and derived pleasure from it. This marked the beginning of her paper-eating habit, which escalated quickly to consuming multiple A4 size papers daily during school hours.

Ms. B's case sheds light on the complexity of eating disorders like xylophagia. She was diagnosed with pica (xylophagia). Treatment included medication to address cravings, and provide essential vitamins and nutrients.

## **His heart isn't in the right place**

Dextrocardia is a rare congenital condition where the apex of the heart is located on the right side of the body instead of the left. The prevalence of dextrocardia is roughly 0.01%. While dextrocardia is a rare condition, it can occur in different forms and be associated with other health issues. Some individuals may have isolated dextrocardia where only the heart is affected. People that have simple dextrocardia have a normal life expectancy and should have no problems related to the location of the heart. Others that have dextrocardia along with additional abnormalities may have more severe problems or syndromes such as Kartagener syndrome or situs inversus.

## **Not a club I want to join**

Clubfoot is a common birth defect that affects the foot and ankle (Figure 46). People with this condition have a foot or feet that is turned inward. When you look at the foot, the sole of the foot can face sideways or even upwards, forcing the sufferers to walk on the side of their ankle rather than the sole of their foot. In the past, this was a very debilitating condition resulting in a loss of function in the leg, limited mobility, and in some cases social ostracism. Today, most cases of clubfoot can be treated successfully with just casting and bracing.

There are several famous people who were born with clubfoot. Here are some examples:



**Figure 46.** Clubfoot in an infant. (Image obtained from Wikimedia Commons, the free media repository)

- The English actor and comedian Dudley Moore.
- The American actor, comedian, and writer Damon Wayans.
- The Scottish novelist and poet Sir Walter Scott.
- Josef Goebbels, a prominent figure in Nazi Germany.
- After examining King Tut's mummified remains with CT scans, scientists discovered that he had clubfoot.
- The influential English Romantic poet Lord Byron, who was another historical figure.
- The American soccer player Mia Hamm, who is considered one of the greatest female athletes.
- The Olympic figure skater Kristi Yamaguchi.

## **Mama Mia!**

Lina Marcela Medina de Jurado, a Peruvian woman born in 1933, made medical history as the youngest confirmed mother when she gave birth at the tender age of 5 years, 7 months, and 21 days old (Figure 47). The circumstances surrounding her pregnancy were considered unusual, given that she was less than five years old when she became pregnant. This was



**Figure 47.** Youngest mother in medical history. (Image obtained from Wikimedia Commons, the free media repository)

suggested to be due to a medical condition known as precocious puberty, a condition that triggers early onset of puberty. Lina was taken to the hospital by her parents due to her increasing abdominal size, which doctors initially suspected to be a tumor. It was later determined that she was in the seventh month of her pregnancy, a diagnosis that required additional confirmation from specialists in Lima.

Despite considerable public interest, the family declined lucrative offers for filming rights to her story. Her doctor, Dr. Gerardo Lozada, documented her case through film for scientific purposes. On May 14, 1939, Lina gave birth to a boy via caesarean section due to her small pelvis. It was noted that despite her young age, she had fully mature sexual organs due to precocious puberty. Interestingly, it was reported that her menarche (i.e., first occurrence of menstruation) had occurred at eight months of age, earlier than previously thought. Her son, Gerardo, was initially raised believing that Lina was his sister. He only discovered that she was his mother when he was 10 years old. He lived a healthy life but unfortunately died in 1979 from a bone marrow disease. The identity of the father was never disclosed, and Lina's father was once arrested on suspicion of child sexual abuse but was released due to a lack of evidence. Lina has since



lived a quiet life, working as a secretary in Dr. Lozada's clinic and raising another son, born in 1972.

Despite speculation that Lina's case was a hoax, it has been validated by several doctors based on biopsies, X-rays of the fetal skeleton in utero, and photographs. Lina Medina's case remains one of the most fascinating instances of precocious puberty and extreme early pregnancy in recorded medical history.

## **I remember you!**

Hyperthymesia, also known as highly superior autobiographical memory (HSAM), is a fascinating condition characterized by individuals who possess exceptional memory recall for personal experiences and events in their lives. People with hyperthymesia have the ability to accurately and vividly remember an abnormally large number of details about past events with ease.

One interesting medical fact about hyperthymesia is that it is a relatively rare condition, with only a small number of confirmed cases reported worldwide. It was first described in scientific literature in 2006, when researchers coined the term "hyperthymesia" to describe the remarkable memory abilities observed in individuals like Jill Price, who was one of the first documented cases. She has the ability to recall almost every day of her life in great detail since she was 14 years old. An intriguing example of her ability occurred during a session with researchers.

When scientists tested her memory, they asked her about specific dates and events. Price could recall not only the events of a given date but also the day of the week it was and what she did that day. For instance, she was asked about the date August 16, 1977. Without hesitation, she remembered that it was the day Elvis Presley died and a Tuesday. She went on to describe the dress she wore that day and the fact that she ate a grilled cheese sandwich for lunch. Her ability to recall such specific, mundane details from decades ago astounded the researchers. One well-known person with hyperthymesia is the actress, Marilu Henner. She has been reported to possess an extraordinary memory, being able to recall specific details about events and experiences throughout her life. While she has not officially been diagnosed with hyperthymesia, her memory abilities align with some of the characteristics associated with the condition.

Studying individuals with hyperthymesia provides valuable insights into the complex workings of memory and cognition, and it challenges our understanding of the limits of human memory capacity. It is worth noting that hyperthymesia is distinct from having a good memory or exceptional memorization skills. It specifically refers to the extraordinary ability to remember personal experiences in great detail rather than a general enhancement of memory across all domains. The precise neurological mechanisms underlying hyperthymesia are still not fully understood, and research in this area is still ongoing.

## **You must have been a beautiful baby, but baby look at you now ...**

Brooke Megan Greenberg, born on January 8, 1993, was an extraordinary case in the realm of medical science. Despite increasing in chronological age, Brooke remained physically and cognitively similar to a toddler for the entirety of her life, a condition her doctors dubbed as “Syndrome X.” Measuring about 30 inches tall and weighing roughly 16 pounds, Brooke had an estimated mental age of nine months to one year. Throughout her life, she experienced a series of unexplained medical emergencies including perforated stomach ulcers, seizures, strokes, and a mysterious brain mass, from all of which she inexplicably recovered.

The Greenberg family spent many years seeking an explanation for Brooke’s condition, visiting numerous specialists, but none could provide a diagnosis of any known genetic syndrome or chromosomal abnormality. Even when her DNA was sequenced, her genes showed no association with known premature aging diseases like Werner syndrome or progeria. Richard Walker, an endocrine physiologist, suggested that Brooke’s body was not developing as a coordinated unit but rather as independent parts that were out of synchronization. Despite her chronological age, Brooke’s brain was not much more mature than that of a newborn, her bones resembled those of a 10-year-old, and she still had her baby teeth.

Brooke Greenberg’s life came to an end on October 24, 2013, due to bronchomalacia, a condition usually found in children, leading to breathing difficulties due to weak cartilage in the walls of the bronchial tubes. She passed away at the same hospital in Baltimore, Maryland where she was born. Brooke’s unique case offers an unprecedented opportunity for

researchers to explore the mysteries of human aging and development, even after her passing.

## **Smurfs**

Blue skin disorder, also known as methemoglobinemia, is a rare genetic condition that causes the skin to turn blue or grayish blue in color. This unusual pigmentation is caused by a buildup of methemoglobin, a type of hemoglobin that is unable to carry oxygen efficiently.

Methemoglobinemia can be caused by a variety of factors, including exposure to certain chemicals and drugs, but the genetic form of the disorder is the most rare and severe. In some cases, the blue skin caused by the disorder can be accompanied by other symptoms, such as shortness of breath, fatigue, and headaches. One of the most famous cases of blue skin disorder occurred in the early 20th century in the town of Troublesome Creek, Kentucky. Many members of a local family, known as the “Blue Fugates,” were affected by the disorder, and their blue skin became a source of fascination and curiosity for outsiders.

Today, treatments for methemoglobinemia include the administration of oxygen and other medications that can help to reduce the levels of methemoglobin in the blood. While it remains a rare and unusual condition, blue skin disorder is a fascinating example of the many ways in which genetic mutations can affect the human body.

## **Does it hurt?**

Imagine a world where pain, hunger, and the need for sleep simply do not exist. It may sound like something out of a science fiction movie, but for a remarkable UK girl named Olivia Farnsworth, it is her reality. Olivia has a condition known as “Chromosome 6p Deletion.” Chromosome 6p deletion refers to the loss of genetic material on the short arm (p) of chromosome 6. The specific genes involved, and the size and location of the deletion determine the severity of the condition and its associated signs and symptoms. In Olivia’s case, the absence of pain, hunger, and the need for sleep are remarkable manifestations of this unique genetic anomaly.

Her extraordinary case has captivated the medical community and shed light on the fascinating complexities of our genetic makeup. In 2016, Olivia experienced a truly astonishing event. She was hit by a car and dragged an astonishing 30 meters, yet she emerged with only minor injuries. The impact and subsequent ordeal would have been excruciating for most individuals, but Olivia felt nothing. Her condition shielded her from the agony that others would have experienced in such a traumatic event. Olivia's extraordinary resilience and lack of fear in the face of danger have earned her the nickname "The Bionic Girl." Her story has not only fascinated the medical community but also sparked curiosity and admiration worldwide. Researchers continue to study her case, hoping to gain insights into the complex mechanisms of pain, hunger, and sleep regulation in the human body.

Olivia's remarkable journey serves as a testament to the intricate and awe-inspiring nature of our genetic makeup. It reminds us of the incredible diversity and mysteries that lie within everyone. Her case offers a glimpse into the intricacies of our biological systems and the potential for future advancements in understanding and treating conditions related to pain, hunger, and sleep.

## **That doesn't feel right**

Synesthesia is a fascinating and unusual neurological condition in which a person experiences cross-sensory perceptions, such as seeing colors when they hear music or tasting flavors when they read words. There are many different types of synesthesia, each involving a unique combination of sensory perceptions. For example, some people with synesthesia may perceive numbers or letters as having distinct colors or personalities, while others may experience a specific taste or smell in response to certain sounds or words.

While synesthesia is relatively rare, it is believed to be a result of abnormal neural connections in the brain, which can cause sensory information to become "cross-wired" or mixed up. Although the condition can be disorienting or distracting for some, many people with synesthesia report experiencing a heightened sense of creativity and imagination and may use their unique sensory experiences as a source of inspiration for

their art or music. Research into synesthesia may also have wider implications for our understanding of the complex ways in which the brain processes sensory information and the relationship between perception, emotion, and creativity.

## **A lump in your throat**

Foreign body sensation, also known as globus pharyngeus, is an unusual medical condition in which a person experiences a persistent feeling of having something stuck in their throat, despite there being no physical obstruction present. People with globus pharyngeus may describe feeling as though they have a lump in their throat or a persistent tickle or itch that they cannot quite reach. The condition is believed to be related to a range of factors, including acid reflux, anxiety, and muscle tension in the throat and neck.

While globus pharyngeus can be uncomfortable and distressing for those who experience it, it is not considered to be a serious or life-threatening condition. In most cases, the symptoms can be managed through lifestyle changes and stress reduction techniques, such as meditation or breathing exercises. Research into this unusual condition may provide valuable insights into the complex interplay between physical and psychological factors in the human body and could lead to new treatments for related conditions such as acid reflux and anxiety disorders.

## **Let me sleep on it**

Narcolepsy is a rare and unusual neurological disorder in which a person experiences sudden and uncontrollable bouts of sleepiness, often accompanied by symptoms such as sleep paralysis, hallucinations, and sudden loss of muscle tone. People with narcolepsy may experience sudden and intense feelings of drowsiness during the day, even if they have had adequate sleep the night before. They may also experience episodes of sleep paralysis, in which they are unable to move or speak for several minutes after waking up, as well as vivid dreams or hallucinations that occur when they are falling asleep or waking up. Narcolepsy is believed to be caused by a malfunction in the brain's sleep-wake cycle, which can disrupt the

normal patterns of sleep and wakefulness. While there is no cure for narcolepsy, treatments such as medication and lifestyle changes can help to manage the symptoms and improve quality of life for those who suffer from the disorder. Research into narcolepsy may also provide valuable insights into the complex mechanisms that regulate sleep and wakefulness in the human body and could lead to new treatments for related sleep disorders such as insomnia and sleep apnea.

## **A half loaf is better than none**

Imagine living in a world where half of everything ceases to exist — people, places, even your own body. Those afflicted with hemispatial neglect inhabit this bizarre realm, where the left or right side of reality has simply vanished from their awareness. For them, only half a meal graces the plate, friends conversing on one side are ignored, and getting dressed is an endless struggle. Even the space around them is warped, as the neglected side fades into a void. This perplexing condition emerges after strokes or injuries rob regions of the brain's right hemisphere of blood supply. Without those neurons firing, the mind's eye becomes blind to the corresponding space. Like cleaning half a room, endeavoring to perceive the missing pieces taxes the brain to its limits, causing mobility and cognition to become increasingly challenging. Yet through therapy, neglect survivors can be coaxed to confront the missing spaces, rediscovering a world made whole once more. Their unique struggles illuminate the brain's astonished reaction when its reality is cleaved in two.

## **Your face doesn't ring a bell**

Imagine looking into your spouse's face each morning while having no flicker of recognition. For Hollywood actor Brad Pitt, this bizarre experience is a daily reality. He lives with the rare medical condition called prosopagnosia, or face blindness. Though his vision is perfect, his brain cannot decode the familiar facial features of his family and friends. "So many people hate me because they think I'm disrespecting them," Pitt shared in an interview, describing the social minefield created by his prosopagnosia. No matter how many times he has been introduced to

someone, he will likely forget their face instantly. Even catching a glimpse of himself in the mirror can be shocking when his brain fails to identify his own famous visage.

Prosopagnosia is a rare genetic disorder, affecting an estimated 2% to 3% of the population. While this disorder can run in families, it can also occur in previously healthy people after strokes, head injuries, and in neurodegenerative disorders. This perplexing condition emerges when facial recognition circuits in the brain malfunction. Without these neural networks binding memories to facial identifiers, familiar faces, even friends and family members, become an endless parade of strangers. Though innovative training programs can ameliorate the symptoms, no true cure exists. Many people with prosopagnosia can learn to recognize faces by focusing on other distinguishing features such as hair, voice, and body shape. Pitt and others with this rare disorder must navigate a socially unrecognizable world, their sense of familiarity continually undermined. However, these stories shine a spotlight on how intricately our brains have evolved to identify those we know and love.

## Getting High

Acute Mountain Sickness (AMS) is the most common form of altitude sickness, which typically occurs at elevations above 8,000 feet. Symptoms of AMS can include headache, nausea, dizziness, and fatigue. In most cases, AMS is a mild and self-limiting condition, but in severe cases, it can progress to High Altitude Cerebral Edema (HACE) or High-Altitude Pulmonary Edema (HAPE).

High Altitude Cerebral Edema (HACE) is a severe form of altitude sickness that occurs when the brain swells due to the lack of oxygen at high altitudes. Symptoms of HACE can include confusion, disorientation, hallucinations, and loss of consciousness. HACE is a medical emergency and requires immediate descent to lower altitudes and medical attention.

High Altitude Pulmonary Edema (HAPE) is a condition that occurs when fluid accumulates in the lungs due to the lack of oxygen at high altitudes. Symptoms of HAPE can include shortness of breath, coughing, chest tightness, and bluish lips or fingernails. HAPE is also a medical

emergency and requires immediate descent to lower altitudes and medical attention.

A famous example of someone who suffered from altitude sickness was Sir Edmund Hillary, a New Zealand mountaineer who, along with Tenzing Norgay, became the first persons to reach the summit of Mount Everest in 1953. He suffered from altitude sickness during the climb but was able to recover and reach the summit.

## **You better sit down for this**

Micturition syncope, also known as post-micturition syncope, is a fascinating phenomenon characterized by a temporary loss of consciousness upon urination. While the exact underlying cause is not fully understood, it is believed to be a result of a combination of factors such as a vasovagal response and postural hypotension. It is important to note that the loss of consciousness during micturition syncope does not typically last long. Interestingly, micturition syncope is not limited to urination alone. Some individuals may experience a similar response and fainting episodes during activities such as coughing, defecating, or even vomiting. These triggers can vary from person to person and are influenced by factors such as fatigue, hunger, dehydration, or medication use. Although micturition syncope can occur in both men and women, it does tend to be more commonly observed in males. Older men, in particular, are more prone to experiencing micturition syncope, especially when getting up at night from a deep sleep.

## **A gut decision**

There is growing evidence suggesting a link between the composition of gut bacteria and mental health conditions, including depression. The gut microbiome, the collection of microorganisms residing in our gastrointestinal tract, can play a role in depression through the production of neurotransmitters such as serotonin and glutamate. These neurotransmitters are known to impact mood regulation, and alterations in their production due to imbalances in the gut microbiome may contribute to depressive symptoms. Studies have shown that reduced microbial diversity in the gut is



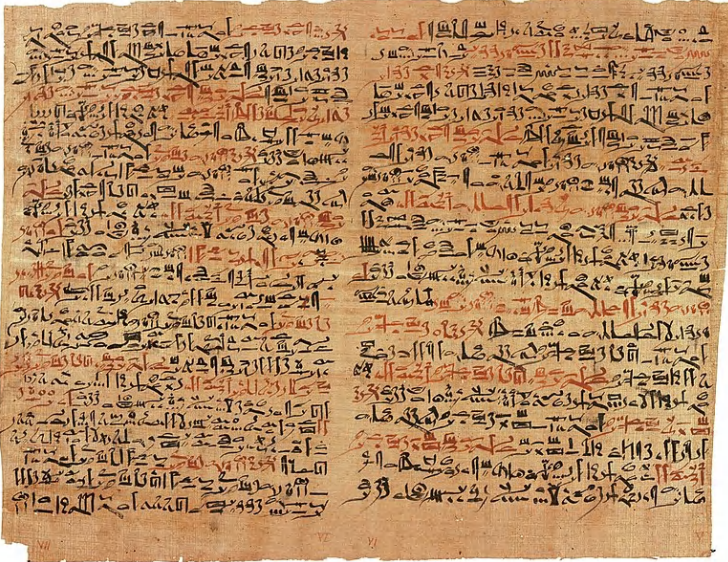
associated with higher depression scores. A diverse and balanced gut microbiome is believed to promote better mental health, while an imbalance in microbial composition may contribute to the development or exacerbation of depressive symptoms.

## **I thought it was just over-eating?**

Recent studies have suggested that the gut microbiota, the collection of microorganisms that live in the digestive tract, may play a role in the development of obesity. The gut microbiota can influence the absorption and metabolism of nutrients and can also affect factors such as inflammation and insulin resistance. Imbalances in the gut microbiota, which can be caused by factors such as diet, antibiotics, and stress, have been linked to obesity and other metabolic disorders. A study published in the journal *Science Translational Medicine* in 2013 examined the effects of gut microbiota transplantation on obesity in mice. The researchers transplanted fecal microbiota from obese or lean human donors into the mice and found that mice that received microbiota from obese donors gained more weight than those that received microbiota from lean donors. The researchers also found that the microbiota from obese donors had a lower capacity to break down carbohydrates, which may contribute to weight gain. This study suggests that changes in gut microbiota composition can influence weight gain and obesity.

## **Mr. Smith goes to goiter-town**

The Edwin Smith Papyrus is an ancient Egyptian medical text that dates to around 1600 BC (Figure 48). It is one of the oldest surviving medical texts and contains descriptions of various medical conditions and treatments. Among these descriptions is a section that refers to a swelling in the neck that resembles goiter, a condition that occurs when the thyroid gland becomes enlarged and causes a noticeable bulge in the neck (Figure 49). Interestingly, the term “goiter” comes from the Latin word *guttur*, which means “throat.” The text describes the condition as “bulging of the throat,” and suggests that it may be caused by an “inflammation of the blood vessels in the neck.” Although the ancient Egyptians did not



**Figure 48.** Edwin Smith Papyrus. (Image obtained from Wikimedia Commons, the free media repository)



**Figure 49.** Woman with goiter. (Image obtained from Wikimedia Commons, the free media repository)

understand the exact function of the thyroid gland, their recognition of goiter suggests that they were aware of its existence and the potential health problems that could arise from its dysfunction. In the Middle Ages, goiter was sometimes associated with witchcraft and supernatural powers, and people who suffered from the condition were often stigmatized and ostracized from society.

Today, goiter is recognized as a treatable medical condition, and it can often be managed using medications or surgery. In regions where iodine deficiency is common, such as the Western Pacific, South-East Asia and Africa, efforts are underway to increase access to iodine-rich foods and supplements, which can help prevent and treat goiter. The prevalence of goiter residing in areas where the soil is low in iodine has been recognized for centuries. This association was first documented in the early 19<sup>th</sup> century by a French physician named Jean-François Coindet, who successfully treated goiter by administering iodine to his patients. The association between goiter and iodine deficiency has led to widespread efforts to increase access to iodine-rich foods and supplements in regions where goiter is prevalent. For example, in the early 20th century, the introduction of iodized salt helped to significantly reduce the incidence of goiter in many parts of the world.

## **Climbing to stand**

There is a peculiar way some individuals with muscle weakness rise from a seated or lying position. It is called Gowers' sign, which is a characteristic movement pattern, like a fascinating secret handshake among those with certain muscle-related conditions.

The process begins with the individual lying flat on their back or sitting on the floor. As they attempt to rise, it becomes evident that their leg muscles are insufficiently strong to lift their body directly. Instead, they rely on their upper body strength and employ a series of movements to gradually ascend. First, they typically roll onto their side and prop themselves up onto their hands and knees. From this position, they use their hands to walk up their legs, using their palms for support and leverage. Their hands may slide upward along their thighs, pushing against their

knees or gripping their own legs. With each movement, they steadily gain height until they eventually achieve a fully upright position. This unique and laborious technique of rising from the floor or a seated position is a distinctive manifestation of Gowers' sign. It serves as a compensatory mechanism for individuals with weakened leg muscles, allowing them to navigate their environment and overcome the limitations imposed by their condition.

Gowers' sign is often seen in people with conditions like Duchenne muscular dystrophy, a genetic disorder that weakens and deteriorates muscles over time. These individuals develop remarkable upper body strength as they compensate for their leg weakness. Their unique method of rising from a seated position becomes a symbol of their resilience and determination in the face of physical limitations.

Next time you witness someone gracefully navigating the world using their own body as a ladder, you might catch a glimpse of Gowers' sign. It serves as a reminder that even in the face of adversity, the human spirit finds creative ways to overcome challenges and adapt.

## **Feeling weak in the knees, and everywhere else**

There is a rare genetic disorder called cataplexy, in which a person experiences sudden and temporary muscle weakness or paralysis, often triggered by strong emotions such as laughter, surprise, or anger. During an episode of cataplexy, a person may have difficulty speaking, moving, or even standing up, but remains fully conscious and aware of their surroundings.

Cataplexy is caused by abnormalities in the part of the brain that controls muscle tone and is typically associated with narcolepsy, a sleep disorder characterized by excessive daytime sleepiness and sudden sleep attacks. Although the exact prevalence of cataplexy is unknown, it is estimated to affect around 70% of people with narcolepsy. Although cataplexy can be disabling and may interfere with daily activities, it is generally not life-threatening, and there is a variety of treatment options available, including medications, lifestyle changes, and therapy. In some cases, avoiding emotional triggers such as excitement or stress can help to reduce the frequency and severity of cataplexy episodes.

## Harley-Quinn-Skin

Harlequin (Figure 50) ichthyosis is a very rare genetic disorder that affects the skin. Infants with harlequin ichthyosis are born with hard, thick plates of skin that crack and split apart, resembling diamond-shaped scales or the costume of a harlequin. The plates of skin can interfere with normal movement and breathing and make it difficult for the infant to maintain a stable body temperature. Although harlequin ichthyosis is a serious and often life-threatening condition, there have been a few reported cases of individuals with the condition surviving into adulthood. One of the most well-known cases is that of Stephanie Turner, who was born with harlequin ichthyosis in 1992. Despite the challenges posed by her condition, Stephanie has gone on to become a motivational speaker and advocate for rare disease research, inspiring others with her courage and determination.



**Figure 50.** “A Harlequin”. A character from the Commedia Dell’arte. (Image obtained from Wikimedia Commons, the free media repository)

## **Geriatric babies**

Progeria is a rare genetic disorder that causes accelerated aging in children, leading to premature death from heart disease or stroke. Although the condition is often referred to as “premature aging,” it does not actually affect the person’s cognitive abilities or personality.

One of the most unique and interesting features of progeria is the physical appearance of the affected children. They typically have very thin and fragile skin, limited hair growth, and a distinctive facial appearance characterized by a small jaw and a prominent forehead. They also experience stunted growth and skeletal abnormalities, which can make them look much older than their actual age. Progeria causes early death, with sufferers only living into their teenage years. The average lifespan of a progeriac is 14 years.

Despite the challenges posed by the condition, many children with progeria can live full and active lives, and there have been several notable cases of individuals with progeria achieving significant accomplishments. One of the most famous examples is that of Sam Berns, who was diagnosed with progeria at age 2 and went on to become a successful student, musician, and motivational speaker. Sam’s positive attitude and determination inspired many people around the world, and he became an advocate for rare disease research before passing away at the age of 17.

## **Fluttering eyeballs?**

One unusual medical case involved a man named Martin Jones, who in 2008, started experiencing a strange symptom where he could hear his own eyeballs moving in their sockets. This condition, known as “ocular flutter,” is an extremely rare neurological disorder that causes involuntary eye movements. Jones’ condition was so rare that doctors had never seen anything like it before, and it took several months of testing and examinations to diagnose him properly. Eventually, doctors discovered that Jones had a small benign tumor in his brain that was pressing on his brainstem, causing the unusual symptom. The tumor was removed through surgery, and Jones’ condition improved significantly. He no longer experienced the strange sensation of hearing his eyeballs move, and his other neurological symptoms also disappeared. Jones’s case remains a fascinating

example of the strange and sometimes unexpected ways that medical conditions can manifest themselves.

## **A stranger in me**

Genetic mosaicism is a phenomenon that occurs when an individual has cells with different genetic makeups within their body. This can happen when mutations occur during cell division in the early stages of embryonic development, resulting in some cells having a different genetic makeup than others.

One fascinating aspect of genetic mosaicism is that it can lead to some individuals having unique physical characteristics or abilities. For example, there have been cases of people with genetic mosaicism who have different eye colors in each eye, or who have both male and female reproductive organs. In some cases, genetic mosaicism can also result in individuals having a heightened immunity to certain diseases or conditions.

While genetic mosaicism is rare, it is more common than you might think. Some estimates suggest that up to 2% of people may be genetic mosaics, although most are unaware of their unique genetic makeup. This phenomenon has important implications for medical research and personalized medicine, as it highlights the importance of understanding the complexities of genetics and individual variation in health and disease.

## **Cocaine Colon**

There is a medical condition known as “cocaine colon.” “Cocaine colon” is a term that refers to the damage that cocaine can cause to the gastrointestinal tract, specifically to the colon. Cocaine is a powerful stimulant drug that restricts blood flow in the body. When used habitually, it can cause significant damage to various body systems, including the digestive system.

Cocaine use can lead to ischemia, or a lack of blood supply, in the intestines. This is because cocaine causes the blood vessels to constrict, reducing the amount of oxygen and nutrients that can reach the tissues. In the worst cases, this can cause necrosis, or cell death, in the colon tissue, a condition that can be life-threatening and often requires surgery to

remove the dead tissue. Symptoms of “cocaine colon” can include abdominal pain, nausea, vomiting, and changes in bowel movements. If necrosis has occurred, symptoms can escalate to severe pain, fever, and signs of septic shock. Another related issue is perforation of the bowel, which can happen if the damage to the colon tissue becomes severe enough.

In addition to these direct effects, cocaine use can also cause a variety of indirect problems with digestion. It can reduce appetite and disrupt normal eating patterns, which can lead to malnutrition over time. It can also disrupt the normal function of the gut, leading to issues like constipation or diarrhea.

## **I’m sad, and my bile is black**

Melancholia, a term that originated in ancient times, has long been associated with a range of emotional and psychological states. Melancholia refers to a state of profound sadness, depression, and introspection that goes beyond ordinary sorrow. It is characterized by a persistent feeling of melancholy, often accompanied by a sense of hopelessness, despair, and a loss of interest in previously enjoyed activities. Melancholia is considered a complex emotional condition that affects an individual’s mood, thoughts, and overall well-being.

The term “melancholia” traces its origins to ancient Greece, where it was coined by the physician Hippocrates. The word itself is derived from the Greek words “melas” meaning black and “khole” meaning bile. This etymology reflects the influence of the humoral theory, a prominent medical concept during that era. The humoral theory, developed by ancient Greek and Roman physicians, posited that the body was composed of four humors: blood, phlegm, yellow bile, and black bile. Each humor was associated with specific qualities and had an influence on an individual’s physical and mental health. Melancholia was believed to be caused by an excess of black bile, one of the four humors. According to the humoral theory, an imbalance or excessive presence of black bile was thought to result in melancholic temperament. This theory associated black bile with qualities such as coldness, dryness, and heaviness, which aligned with the melancholic experience of sadness, introspection, and a sense of heaviness in one’s emotional state.



Throughout history, melancholia has captivated the minds of scholars, philosophers, and artists. In ancient times, it was often regarded as a form of divine inspiration, linking melancholia to creativity and genius. During the Renaissance, melancholia gained further significance as philosophers like Robert Burton explored its nature and connection to mental health. In modern times, the understanding of melancholia has evolved. It is no longer tied to the humoral theory but is recognized as a complex mood disorder within the field of psychiatry. Today, melancholic symptoms are considered part of major depressive disorder and other related conditions, and they are assessed and treated within a medical framework.

## **Not appropriate for the baby to play with**

The eerie phenomenon known as the “death rattle” is a common occurrence during the dying process. It is a distinctive sound produced by a person’s respiratory system towards the end of life. While it can be unsettling to hear, it is often a sign that the body is transitioning, and the person is entering the final stages of death. The cause of the death rattle, also known as terminal respiratory secretions, is attributed to a combination of factors. As a person approaches the end of life, their body undergoes changes that affect the respiratory system. The accumulation of fluids, such as saliva or mucus, in the airways and the relaxation of muscles involved in breathing contribute to the characteristic sound of the death rattle. It is important to note that the death rattle itself is not the cause of death, but rather a symptom of the body’s natural processes during the dying phase.

## **An early form of Disco?**

Have you heard about the “Dancing Plague” that occurred in the 14th century in Europe? The Dancing Plague, also known as the Dancing Mania (Figure 51), was a strange phenomenon that caused hundreds of people to dance uncontrollably for hours or even days at a time. The dancers often suffered from convulsions, hallucinations, and respiratory problems, and many died from exhaustion or heart attack. The cause of the Dancing Plague is still unknown, but there are several theories, including mass hysteria, religious fervor, and poisoning from contaminated rye



**Figure 51.** Detailed from a 1642 engraving by Hendrik Hondius, based on Peter Breughel’s 1564 drawing depicting sufferers of a dance epidemic occurring in Molenbeek that year. (Image obtained from Wikimedia Commons, the free media repository)

grain. The outbreak of the Dancing Plague occurred in several waves over several centuries, but the most famous and well-documented occurred in Strasbourg, France, in 1518. The name “Dancing Plague” may seem unusual or even comical, but it was a serious and deadly disease that affected many people. Today, the Dancing Plague remains a mystery and a cautionary tale of how strange and unpredictable diseases can be.

### **Not a new dance craze...**

St. Vitus Dance is a historical term used to describe a range of movement disorders, including Sydenham’s chorea, a rare neurological disorder that can occur as a complication of untreated streptococcal infections such as strep throat. The name “St. Vitus Dance” originated in the Middle Ages and was named after the Christian martyr St. Vitus, who was believed to

have the power to heal people from movement disorders. The condition was associated with dancing manias and outbreaks of mass hysteria, which were thought to be caused by demonic possession or divine punishment. In modern medicine, St. Vitus Dance is no longer used as a diagnostic term, but Sydenham's chorea, which can cause involuntary movements, muscle weakness, and emotional instability, is still known as a complication of untreated strep infections. Interestingly, St. Vitus is also the patron saint of actors, comedians, and dancers, as well as people with neurological and movement disorders. Today, St. Vitus Dance remains an intriguing and mysterious historical term that reflects the cultural and medical beliefs of the time.

## **Un ballet de fous**

An unusual name for a rare neurological disorder "Jumping Frenchmen of Maine," is characterized by exaggerated startle reflex and involuntary movements. This condition was first observed in the late 19th century among a group of lumberjacks of French-Canadian origin in the remote forests of Maine. These lumberjacks exhibited an extreme startle response to any unexpected noise or touch, such as jumping, shouting, flailing, or repeating words or actions. The condition was named by George Beard, a physician who observed the disorder in the 1870s. The name "Jumping Frenchmen of Maine" reflects the origin of the sufferers and symptoms of the disorder. The exact cause of the condition is still unknown, but it is believed to be a type of reflex neurosis, a neurological disorder that involves abnormal reflex responses to stimuli.

Although the Jumping Frenchmen of Maine disorder is rare and not well-understood, it has contributed to the understanding of the neurological mechanisms underlying the startle reflex and involuntary movements. Today, the name is considered outdated and potentially offensive, but it remains a fascinating and intriguing chapter in the history of medicine.

# Chapter 8

## Syndromes

### Living dead

While zombies are a popular trope in horror films and fiction, there is no scientific evidence to support the existence of zombies in the real world. However, there are some rare medical conditions that can cause individuals to exhibit behaviors that are like those associated with zombies. One example is a rare neurological disorder called Cotard's syndrome, also known as "walking corpse syndrome." It is a rare psychological disorder that turns the world upside down for those who suffer from it. This condition causes individuals to believe that they are dead or that their organs are decaying or missing.

People with Cotard's syndrome find themselves trapped in a disturbing state of mind, where they believe they are non-existent or deceased. They may feel detached from their own body, as if they are mere observers of their own existence. These delusions of death or non-existence are often accompanied by intense feelings of guilt, despair, and a profound sense of emptiness. This perplexing disorder is thought to stem from abnormalities in how the brain perceives the self and the external world. It can be associated with other mental health conditions, such as depression and anxiety disorders, making the experience even more challenging for those affected. Some people with Cotard's syndrome also experience delusions of immortality or invincibility, leading them to engage in dangerous behaviors that put themselves or others at risk.

Fortunately, Cotard's syndrome is treatable. A combination of medication and psychotherapy can help individuals regain a sense of reality and alleviate their distressing symptoms. Additionally, studying this rare condition offers researchers valuable insights into the intricate workings of the brain, shedding light on how we perceive ourselves and the world around us. These discoveries may pave the way for new treatments and interventions for related psychiatric disorders. Cotard's syndrome stands as a remarkable example of the complexity of human cognition and the profound impact it can have on our perception of reality.

## **Not furious rabies**

Another condition that has been associated with zombie-like behaviors is rabies. Rabies infections usually present with one of two forms. The first is called Furious Rabies, and it accounts for 80% of the presentations. It is characterized by hyperactivity, aggressive and violent behavior, as well as hydrophobia. Death occurs after a few days due to cardio-pulmonary arrest. The second type of rabies is called apathetic rabies. Patients with this form of rabies complain of headaches and fever, they become listless, and quiet, but remain lucid. The virus eventually causes paralysis and the patient lapses into a coma after 10 days. Death results from respiratory arrest.

The aggressive and violent behavior found in humans and animals after a rabies infection lead to the myth of the "zombie virus." However, while rabies can cause changes in behavior, it does not turn people into zombies in the traditional living-dead sense.

## **A deadpan face**

People with Moebius syndrome are unable to move their facial muscles or even move their eyes from side to side. They can never smile or frown, or even wink at a friend. Moebius syndrome is named after the German neurologist Paul Julius Moebius, who first described the condition in the late 19th century. Moebius syndrome is a rare neurological disease. It primarily affects the muscles responsible for facial expression and eye

movement. Most individuals with Moebius syndrome are born with complete facial paralysis and cannot close their eyes or form facial expressions. The condition can also affect other nerves responsible for speech, chewing, and swallowing.

### **I think that I shall never see ...**

Tree-man syndrome, also known as epidermodysplasia verruciformis, is an extremely rare genetic disorder that causes the skin on the hands and feet to become thick and bark-like in appearance, resembling the trunk of a tree. The condition is caused by a defect in the immune system that makes it difficult for the body to fight off certain strains of the human papillomavirus (HPV). People with tree-man syndrome are highly susceptible to developing warts and other benign skin growths, which can grow out of control and cause the skin to become thick and scaly (Figure 52).



**Figure 52.** Abul Bajandar, 25 years old, is the fourth man in the world with the tree-man illness, a rare skin disorder caused by a virus named human papillomaviruses, awaiting treatment at the Dhaka Medical College, in Dhaka, Bangladesh. (Image obtained from Wikimedia Commons, the free media repository)

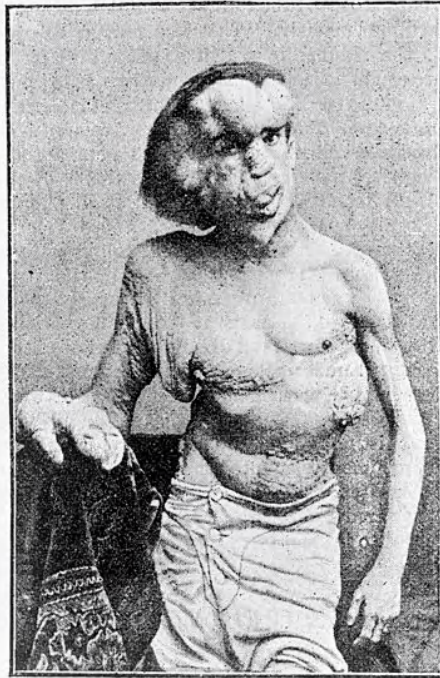
The condition can be extremely painful and can make it difficult for people to perform basic daily activities. While there is no cure for tree-man syndrome, treatments such as surgical removal of the growths and laser therapy can help to manage the symptoms. In some cases, the use of immunosuppressive drugs can also help to prevent the growth of new warts.

Tree-man syndrome is an incredibly rare and fascinating medical condition that highlights the complex ways in which our immune systems interact with the world around us. While it can be debilitating for those who suffer from it, research into this condition may also hold promise for the development of new treatments for other skin disorders and immune-related illnesses.

### **“I am not an animal! I am a human being. I am a man.”**

Proteus syndrome is a medical condition that it is named after the Greek god Proteus, who was known for his ability to change his shape. The name was chosen because the condition is characterized by excessive and asymmetric growth of various tissues in the body, leading to a wide range of physical manifestations and irregularities. The overgrowth can affect bones, skin, organs, and other tissues, causing disproportionate enlargement of certain body parts. This mosaic-like growth pattern contributes to the uniqueness and complexity of the syndrome. Proteus syndrome is a rare disorder with highly variable clinical and radiographic symptoms. It typically becomes more noticeable between the ages of 6 and 18 months. Left untreated, the overgrowths can potentially lead to functional impairments and complications. Additionally, individuals with Proteus syndrome have an increased risk of developing embryonic tumors.

Joseph Merrick, commonly known as the “Elephant Man,” is often linked to Proteus syndrome (Figure 53). Joseph Merrick lived during the late 19th century and gained fame by being exhibited in human novelty exhibitions due to the unique physical features caused by his condition. While a definitive diagnosis was not made during his lifetime, many experts believe that his condition was consistent with Proteus syndrome. Joseph Merrick passed away on April 11, 1890, at the Royal London



The "Elephant Man," from a photograph taken in 1889.

**Figure 53.** Joseph Merrick who suffered from Proteus syndrome. (Image obtained from Wikimedia Commons, the free media repository)

Hospital in the United Kingdom. Initially, his cause of death was ruled as asphyxiation, with the weight of his head, estimated to be around 20 pounds, causing him to suffocate once he laid down. However, after performing an autopsy, Sir Frederick Treves, the surgeon who treated Merrick, determined that Merrick had died from a dislocated neck, which likely severed his vertebral arteries.

## Got any aspirin?

Exploding head syndrome is a rare and startling neurological condition in which a person experiences a loud and sudden "explosion" or noise in their head, often accompanied by a bright flash of light. Despite its alarming name, the condition is not dangerous or life-threatening.



People with exploding head syndrome typically report feeling as though they have been jolted awake by a loud noise or explosion, even though there is no external stimulus present. The condition is believed to be related to disruptions in the brain's auditory processing centers, which can cause misperceptions of sound and light.

While exploding head syndrome can be a frightening and unsettling experience, it is not considered to be a serious or debilitating condition. In most cases, the symptoms can be managed through lifestyle changes, such as improving sleep hygiene and reducing stress levels. However, research into this unusual condition may help to shed light on the complex ways in which the brain processes sensory information and could lead to new insights into related neurological disorders.

## **ET Phone home**

Alien hand syndrome is a rare and unusual neurological condition in which a person's hand seems to have a mind of its own, acting independently and often in opposition to the person's intentions. People with alien hand syndrome may experience involuntary movements of their hand, such as grasping or reaching for objects without conscious control. They may also experience a sense of detachment or alienation from their own hand, as though it is acting independently of their own will. Alien hand syndrome is believed to be caused by damage to the corpus callosum, the part of the brain that connects the two hemispheres and facilitates communication between them. While there is no cure for alien hand syndrome, treatments such as physical therapy and cognitive-behavioral therapy can help to improve control over the affected hand and reduce the impact of the condition on daily life. Research into alien hand syndrome may also provide valuable insights into the complex ways in which the brain controls movement and the relationship between intention and action.

## **A little more than the life of the party**

Klüver-Bucy syndrome is a rare neurological condition that causes dramatic behavioral changes in individuals. People with this syndrome

experience a lack of fear and hypersexuality. They tend to put inappropriate objects in their mouths and have a strong urge to touch or even eat things that they should not. Sufferers of Kluver-Bucy syndrome lack inhibitions and can make poor or dangerous decisions as a result. They may compulsively approach strangers or expose themselves in public. This syndrome is usually caused by bilateral damage to the medial temporal lobes of the brain, often from illness or injury. People with Kluver-Bucy syndrome can struggle to function normally in daily life. Their disinhibited behaviors can be socially unacceptable or even illegal. Caretakers have a difficult task trying to protect sufferers from harming themselves or others. While some symptoms may improve over time, there is currently no cure for the syndrome. Kluver-Bucy syndrome is a challenging condition that disrupts thinking and behavior in those affected.

While Kluver-Bucy syndrome is rare, it is a fascinating example of the complex ways in which the brain processes sensory information and regulates behavior. Research into this unusual condition may help to provide valuable insights into the relationship between brain function and behavior and could lead to new treatments for related neurological disorders.

## **Contortionists**

In the intricate web of genetic disorders, there is a group of connective tissue disorders known as Ehlers-Danlos Syndrome (EDS) that can truly captivate our attention. This collection of conditions arises from defective collagen or collagen deficiency, leading to a myriad of unique symptoms and challenges for those affected. One intriguing and engaging medical fact about people with Ehlers-Danlos Syndrome is their extraordinary flexibility (Figure 54). Due to the absence or abnormality of collagen, the connective tissues in their bodies become hyperelastic, resulting in incredibly stretchy skin and hyper-flexible joints. Imagine being able to perform contortions and bending in ways that seem almost unimaginable to others. It is like having an innate superpower of flexibility.

However, this extraordinary elasticity comes with a price. While it may seem fascinating, individuals with EDS face numerous painful



**Figure 54.** A patient with Ehlers-Danlos syndrome showing extraordinary joint flexibility. (Image obtained from Wikimedia Commons, the free media repository)

defects and challenges in their daily lives. Deformed fingers, joint dislocations, and chronic pain are just a few of the struggles they endure. Simple tasks like buttoning a shirt or opening a jar can become daunting obstacles. Moreover, the absence or deficiency of collagen in their tissues makes them more susceptible to life-threatening complications. One such complication is aortic dissection, where the aorta, the main artery carrying blood from the heart, can tear or rupture. This poses a significant risk and highlights the importance of vigilant monitoring and medical management for individuals with EDS to prevent such critical events.

Despite the challenges and potential dangers, individuals with Ehlers-Danlos Syndrome demonstrate remarkable resilience and strength. Their ability to adapt and navigate through life with grace and determination is awe-inspiring. They find ways to manage their symptoms, seek appropriate medical care, and support one another through online communities and support groups.

## Refeeding Syndrome

Refeeding syndrome is a potentially life-threatening condition that can occur when someone who has been starved is given food too quickly. When the body is starved, it enters a state of conservation, and its metabolic rate slows down to conserve energy. As a result, the body becomes accustomed to using fat and protein as its primary energy sources rather than glucose. When food is reintroduced too quickly, the body may not be able to handle the sudden influx of glucose, which can lead to a rapid drop in electrolytes, such as potassium, magnesium, and phosphate. This can cause a variety of symptoms, including muscle weakness, seizures, heart failure, and even death.

Refeeding syndrome is particularly likely to occur in individuals who have experienced severe malnutrition (Figure 55), such as those with eating disorders or individuals who have endured starvation during periods of famine or war. Additionally, it can also affect people who have undergone gastrointestinal surgery or have been on prolonged fasts.



**Figure 55.** A malnourished boy. (Image obtained from Wikimedia Commons, the free media repository)

Recognizing the importance of a gradual and monitored reintroduction of nutrients is essential to mitigate the risks associated with refeeding syndrome and ensure the individual's safety and well-being. By understanding the intricate balance of the body's nutritional needs and the potential dangers of rapid refeeding, healthcare professionals can take the necessary precautions and tailor treatment plans accordingly. Proper monitoring, gradual reintroduction of food, and close attention to electrolyte levels are vital steps in the management and prevention of refeeding syndrome, ultimately promoting the safe and successful recovery of individuals who have experienced starvation.

One example of someone who suffered from refeeding syndrome is a 21-year-old female patient who was admitted to the hospital with anorexia nervosa. The patient had lost a significant amount of weight and had not eaten solid food for several weeks. Upon admission, the patient was started on a gradual refeeding protocol, with a goal of increasing her caloric intake by 200 to 400 calories per day. Within a few days of starting refeeding, the patient developed symptoms of refeeding syndrome, including weakness, confusion, and low blood pressure. Blood tests revealed a rapid drop in electrolyte levels, including potassium, magnesium, and phosphate. The patient was immediately given electrolyte replacement therapy and was closely monitored for signs of worsening symptoms. Despite treatment, the patient's condition continued to deteriorate, and she eventually developed heart failure. She was transferred to the intensive care unit, where she was placed on a ventilator and received aggressive treatment for refeeding syndrome. After several weeks of treatment, the patient's electrolyte levels stabilized, and she was eventually able to be discharged from the hospital.

## **Tourette Syndrome**

Tourette syndrome is a neurological disorder characterized by repetitive, involuntary movements and vocalizations known as tics, and is often associated with other symptoms and co-occurring conditions such as anxiety, obsessive-compulsive disorder, and attention deficit hyperactivity disorder. Tics are sudden twitches, movements, or sounds that people do repeatedly. People who have tics cannot stop their body from making

these movements. For example, a person might keep blinking over and over. Or, a person might make a grunting sound unwillingly. Vocal tics are a type of tics made with the voice, they can include humming, clearing the throat or yelling out a word or phrase. Rarely, these vocal tics include foul language or curses. The tics typically show up between the ages of 2 and 15 and males are four times more likely than females to develop Tourette syndrome.

While most tics associated with Tourette syndrome are brief and repetitive movements or vocalizations, some individuals with the condition may experience tics that are more elaborate or creative, called “super tics.” For example, some individuals with Tourette syndrome have been known to produce intricate dance moves, musical performances, or even impressive feats of memory or calculation as part of their tics. Coprolalia is the involuntary utterance of socially inappropriate or taboo words or phrases. While it is one of the more sensationalized and well-known symptoms associated with Tourette’s Syndrome, it’s actually relatively rare among individuals with the condition. Only a small percentage of people with Tourette’s (estimates range from 10% to 30%) exhibit coprolalia. While super tics are relatively rare, they provide a unique and fascinating glimpse into the diverse range of symptoms that can be associated with Tourette syndrome. Additionally, for some individuals with Tourette syndrome, these more elaborate tics may be a source of creative expression or personal fulfillment, rather than a source of distress or impairment.

## **Who are you, and what did you do with my wife?**

Imagine looking at someone you love, someone who is supposed to be familiar, and feeling an inexplicable sense of unease. You become convinced that this person is an imposter, a perfect copy pretending to be your loved one. This bewildering experience is known as Capgras syndrome or Capgras Delusion. In Capgras syndrome, individuals firmly believe that someone they know, often a family member or close friend, has been replaced by an identical imposter. This delusion persists despite evidence to the contrary, leading to a constant state of paranoia and distrust.

The origins of Capgras syndrome lie in a disruption within the brain’s ability to process familiar faces. Normally, we recognize familiar faces

and experience emotional responses tied to those relationships. However, in Capgras syndrome, this connection between visual recognition and emotional response is severed. Brain imaging studies have revealed abnormalities in specific regions involved in face processing and emotional processing, such as the fusiform face area and the amygdala. These findings suggest that Capgras syndrome arises from a breakdown in the neural circuitry responsible for perceiving faces and generating emotional reactions.

Capgras syndrome can occur in various underlying conditions, including neurodegenerative disorders, psychiatric disorders, and brain injuries. Treatment typically involves a combination of psychotherapy, medication, and tailored supportive interventions to address the specific needs of the individual.

While relatively rare, Capgras syndrome serves as a captivating illustration of the complexities of our brains and the incredible ways in which they can shape our perception of reality. It reminds us that our minds can create astonishing distortions even within our closest relationships.

## **Foreign Accent Syndrome**

There is a rare medical condition called Foreign Accent Syndrome, in which a person suddenly begins speaking with a foreign accent, even if they have never visited the country associated with the accent. The condition typically occurs after a traumatic brain injury or stroke and is thought to be caused by damage to the part of the brain that controls speech.

Foreign Accent Syndrome was first documented in the 1940s, when a Norwegian woman began speaking with a strong German accent after being hit by shrapnel during an air raid. Since then, there have been numerous documented cases of the condition, including a Texan woman who developed a British accent after dental surgery, and an Australian woman who developed a French accent after a migraine.

Although the condition may seem humorous at first glance, it can have serious social and psychological consequences for those affected. People with Foreign Accent Syndrome may be perceived as foreigners in their own country and may experience discrimination or isolation as a result. Treatment for the condition is typically focused on speech therapy

and rehabilitation, and in some cases, the accent may gradually disappear over time as the brain recovers from the injury.

## **Hit the showers**

There is a rare genetic disorder called trimethylaminuria, also known as fish odor syndrome, in which a person emits a strong odor that resembles rotting fish, even after bathing or showering. Trimethylaminuria is caused by a defect in the production of an enzyme that is responsible for breaking down trimethylamine, a compound found in certain foods such as fish, eggs, and liver. People with trimethylaminuria may experience social isolation, discrimination, and depression due to the unpleasant odor, which can be especially noticeable during times of stress, menstruation, or illness. The condition is relatively rare, affecting an estimated 1 in 200,000 people worldwide.

Although there is no cure for trimethylaminuria, there are several ways to manage the condition, such as avoiding foods that contain high levels of trimethylamine, taking antibiotics to reduce the levels of trimethylamine-producing bacteria in the gut, and using topical or oral deodorants to mask the odor. Some people with trimethylaminuria also find relief through dietary supplements or other alternative therapies, although the effectiveness of these treatments is not well established.

## **Statuesque**

Fibrodysplasia ossificans progressiva (FOP), also called “Stone Man Syndrome,” is a rare genetic disorder in which a person’s muscle and connective tissues gradually turn into bone, eventually causing permanent immobilization of the joints. FOP is caused by a mutation in a gene called *ACVR1*, which regulates the development and repair of bone and muscle tissue.

FOP is one of the rarest genetic disorders in the world, affecting an estimated 1 in 2 million people. The condition typically begins in early childhood, with the formation of small bony growths, or heterotopic ossification, in the muscles and connective tissues. Over time, these growths can merge, creating a second skeleton that immobilizes the joints



and restricts movement. Although there is no cure for FOP, there are several ways to manage the symptoms, such as pain management, physical therapy, and surgical removal of the bony growths. Researchers are also exploring potential treatments for FOP, such as drugs that can target the ACVR1 gene or prevent the formation of bone.

## **Too much starch**

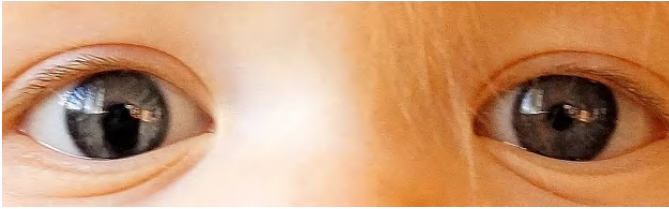
The disease “stiff man syndrome” was not named that way because of misogyny, but because it was initially thought to affect only men. However, it is now known that “Stiff Person Syndrome” (SPS) because scientist have determined that it can affect people of any gender, age, or ethnicity.

SPS is a rare neurological disorder that causes muscle stiffness and spasms, particularly in the trunk and limbs. This condition is caused by a dysfunction of the nervous system, which leads to abnormal activity in the muscles. Although the exact cause of SPS is unknown, it is thought to be related to autoimmune factors, as many people with SPS have antibodies in their blood that attack specific cells in the nervous system. Although SPS can be disabling and may interfere with daily activities, there are several treatments available to help manage the symptoms, including medications, physical therapy, and lifestyle modifications. With appropriate treatment, many people with SPS are able to manage their symptoms and maintain a good quality of life. Famous people who have been diagnosed with SPS include Isaac Asimov, Martha Graham, Josef Stalin, Andy Griffith and Jerry Lewis.

## **Meow!**

Cat eye syndrome (Figure 56), also known as Schmid-Fraccaro syndrome, is a rare genetic disorder that affects various parts of the body, including the eyes, ears, heart, and kidneys. The condition is caused by a missing or duplicated section of chromosome 22, which can lead to a wide range of symptoms.

One of the most unique and striking features of cat eye syndrome is the presence of small, slit-like openings in the lower part of the iris, which



**Figure 56.** Cat's eye syndrome. (Image obtained from Wikimedia Commons, the free media repository)

can resemble a cat's eye. These openings, known as colobomas, do not typically affect vision, but can be a noticeable and defining characteristic of the condition. In addition to colobomas, people with cat eye syndrome may also have other physical features such as a cleft palate, heart defects, and kidney abnormalities. Although there is no cure for cat eye syndrome, there are treatments available to help manage the symptoms and improve quality of life. With proper care and support, many people with cat eye syndrome are able to live full and active lives.

## Go ask Alice

Alice in Wonderland Syndrome (AIWS) is a rare neurological condition in which a person experiences distorted perception of time, size, and spatial relationships, often leading to hallucinations. The condition is named after the famous character in Lewis Carroll's book, *Alice's Adventures in Wonderland* (Figure 57), who experiences similar perceptual distortions.

One of the most common symptoms of AIWS is micropsia, or the perception that objects are smaller than they actually are. This can lead to the sensation that the person or their surroundings are shrinking, or that they have entered a miniature world. Other symptoms may include macropsia (perception that objects are larger than they actually are), time distortion, and changes in visual perception such as color intensity and contrast.

Although the exact cause of AIWS is not known, it is thought to be related to abnormal activity in the part of the brain that processes sensory information. The condition can occur as a result of a variety of neurological disorders, including migraines, epilepsy, and brain tumors. Although



**Figure 57.** Alice in Wonderland. (Image obtained from Wikimedia Commons, the free media repository)

AIWS can be distressing and disorienting, most people with the condition experience only occasional episodes and are able to lead normal lives with proper management and treatment.

## Cancel my bar tab

In 2011, a man in California was diagnosed with a rare and unusual condition known as “auto-brewery syndrome.” This condition causes the body to produce high levels of yeast in the gut, which can ferment carbohydrates and produce alcohol.

The man, who had a history of alcoholism, started experiencing symptoms of drunkenness, including slurred speech and difficulty walking, even when he had not consumed any alcohol. Doctors were initially skeptical of his claims but later discovered that his blood alcohol level was consistently above the legal driving limit. After further testing, doctors confirmed that the man's gut was producing high levels of ethanol, which was then absorbed into his bloodstream. In simple terms, his body was turning sugary and starchy foods (carbohydrates) into alcohol through the action of yeast or bacteria in his gut. This means that he could become intoxicated without consuming any alcohol. The condition was treated with a special diet and medication to reduce the levels of yeast in his gut, and he was able to make a full recovery.

Auto-brewery syndrome is extremely rare, with only a handful of cases reported worldwide. However, it highlights the unusual ways in which the body can produce alcohol and the potential for medical conditions to have unexpected symptoms.

## **Trick or treat**

While werewolves are only fictional creatures, there is a real condition known as “Werewolf Syndrome.” Werewolf syndrome also known as hypertrichosis, is a rare genetic disorder characterized by excessive hair growth all over the body, including the face and extremities.

The condition was given the name “Werewolf Syndrome” due to its similarity to the fictional creature that is said to have a body covered in hair. People with hypertrichosis have thick, dark hair that covers their face and body, giving them a werewolf-like appearance. Hypertrichosis can be caused by genetic mutations, and it can be inherited or acquired. Acquired hypertrichosis can be caused by certain medications, hormonal imbalances, or underlying medical conditions.

Although hypertrichosis is a rare disorder, it has been documented throughout history and has captured the attention of many people due to its intriguing name and unique appearance. Today, there is no cure for hypertrichosis, but hair removal techniques such as shaving, waxing, or laser therapy can help manage the excessive hair growth.

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# Chapter 9

## Disease and Infections

### A disease with a twist

Lyme disease, which is caused by the bacterium *Borrelia burgdorferi* and transmitted by tick bites (Figure 58), is one of the most common zoonotic diseases in the United States. Lyme disease was named after the town of Lyme, Connecticut. In the mid-1970s, a group of children and adults in Lyme began to develop an unusual set of symptoms, including joint pain and a circular rash. Two local mothers, Polly Murray and Judith Mensch, were instrumental in calling attention to the mysterious condition afflicting their families and neighbors. The Connecticut State Department of Health was alerted and began an investigation. Soon, Yale researchers, led by Dr. Allen Steere, got involved and discovered that the condition was a tick-borne disease caused by the bacterium *Borrelia burgdorferi*. The condition was initially referred to as “Lyme arthritis” due to the significant joint inflammation observed in early cases, but as more symptoms outside of joint inflammation were recognized, it was renamed “Lyme disease.” The discovery of Lyme disease in Lyme, Connecticut, led to increased awareness of the illness and prompted further research into its causes and treatment. Today, Lyme disease is a common tick-borne illness that affects people in many parts of the world, but its association with the town of Lyme remains an important piece of medical history.

While Lyme disease can cause a range of symptoms in humans, including fever, headache, and fatigue, one of its most distinctive features is the “bull’s eye” rash that often develops at the site of the tick bite.



**Figure 58.** Ixodes tick, carrier of Lyme disease. (Image obtained from Wikimedia Commons, the free media repository)

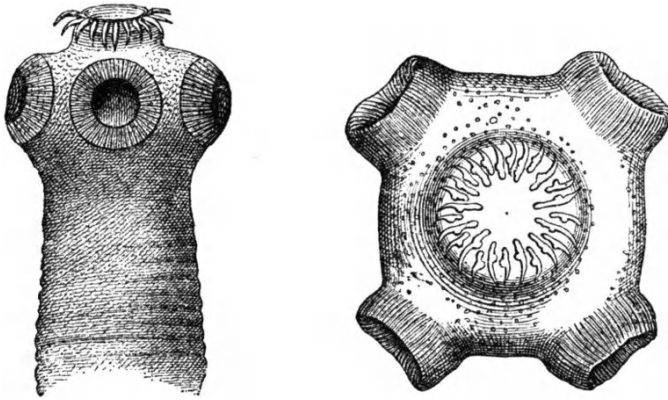
This rash is usually round or oval in shape and may be red or pink, with a central area of clearing that creates the appearance of a bull's eye. If left untreated, Lyme disease can lead to more serious symptoms, including joint pain, neurological problems, and heart problems. However, with prompt treatment, most people with Lyme disease can recover fully.

Interestingly, the history of Lyme disease is intertwined with the history of ticks themselves. While the disease was not officially recognized until the 1970s, some evidence suggests that it may have been present in certain regions of the world for thousands of years. Similarly, the emergence of Lyme disease in the United States has been linked to the expansion of deer populations, which are an important host for the ticks that transmit the disease.

Despite its potentially serious health effects, Lyme disease has also played a role in raising awareness about the importance of tick bite prevention and environmental conservation, as researchers work to better understand the complex interactions between humans, animals, and the natural world.

## **I'm having seconds**

Tapeworms are parasitic flatworms that can live in the intestines of humans and animals. In humans, one of the most common tapeworm



**Figure 59.** The Scolex of a tapeworm. (Image obtained from Wikimedia Commons, the free media repository)

species is the beef tapeworm, *Taenia saginata*, which is acquired by eating undercooked contaminated beef.

The adult tapeworm attaches to the intestinal wall by hooks and suckers on its scolex, also known as its head (Figure 59). It grows by producing a chain of segments called proglottids that contain eggs. Each segment contains around 80,000 eggs and tapeworms can produce more than a million eggs per day. New segments are continually formed as the tapeworm grows and these segments grow fast. The rate of growth may exceed 22 cm (8.66 inches) per day. Tapeworms in the human gut can reach 15 meters (45 feet) long. While there are reports of tapeworms exceeding 30 meters (90 feet), these are unsubstantiated in the medical literature. The tapeworm segments detach and are excreted in feces, releasing eggs which can spread infection. Tapeworms can live in the human intestine for 25 years or more.

Tapeworm infection often causes mild or no symptoms but can lead to vitamin deficiencies, intestinal blockage, and other complications in some cases. Treatment for tapeworms involves oral medication to kill the parasite, often praziquantel or niclosamide. Preventing tapeworm infection relies on proper cooking of meat and reducing consumption of raw or undercooked beef and pork. Public health initiatives promoting hand-washing, safe food preparation, and effective sewage treatment can also help reduce the transmission of tapeworm parasites.

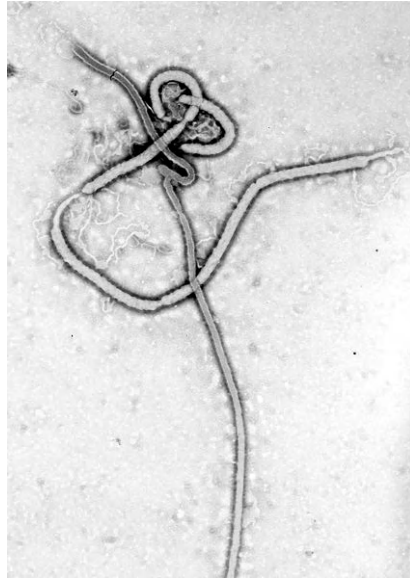


## **Ebola**

The lush rainforests of the Democratic Republic of the Congo hold many secrets, including deadly diseases unseen by human eyes. In 1976, an insidious newcomer announced its arrival. Near the winding Ebola River, a mysterious illness emerged that would bring entire villages to their knees. Ebola virus infection, known for its dramatic and severe symptoms, strikes with a sudden onset of fever and debilitating fatigue, followed by a cascade of increasingly severe symptoms. Victims often experience a troubling combination of headaches, sore throat, and muscle pains, which rapidly escalate into vomiting, diarrhea, and in some cases, both internal and external bleeding. As the virus progresses, its impact on the body's vascular system can lead to a drop in blood pressure, resulting in a life-threatening condition known as shock. In some outbreaks, 90% of infected patients perished. The rapid progression and severity of these symptoms make Ebola not just a medical challenge, but also a public health emergency whenever outbreaks occur. Doctors were helpless against the microscopic predator, which managed to vanish back into the jungle after taking hundreds of lives. Under the shadow of towering trees, a killer without a face had earned its moniker — the Ebola virus (Figure 60). Decades later, outbreaks flare up now and then, reminding us that the rainforest still harbors deadly secrets waiting to be unleashed.

## **Monsters are not just in story books**

The Willowbrook hepatitis study, which took place in a state institution for intellectually disabled children in Staten Island, New York, was conducted in the 1950s and 1960s when there was no effective vaccine for hepatitis B. In this study, intellectually disabled children were intentionally infected with the hepatitis virus without their consent or that of their guardians. Researchers sought to study the natural course of the disease and to test the effectiveness of a new experimental vaccine. However, the study raised serious ethical concerns as the children involved were often from poor and marginalized backgrounds and were unable to provide informed consent for their participation. The study led to numerous infections and deaths among the children and is now recognized as a prime



**Figure 60.** Micrograph of an Ebola virus, with magnification  $\times 60,000$ . (Image obtained from Wikimedia Commons, the free media repository)

example of the need for ethical considerations and protection of vulnerable populations in medical research.

## **The Philadelphia Experiment**

The Philadelphia General Hospital Experiment was a study conducted in the 1950s that exposed mentally ill patients to radiation without their consent, to study the effects of radiation on the human body. Patients at the hospital were subjected to high doses of radiation, often without proper shielding or protective measures. Many of the patients suffered severe health problems because of the exposure, including radiation burns, cancers, and death. The experiment has been widely condemned for its ethical violations, including the lack of informed consent from the patients involved and the failure to provide appropriate medical care to those who were harmed. The study has also raised broader questions about the use of vulnerable populations in medical research and the need for rigorous

ethical standards and oversight in scientific inquiry. The Philadelphia General Hospital Experiment serves as a stark reminder of the dangers of conducting medical experiments without proper ethical and scientific considerations, and the need to prioritize the well-being and autonomy of human subjects in all research.

## Rocky mountain low

In the late 1800s, ghostly rumors drifted down from the formidable Rocky Mountains. There were tales of a strange malady stalking the hills and hollows. Victims complained of unrelenting fever and their skin blossomed in an eerie, red, spotted rash (Figure 61). Locals could only watch helplessly as their loved ones wasted away, consumed from within. Doctors were baffled by the origin of the disease, unsure of how to combat this spectral killer. It would be decades before scientists traced the culpable bacteria, *Rickettsi rickettsia*, back to its source — the tiny and tenacious Rocky Mountain wood tick. This persistent parasite was responsible for the spread of the sickness, named for its towering home range. This stealthy adversary is transmitted by tick bites, which launches its assault with a sudden fever and a peculiar rash, often appearing on wrists and ankles before ambitiously spreading. Accompanied by severe headaches, muscle pain, and often nausea, this bacterial infection cloaks itself in

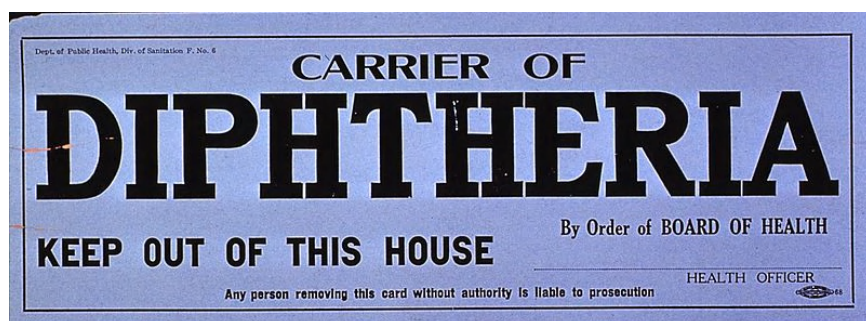


**Figure 61.** The rash of Rocky Mountain Spotted Fever. (Image obtained from Wikimedia Commons, the free media repository)

commonplace symptoms, making early detection a challenge. Yet, the stakes are high; if left untreated, Rocky Mountain spotted fever (RMSF) can escalate rapidly, causing serious complications and boasting a mortality rate of up to 20%. Swift and effective antibiotic treatment, typically within the first five days of symptoms, dramatically reduces this risk, turning a potentially lethal disease into a manageable ailment. This juxtaposition of common symptoms with a high untreated mortality rate underscores the critical importance of awareness and prompt medical intervention in the face of RMSF. Today, the fever's spooky moniker remains, though modern medicine can now tame the spotted specter. Still, in the shadowy wilderness, the ticks continue waiting to ambush the unwary. Their bite carries the ghostly echoes of a mysterious mountain illness.

## It wasn't a very good year

There was a diphtheria epidemic in Spain in 1613. It was known as El Año de los Garrotillos (the Year of Strangulations), where thousands of people died from the disease, mostly children (Figure 62). The name reflects the severe and suffocating nature of diphtheria symptoms. Diphtheria is caused by the bacterium *Corynebacterium diphtheriae*. This insidious invader spreads with ease, traveling through the air in tiny droplets expelled when an infected person coughs or sneezes. Close contact or sharing personal items with an infected individual can also pass along this formidable foe. Once in the body, the bacteria releases a potent toxin,



**Figure 62.** Diphtheria Quarantine Warning Sign. (Image obtained from Wikimedia Commons, the free media repository)

wreaking havoc on tissues and organs. The hallmark sign is a thick, gray membrane forming in the throat or nose, that not only symbolizes the disease but also serves as a grim reminder of its obstructive and dangerous nature. The name diphtheria was derived from the Greek word for “leather” or “hide” because of the characteristic coating that appears in the throats of infected individuals (Figure 63). This membrane, often referred to as the “pseudomembrane,” can lead to a sensation of strangulation and asphyxiation in affected individuals. Before the availability of vaccines, diphtheria was a significant cause of childhood death. Although it was particularly prevalent among younger age groups, outbreaks could claim many lives, not just among the youngest and poorest individuals. During the “Year of Strangulations” epidemic, the high mortality rate among those infected



**Figure 63. Diphtheria.** (Image obtained from Wikimedia Commons, the free media repository)

with diphtheria was likely due to the suffocating effect of the pseudomembrane, which restricted the passage of air into the lungs. This historical event highlights the life-threatening nature of diphtheria and the significant impact it had on the affected population during that time. Today, vaccination remains our most effective shield, keeping pandemics like this at bay.

## **Need new shoes?**

In some regions of the world, individuals may experience spontaneous loss of their toes. Ainhum (pronounced aye-num), also known as dactyololysis spontanea, is a disease involving constricting fibrous bands that can result in auto-amputation. Ainhum has a prevalence worldwide but is most common in African countries and Brazil. Patients with this disease often develop a fibrous band at the base of their toes although it rarely occurs on fingers, and the cause is often spontaneous and unknown. As the disease progresses over time, the fibrous band grows and constricts, eventually cutting off the blood supply to the toe. Within a few years, the tissue of the toe dies and falls off in a spontaneous, bloodless, auto-amputation. Unfortunately, there has not been an effective treatment established for this disease.

## **I'm so dizzy, my head is spinning**

A disease of the human vestibular system, called benign paroxysmal positional vertigo (BPPV), is one of the most commonly diagnosed vestibular disorders and can be effectively treated with a simple repositioning maneuver. BPPV occurs when tiny calcium crystals in the inner ear become dislodged and migrate into the semicircular canals, causing episodes of dizziness and vertigo. However, healthcare professionals can perform specific repositioning maneuvers, such as the Epley maneuver or the Semont maneuver, to reposition the crystals and alleviate symptoms. These maneuvers involve a series of head movements designed to guide the crystals out of the affected semicircular canal, providing relief and restoring normal vestibular function.

This fascinating fact highlights the effectiveness of non-invasive and relatively simple interventions for certain vestibular disorders. The

repositioning maneuvers for BPPV offer a targeted solution that can significantly improve the quality of life for individuals affected by this condition. It showcases how understanding the underlying mechanisms of vestibular disorders allows for the development of targeted treatments that address the specific issues within the vestibular system.

## **Don't have a cow, man!**

'Cow tuberculosis, known as *Mycobacterium bovis*, is sometimes used to treat human bladder cancer. A weakened strain of *Mycobacterium bovis*, called Bacillus Calmette-Guérin (BCG) is an effective immunotherapy agent. BCG has been used for over a century to prevent tuberculosis and has also become a standard approach for treating non-muscle-invasive bladder cancer. BCG immunotherapy involves depositing the BCG directly into the bladder through a catheter. The treatment prompts the immune system to attack cancer cells in the bladder while minimizing the impact on other parts of the body. It is primarily used for noninvasive (stage 0) and minimally invasive (stage 1) bladder cancers, following transurethral resection of the bladder tumor (TURBT).

What makes this treatment fascinating is that BCG initially derived from a tuberculosis vaccine but was developed to effectively stimulate the immune system to attack cancer cells in the bladder. While the exact mechanisms are not fully understood, the ability of BCG to activate the immune response against bladder cancer has made it a valuable therapeutic option. This approach highlights the potential of repurposing existing medical treatments to address other conditions, showcasing the versatility and ingenuity of medical research and innovation.

## **TB sanitoriums**

The leading cause of death in the US during the 1800s and early 1900s was tuberculosis, sometimes called the "the white death." Without antibiotics or a vaccine, sanitoriums for the treatment of tuberculosis patients were created. Sanitoriums were specialized hospitals that were designed to isolate and treat patients with tuberculosis, using a combination of rest, fresh air, and a healthy diet.

Patients at sanatoriums were often encouraged to spend time outdoors, and many were given access to rooftop gardens or balconies to get plenty of fresh air and sunshine. They were also assigned strict diets, which often consisted of a lot of milk, eggs, and other nutrient-rich foods. While it was not understood in the past, when skin is exposed to ultraviolet rays of the sunlight, it produces vitamin D. Vitamin D increases the ability of the innate immune system to fight tuberculosis. In addition, malnutrition depresses the immune system. The combination of longer exposures to the sun and a healthier diet led to significant improvements in the tuberculosis infections of many patients. While sanatoriums may seem like a pleasant and relaxing way to treat an illness, they were highly regimented and often involved a lot of boredom and isolation for the patients. However, the practice of sanatoriums did have some success in treating tuberculosis, and many patients were able to recover and go on to live normal, healthy lives.

Today, thanks to advances in medical science, effective antibiotics, and improved living conditions, tuberculosis is much less common. Yet, the legacy of the sanatoriums remains a fascinating and somewhat bizarre reminder of the strange and often extreme measures that were once used to treat deadly diseases.

## **They did what?**

The St. Louis Encephalitis Experiment was a study conducted in the 1950s by the US Army and the City of St. Louis, which aimed to test the effectiveness of mosquito control measures in preventing the spread of the St. Louis encephalitis virus. As part of the study, thousands of mosquitoes infected with the virus were released into residential neighborhoods in the city. The experiment resulted in numerous cases of illness and at least one death, as individuals who were bitten by the infected mosquitoes contracted the virus and became ill.

The experiment has been heavily criticized for its ethical implications, particularly due to the lack of informed consent from the residents who were exposed to the infected mosquitoes. The study also raised questions about the scientific validity of intentionally infecting human populations with a potentially deadly virus. The St. Louis Encephalitis Experiment



remains a cautionary tale about the need for ethical considerations and rigorous scientific oversight in medical research, particularly when it involves potentially harmful interventions on human subjects.

## **Violations**

A disturbing medical study was conducted by American scientists in Guatemala from 1946 to 1948. Prisoners and patients in a mental hospital were intentionally infected with syphilis to determine if penicillin could prevent certain sexually transmitted diseases. The study, however, provided no useful results and was concealed for many years.

This Guatemala study grossly violated medical ethics, as it involved infecting individuals with a severe disease without their understanding or consent. This lack of regard for the rights of the study participants was notable even in a time when such unethical practices were more common. The Guatemala study drew sharp criticism, with Wesleyan researcher Laura Stark deeming it “unusually unethical, even at the time.” Upon learning of the study, President Obama questioned whether such events could occur in the present day. This led his administration to request a new evaluation of international medical studies by a bioethics panel.

However, when the Institute of Medicine (IOM) was tasked with further investigating the Guatemala study, it had to withdraw due to a conflict of interest. It was revealed that in the 1940s, five members from an affiliated organization of the IOM were significantly involved in federal syphilis research and had connections to the Guatemala study. The Guatemala study has similarities to the infamous Tuskegee syphilis experiment that was conducted by the U.S. Public Health Service between 1932 and 1972. In the Tuskegee study, African American men in Alabama were not informed they had syphilis and were denied treatment, with researchers choosing to observe the natural progression of the disease.

Both the Guatemala study and the Tuskegee experiment represent gross violations of medical ethics. Both involved vulnerable populations, deceptive practices, lack of informed consent, and purposeful denial of appropriate treatment. The revelations of these studies have led to significant changes in how clinical trials are conducted, particularly regarding

informed consent and the ethical treatment of study participants. However, they remain stark reminders of the potential for abuse in medical research.

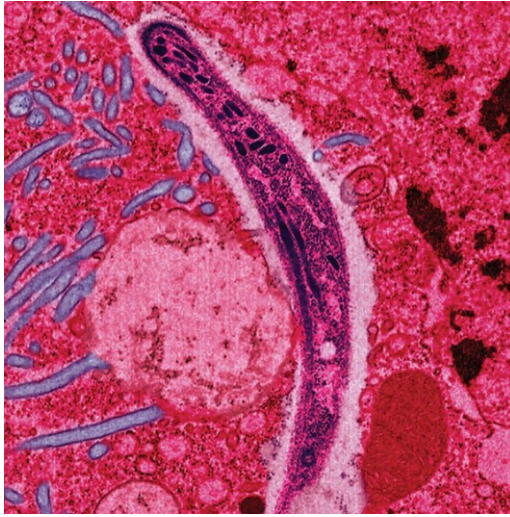
## **Parasite**

Alphonse Laveran was a French physician and scientist who discovered the malaria parasite in 1880 and was awarded the Nobel Prize in Physiology or Medicine in 1907 for his work. Laveran was a pioneer in the use of microscopy to study disease. He was one of the first scientists to use microscopy to study blood cells, and he was able to identify the malaria parasite in the blood of infected patients. Laveran's work was a breakthrough in the fight against malaria. His discovery of the cause of the disease led to the development of effective treatments and prevention methods. Malaria is still a major problem in many parts of the world, but Laveran's work has helped to save millions of lives.

## **Bad Air**

Malaria is one of the oldest diseases known to humanity, with the earliest known written records dating back to ancient Egypt, indicating that the disease is likely much older than that. Malaria was once thought to be caused by the unwholesome atmosphere caused by the exhalations of swamps and marshes. The name, Malaria comes from two Italian words mala aria or bad air. We know now that malaria is caused by a parasite that is spread to humans by mosquitoes (Figure 64). The parasite infects red blood cells and can cause a variety of symptoms, including fever, chills, and anemia. In severe cases, malaria can be fatal. Malaria is a major public health problem in many parts of the world, particularly in sub-Saharan Africa. In 2020, there were an estimated 241 million cases of malaria worldwide, and an estimated 627,000 people died from the disease.

There are a number of effective treatments for malaria, but the disease is still a major challenge to global health. There is no vaccine for malaria, and the parasites that cause malaria are becoming increasingly resistant to drugs. Despite these challenges, there is hope for the future. There are a



**Figure 64.** This false-colored electron micrograph shows a sporozoite of *Plasmodium berghei* migrating through the cytoplasm of midgut epithelia of an *Anopheles stephensi* mosquito. (Image obtained from Wikimedia Commons, the free media repository)

number of promising new research initiatives underway to develop new treatments and prevention methods for malaria. With continued effort, it is possible to one day eradicate this devastating disease.

## Yellow Jack

The names “yellow fever” or “yellow jack” derive from jaundice that affects some patients with this viral illness. Jaundice is a yellowing of the skin and eyes that is caused by a build-up of bilirubin in the blood. Bilirubin is a waste product that is produced when red blood cells break down. Yellow fever is a viral hemorrhagic disease that is spread to people by the bite of infected mosquitoes. The virus is found in tropical and subtropical areas of Africa and South America.

Most people who are infected with yellow fever do not get sick. However, about 15% of people who get sick will develop a severe form of the disease. Severe yellow fever can cause bleeding, shock, and organ failure. About 20% to 50% of people who develop severe yellow fever die from the disease.

While there is no specific treatment for yellow fever, there is supportive treatment that includes measures such as providing fluids and electrolytes, treating any complications, and providing supportive care. However, there is a vaccine for yellow fever. The vaccine is safe and effective, and recommended for people who travel to areas where yellow fever is prevalent. Yellow fever, although a serious disease, is preventable with vaccination, which is the best way to protect yourself from yellow fever.

## **Guess who's coming to dinner**

Kuru is a rare and fatal neurodegenerative disorder, found in the Fore people who live in Papua New Guinea. It occurred in epidemic levels from the 1950s to 1960. The word “kuru” means “trembling” in the Fore language. It was originally thought to be caused by a virus but is now known to be caused by a prion. Prions are misfolded proteins that can cause other proteins to misfold, leading to the death of brain cells. Kuru is spread through contact with infected brain tissue. Infections occurred as a result of ritualistic cannibalism, which was practiced by some tribes in Papua New Guinea. Kuru belongs to a class of infectious diseases called prion transmissible spongiform encephalopathies. Kuru is related to other spongiform encephalopathies such as Creutzfeldt-Jakob disease, fatal familial insomnia, in humans and bovine spongiform encephalopathy in cows (also known as mad cow disease). While there is no cure for kuru, treatment is supportive and includes measures such as providing fluids and electrolytes, treating any complications, and providing supportive care. Although kuru is a serious disease, it is preventable. The best way to prevent kuru is to avoid contact with infected brain tissue. In New Guinea, the government actively discouraged the practice of cannibalism. This led to a decline of the disease incidence, which has now mostly disappeared.

## **Fighting the fever**

In the steamy jungles of Panama, death came on delicate wings. When the French arrived in the 1880s to conquer the narrow land bridge between continents, they envisioned carving out a glorious canal to unite the seas. However, the mosquitoes swarming the tropical swamps carried a deadly



**Figure 65.** Head of a mosquito showing antennae and proboscis. (Image obtained from Wikimedia Commons, the free media repository)

cargo — yellow fever (Figure 65). The workers, drenched in sweat and blood, collapsed by the dozens as the mysterious illness ravaged their ranks. Fevers spiked without warning and jaundice tinted their skin yellow as vital organs failed. The iron will of the French was no match for the insect's vampire bite. Their dreams crumbled along with the bodies piling up on the jungle floor. It is estimated that more than 20,000 workers died in the 1880's.

Decades later, the Americans took up the mantle. However, they were determined not to be felled by the same fate as their predecessors. Under Dr. William Gorgas' command, they waged war against the wily mosquito, draining still waters where she laid her eggs and dousing the land in pesticides. Finally, the workers could toil in peace, the constant buzzing threat eliminated. The Panama Canal rose at last, a monument to both engineering and medical triumphs. With yellow fever vanquished, the wings of death no longer fluttered over the churning brown waters. Machine had conquered nature, pushing back the shadows of disease.

## **Genetic safe-harbor**

In the malaria-plagued regions of Africa, a quiet evolutionary arms race has played out for centuries. The microscopic malaria parasite,

transmitted through the bite of the *Anopheles* mosquito, has long stalked the local populations, infecting, and multiplying within red blood cells. Most succumb to the disease's raging fevers, as their cells rupture and spill their contents. However, a genetic mutation provides a stealthy defense for some — the sickle cell gene. This alteration changes the very shape of red blood cells, transforming them into crescent moons. Within these curving walls, the malaria parasite struggles to gain footing, and is starved of its usual nourishment. The mutated cells become poor hosts, denying the parasite its parasitic victory. Thus protected, those with the sickle cell trait can walk with impunity in malaria's domain.

Over generations, the advantage afforded by sickle cell has risen in prevalence and is now present in up to 25% in some African communities. By altering the profile of red blood cells, the sickle gene outsmarts the malaria parasite at its own game. An enduring evolutionary alliance has arisen between human and disease — one that offers both vulnerability and resistance, decided by the flip of a gene.

## **A Royal Disease**

Gout is a type of arthritis caused by a build-up of uric acid crystals in the joints. It is one of the oldest joint diseases known to humans. It was described by Egyptian doctors more than 4,000 years ago. It results in redness, swelling and excruciating pain in the affected joint. Older males are most commonly affected as were those with a rich diet. The severity of the symptoms and the wealth of the patients led to gout being called "The disease of kings and king of diseases." While there are many effective treatments available today, historical treatments for gout were often quite unusual.

One such treatment was to wear a live chicken on the affected joint! This bizarre remedy was believed to draw the gout out of the joint and into the chicken, which was then sacrificed. Another treatment involved placing a hot coal or stone on the joint, which was believed to burn off the gout. While these treatments may sound strange (and possibly even harmful), there were some remedies that were surprisingly effective. For example, eating cherries was found to be helpful in reducing the symptoms of gout, likely due to their anti-inflammatory properties. So, while the treatments of the past may seem odd to us today, there may have been some kernels of truth in their methods!

## **Get out of the hospital**

The word “nosocomial” has its roots in ancient Greek. The term is derived from “nosos,” meaning “disease,” and “komeion,” meaning “to take care of.” It is a fitting word to describe infections that are acquired in health-care settings, such as hospitals or clinics, where patients come to receive treatment for their ailments but may leave with an additional health concern. Nosocomial infections can be caused by bacteria, virus, or fungus that lurk in healthcare facilities and can spread from patient to patient or from healthcare workers to patients.

One of the reasons nosocomial infections are a concern is their potential impact on patient health and outcomes. These infections can lead to complications, prolonged hospital stays, increased healthcare costs, and even mortality in some cases. The Centers for Disease Control (CDC) reports that there are approximately 1.7 million hospital acquire infections each year, which results in 99,000 deaths. Healthcare facilities take various preventive measures to reduce the risk of nosocomial infections, including strict adherence to infection control protocols, hand hygiene practices, proper disinfection and sterilization procedures, and surveillance programs.

So, the next time you are in a hospital or clinic, remember the origins of the word “nosocomial” and take extra precautions to protect yourself from healthcare-associated infections!

## **They’re in this year**

Scrofula collars were a type of metal collar worn around the neck to treat scrofula (also called mycobacterial cervical lymphadenitis), a form of tuberculosis that commonly affected the lymph nodes in the neck (Figure 66). These collars were often made of silver, which was believed to have healing properties, and they were typically worn for long periods of time, sometimes even years. Interestingly, scrofula collars became a fashion statement in the late 19th century, even among those who did not suffer from scrofula. It was believed that the silver in the collar could help prevent illness and ward off evil spirits, and so many people wore them as a form of protection.



**Figure 66.** Woman with enlarged cervical lymph node from tuberculosis infection, or scrofula. (Image obtained from Wikimedia Commons, the free media repository)

While the use of scrofula collars may seem strange to us today, it is a reminder of the lengths people have gone to in the past to treat and prevent illness. And who knows — maybe silver collars will make a fashion comeback someday!

## **You missed a spot**

Medicine and surgery have had a significant impact on fashion throughout history. One example is that during the 16th century, many people were infected with syphilis, which caused disfiguring sores on the face. To hide these sores, women began wearing a small patch of fabric, known as a “beauty patch,” on their faces. The placement of the patch was often symbolic, with certain positions indicating different messages or social statuses.

## **Ding Dong, Avon is calling**

The trend of using rice powder as a cosmetic product for hiding smallpox scars during the 18th century was based on a medical practice. Smallpox is a highly contagious viral disease caused by the variola virus. It is characterized by fever, a distinct rash with raised, fluid-filled blisters, and



flu-like symptoms. Smallpox had devastating effects, causing high mortality rates and leaving survivors with severe scarring, blindness, and sometimes even long-term complications such as arthritis or encephalitis. Physicians during that time often prescribed the application of rice water to treat various skin conditions, as it was believed to have soothing and healing properties. The use of rice powder as a cosmetic product was a natural extension of this medical practice, as women sought to improve the appearance of their skin using the same ingredient. The fine texture and light-reflecting properties of rice powder helped to visually minimize the appearance of the scars, providing a smoother and more even complexion.

The development of vaccines for smallpox in the late 18<sup>th</sup> century had a significant impact on this fashion. As vaccines led to a decline in the prevalence of smallpox scars, and women no longer needed to rely on rice powder to hide their scars, new cosmetic products and trends emerged. For example, during the Victorian era, pale skin was considered fashionable, leading to the use of lead-based cosmetics and powders, which were later found to be toxic.

## **Not for old fogies**

The rise of flapper fashion in the 1920s was associated with advancements in medicine and health practices. The Spanish Flu pandemic of 1918 had brought about a heightened awareness of hygiene, and the need for clothing that could be easily washed and cleaned. As medical knowledge improved, doctors also began to warn against the dangers of other restrictive clothing, such as tight shoes and girdles, which could cause a variety of health problems, including back pain, poor posture, and reduced blood flow. This led to the development of new clothing styles and materials, such as elastic fabrics and rubber-soled shoes, which allowed for greater comfort and mobility. The adoption of flapper fashion in the 1920s was also a reflection of changing social attitudes, as women began to challenge traditional gender roles and expectations. The looser, more androgynous style of clothing reflected a desire for freedom and independence, as well as a rejection of the restrictive and constrictive clothing of the past.

## Flu Negotiations

The Spanish flu outbreak during World War I had an impact on the peace negotiations and the eventual armistice that ended the war. The toll of the Spanish flu on soldiers and civilians, combined with the overall war-weariness experienced by nations, contributed to a growing desire for peace. The devastating effects of the flu, which infected millions and caused significant mortality (estimated to be in excess of 50 million people) (Figure 67), intensified the longing for an end to the conflict and the restoration of stability and normalcy. Indeed, the humanitarian aspect of the Spanish flu outbreak had a profound impact on the peace negotiations. The recognition of the immense suffering caused by the flu prompted a heightened sense of empathy and a desire to prioritize the well-being of individuals and communities affected by the disease. This humanitarian perspective likely influenced the negotiation process and the decisions made.



**Figure 67.** The United States Army influenza ward. (Image obtained from Wikimedia Commons, the free media repository)

## **More productive than chopping down the cherry tree**

During the winter of 1777 to 1778, in the Valley Forge winter encampment, smallpox was a significant concern among the Continental Army. Already challenged by the cold, a lack of supplies and desertion of some troops, George Washington was concerned by the threat posed by the disease among his troops. He made the crucial decision to inoculate his troops against smallpox. Historian Elizabeth Fenn describes Washington's resolution to inoculate the Continental forces as one of the most important decisions of the war.

Washington's proactive approach to smallpox inoculation helped to mitigate the impact of the disease within his army. By taking preventive measures, he ensured that his troops would be healthier and more prepared to face the challenges of war. This decision demonstrated Washington's understanding of the importance of maintaining the health and well-being of his soldiers.

## **Saints preserve us**

In the annals of medical history, numerous diseases and conditions have been colloquially named after Christian saints, often due to historical associations, cultural beliefs, or the saint's patronage for certain ailments. Here are a few examples:

- **St. Vitus' Dance:** This is an older name for Sydenham's chorea, a neurological disorder characterized by rapid, uncoordinated jerking movements primarily affecting the face, hands, and feet. It is a neuropsychiatric manifestation of rheumatic fever.
- **St. John's Disease:** An old term for epilepsy. St. John the Baptist was considered the patron saint of people with epilepsy.
- **St. Blaise's disease:** Refers to illnesses of the throat. St. Blaise is invoked for protection against injuries and illnesses of the throat.
- **St. Agatha's disease:** Refers to breast cancer or disorders of the breast. St. Agatha of Sicily is the patron saint of breast cancer patients and survivors because she had her breasts cut off during her martyrdom.

- St. Anthony's Fire: As mentioned earlier, this term has been used to describe two different conditions — ergotism and erysipelas. Ergotism is a poisoning produced by eating food containing ergot, a naturally occurring alkaloid chemical. Erysipelas is a bacterial skin infection that causes large, red, raised patches of the skin, especially that of the face and legs. Of note, St. Elmo's Fire is not a disease, rather, it is a weather phenomenon that sailors superstitiously viewed as a good omen. It refers to a visible plasma discharge on pointed objects in a strong electric field, such as those experienced during thunderstorms.

Please note that these terms are largely historical and not commonly used in contemporary medical practice. Modern medicine uses more precise terminology for these conditions. Also, the associations between these conditions and the saints are largely based on historical and cultural context, not on any direct connection between the saint and the disease.

## Black death

One disease that had a significant impact on world history is the bubonic plague, also known as the Black Death (Figure 68). The plague is thought to have originated in China and spread along trade routes to Europe and other parts of the world in the 14th century.

The discovery of the bacterium responsible for causing the bubonic plague, also known as the Black Death, is attributed to a Swiss — French physician and biologist named Alexandre Yersin (Figure 69). Yersin was a student of Louis Pasteur. He is best known for his work on the plague, a deadly infectious disease that ravaged Europe in the 14th century, killing an estimated 75–200 million people. In 1894, there was a major outbreak of the plague in Hong Kong, and Yersin was one of the scientists dispatched to investigate the cause of the disease. Using a microscope, Yersin was able to identify a bacterium in the lymph nodes of infected patients, which he named *Pasteurella pestis*, in honor of his mentor, Louis Pasteur. In 1944, Yersin's supporters changed the name to *Yersinia pestis* (Alexandre's mother was so proud, Louis' mom ... not so much). Although Yersin is credited with discovering the bacterium that causes the bubonic plague, he



**Figure 68.** A doctor’s protective garments worn during the bubonic plague. The beak in the mask contained fragrant flowers or herbs that were thought to protect the wearer from infection. (Image obtained from Wikimedia Commons, the free media repository)

was not the first to recognize its role in the disease. The German physician Robert Koch also independently identified the bacterium around the same time, and the two men are often given joint credit for the discovery.

The Black Death was a highly infectious disease transmitted by fleas that infested rats. The disease caused fever, chills, and the development of painful, swollen lymph nodes known as buboes. It was highly contagious and spread quickly through crowded and unsanitary living conditions. Today, the bubonic plague is relatively rare, but it still exists in some parts of the world and is considered a serious public health threat. Thanks to the



**Figure 69.** Photo of Alexandre Yersin. (Image obtained from Wikimedia Commons, the free media repository)

work of scientists like Yersin and Koch, however, we now have a better understanding of the causes and treatment of the disease.

The Black Death had a profound impact on medieval society, killing an estimated 75–200 million people in Europe and Asia and causing widespread social and economic disruption. The loss of so many people had significant economic consequences, leading to labor shortages, rising wages, and social upheaval. The Black Death also had a significant impact on art, literature, and culture, with many works from the time reflecting the fear and anxiety associated with the disease. It is considered one of the most devastating pandemics in human history and is still studied today as an example of the impact that infectious diseases can have on society.

### **Isn't that what lab rats are for?**

Daniel Alcides Carrion (Figure 70) was a Peruvian medical student who played a pivotal role in the discovery and understanding of Carrion's



**Figure 70.** Daniel Carrion. (Image obtained from Wikimedia Commons, the free media repository)

disease, also known as verruga peruana. In 1885, Carrion began to investigate the illness, which was characterized by fever, anemia, and the development of skin lesions. To better understand the disease, Carrion decided to conduct a self-experimentation by allowing infected sand flies to bite him. As a result of the experiment, Carrion developed the two phases of the disease. The first phase, known as Oroya fever, is characterized by fever, anemia, and general malaise. The second phase, known as verruga peruana (Peruvian Wart), is characterized by the development of skin lesions that can range in size from small papules to large nodules. Patients can go on to develop severe complications, including anemia, heart failure, and other organ damage.

Unfortunately, Carrion died from the disease during his research before he could complete his investigation. However, his self-experimentation

ultimately led to a better understanding of the pathogenesis of Carrion's disease, and the disease is now named after him in his honor. Today, Carrion's disease is still a public health concern in certain areas of South America, particularly in the Andes Mountains. It is caused by the bacterium *Bartonella bacilliformis*, which is transmitted to humans through the bite of infected sand flies. While antibiotics such as streptomycin and azithromycin are effective treatments for the disease, prevention measures such as avoiding areas where sand flies are common, wearing protective clothing, and using insect repellent are also important to reduce the risk of infection.

## Ozzie Medicine

Dr. Barry Marshall, is the Australian doctor who discovered the link between *Helicobacter pylori* and peptic ulcers. In 1984, Dr. Marshall and his colleague Dr. Robin Warren hypothesized that peptic ulcers were caused by *Helicobacter pylori* (*H. pylori*) bacteria, which at the time was a controversial idea. To prove their theory, Dr. Marshall ingested a solution containing the bacteria and then developed gastritis, which is inflammation of the stomach lining. He later confirmed the presence of *H. pylori* in his stomach lining, providing conclusive evidence that the bacteria were indeed linked to peptic ulcers. This discovery upended a century or more of the medical dogma that ulcers were related to stress.

Dr. Marshall's self-experimentation was not only brave, but also instrumental in changing the way that peptic ulcers were treated. Before his discovery, peptic ulcers were thought to be caused by stress or spicy foods and were treated with antacids and surgery. Thanks to Dr. Marshall's groundbreaking work, antibiotics are now used to treat *H. pylori* infections, which has led to a significant reduction in the number of peptic ulcers and related health problems.

## Creative Consumption

In both history and literature there is a long-standing association between tuberculosis and creative people. In the late 19th and early 20th centuries,



tuberculosis was known as the “consumption” disease and was highly prevalent in urban areas, where poor living conditions and overcrowding facilitated its spread. Many artists, writers, and musicians of the time were affected by the disease, including Vincent van Gogh, Edgar Allan Poe, and Franz Kafka.

While tuberculosis is a serious and potentially deadly disease, it has been suggested that the experience of living with the disease may have influenced the work of some of these creative individuals. Some researchers have hypothesized that the mental and emotional distress caused by tuberculosis may have led to artistic expression as a coping mechanism, while others have suggested that the illness itself may have had a direct impact on the brain and cognition.

While the link between tuberculosis and creativity remains an intriguing topic of research, it is important to remember that tuberculosis is a serious illness that requires prompt diagnosis and treatment. With modern medical advances, tuberculosis is now highly treatable, and public health initiatives have helped to reduce its prevalence around the world.

## **You ain’t nothin’ but a hound dog**

In 2008, a woman named Joy Milne started noticing a strange smell coming from her husband, Les. She described the smell as “musky” and “woody,” and while Les didn’t think it was anything to worry about, Joy could not shake the feeling that something was wrong. Several years later, Les was diagnosed with Parkinson’s disease, and Joy started to realize that the smell she had detected years earlier was actually a unique odor associated with the disease. She became known as the “super smeller” and was able to identify other people with Parkinson’s simply by smelling their clothes. Scientists were intrigued by Joy’s ability and conducted studies to investigate the link between Parkinson’s and the distinct odor it produces. They found that people with Parkinson’s had elevated levels of a compound called sebum, which produces the musky odor that Joy had detected. Joy’s story highlights the incredible power of the human senses and the potential for unusual cases to provide valuable insights into medical conditions.

## **Don't bring your work home with you!**

Research indicates that the wives of shipyard workers who were exposed to asbestos in their occupational environment have also been affected by the development of asbestosis. Asbestosis is a lung disease that occurs when inhaled asbestos fibers cause scarring in the lungs, leading to breathing difficulties and reduced lung function. Asbestos fibers, when released into the air, can become suspended and easily attach to clothing. These fibers can be inadvertently carried home by workers exposed to asbestos, and when family members handle or come into contact with the contaminated clothing, they can inhale or ingest the asbestos fibers. Over time, this secondary exposure can lead to the development of asbestosis, similar to individuals who had direct occupational exposure to asbestos.

Radiological examinations conducted on the wives of these shipyard workers revealed signs of pulmonary asbestos disease in 11.3% of the cases. Additionally, asbestosis was identified in 7.6% of the sons and 2.1% of the daughters of shipyard workers, suggesting the intergenerational impact of asbestos exposure in shipyard communities.

These findings highlight the potential for indirect asbestos exposure among family members of shipyard workers, including their wives and children, who may have been exposed to asbestos fibers brought home on their husbands' work clothes. It underscores the importance of understanding the broader consequences of asbestos exposure and implementing appropriate preventive measures to protect not only the workers themselves but also their families.

## **Resistant Mosquitos**

Mosquitoes are known to transmit many tropical diseases. Recently, scientists had genetically modified mosquitoes to help fight diseases like malaria and dengue fever. The genetically modified mosquitoes contain a gene that makes them resistant to the malaria parasite or the dengue virus. When released into the wild, they mate with wild mosquitoes, passing on the resistance gene to their offspring. Over time, this can lead to a significant reduction in the number of disease-carrying mosquitoes in an area.

While the use of genetically modified mosquitoes is still in the experimental stages, it has the potential to be a powerful tool in the fight against malaria and other mosquito-borne diseases.

## **Bee-utiful**

Honeybees can be trained to detect certain diseases in humans. Researchers have discovered that honeybees have an incredible sense of smell and can be trained to detect the unique chemical compounds present in diseases like tuberculosis, cancer, and diabetes. The training process involves exposing the bees to the scent of a specific disease, then rewarding them with sugar water. Over time, the bees learn to associate the scent with the reward and will extend their proboscis (a long, thin tongue-like appendage) when exposed to the scent of the disease. While the use of honeybees for disease detection is still in its early stages, it has the potential to be a low-cost and non-invasive method of diagnosis, particularly in areas where medical resources are limited.

## **Sleeping Sickness**

The tsetse fly, which is found in parts of Africa, is responsible for spreading a parasitic disease called sleeping sickness (aka human African trypanosomiasis or HAT). Sleeping sickness is caused by a parasite that is transmitted through the bite of the tsetse fly. The disease can cause a variety of symptoms, including fever, headaches, and joint pain, but its most distinctive feature is the disruption of sleep patterns. In the early stages of the disease, patients may experience daytime sleepiness and insomnia, while in later stages, they may fall into a deep, coma-like sleep that lasts for days. In the acute form of sleeping sickness the disease progresses rapidly and can be more severe. Without treatment, the mortality rate can be as high as 100%. Despite its serious consequences, sleeping sickness is a relatively rare disease, with only a few thousand cases reported each year. However, efforts are underway to develop new treatments and vaccines to combat the disease and reduce its impact on affected communities.

## Kissing Bug

The “kissing bug,” also known as the triatomine bug, is a blood-sucking insect found in parts of North, Central, and South America (Figure 71). While the bug’s name may sound cute and harmless, it is actually responsible for spreading a parasitic disease called Chagas. Chagas disease can cause a variety of symptoms, including fever, fatigue, and swelling at the site of the bug bite. It is caused by an infection with the parasite called *Typanosoma cruzi*. Chagas is transmitted through bite of an infected insect called the triatomine bug, or Kissing Bug. Many people with the disease are asymptomatic and may not realize they are infected. However, here is the interesting fact: the kissing bug got its name because it has a unique feeding behavior. Attracted to the carbon dioxide exhaled by humans, the bug tends to bite a person on the lips or face. Rather than simply biting and withdrawing its proboscis like other blood-sucking insects, the kissing bug will often remain attached to its host’s skin for several minutes while it feeds. During this time, it may defecate near the bite wound, allowing the Chagas parasite to enter the body through the bite or through the mucous membranes of the eyes, mouth, or nose. So, the next time you encounter a kissing bug, be sure to give it a wide berth!



**Figure 71.** Kissing bug. (Image obtained from Wikimedia Commons, the free media repository)

## **He did what?**

Dr. Carlos Chagas, the Brazilian physician who discovered Chagas disease, infected himself with *Trypanosoma cruzi*, the parasite that causes the disease, through the bite of an infected triatomine bug. In 1909, while working in a remote area of Brazil, Dr. Chagas had heard reports of a new illness that was affecting many people in the region. He investigated and discovered that the disease was caused by a parasite that was transmitted to humans through the bite of the triatomine bug, also known as the “kissing bug.”

To prove the connection between the parasite and the disease, Dr. Chagas conducted a series of experiments on laboratory animals, but he also decided to test the parasite’s effects on himself. He allowed an infected triatomine bug to bite him on the arm, and then observed the progression of the disease in his own body. Dr. Chagas described the symptoms he experienced in a paper he published in 1912, which included fever, swelling at the site of the bite, and enlargement of the lymph nodes. His self-experimentation helped to establish the link between the triatomine bugs and Chagas disease and paved the way for further research and understanding of this parasitic infection. He lived a long and productive life after this experiment, continuing to make significant contributions to the fields of medicine and science until his death in 1934 at the age of 55.

## **Rabid fascination**

One interesting fact about rabies is that it has been known since ancient times. In fact, there are references to rabies in ancient Egyptian and Greek texts dating back more than 4,000 years. The disease was often associated with “madness” or possession by evil spirits. In fact, the word “rabies” comes from the Latin word “rabere,” which means “to rage.” This reflects the disease’s historical association with aggressive and frenzied behavior in infected animals (Figure 72), as well as its potential to cause similar symptoms in humans.

Many early treatments were based on superstitious beliefs rather than scientific understanding. For example, in ancient Rome, people believed



**Figure 72.** Dog infected with rabies. (Image obtained from Wikimedia Commons, the free media repository)

that wearing an amulet made from the tooth of a dog that had died of rabies could prevent infection. It was not until the 19th century that scientists began to understand the true nature of rabies and how it was transmitted. Today, we have effective vaccines and treatments for rabies, and the disease is much less common in many parts of the world thanks to the widespread vaccination of pets and livestock.

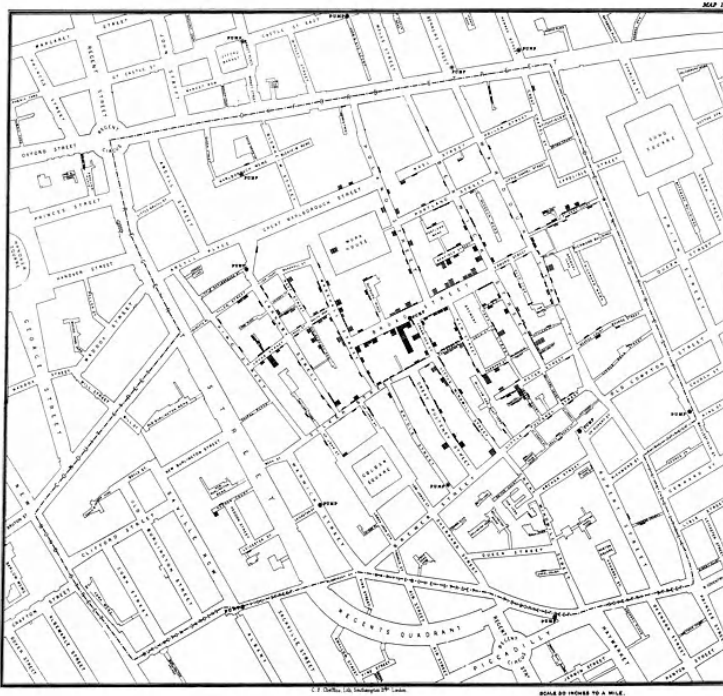
## John Snow, but without the dragons

The science of epidemiology was first developed in response to a cholera outbreak in mid-19th century London. In 1854, an outbreak of cholera struck the Soho district of London, killing hundreds of people in a matter of days. At the time, the cause of cholera was not well understood, and many people believed that the disease was spread through the air, rather than through contaminated water.

However, a British physician named John Snow suspected that contaminated water was to blame for the outbreak. Snow began collecting data on the outbreak and creating maps of where the cases were occurring.

He noticed that many of the cases were clustered around a single water pump on Broad Street, which he suspected was contaminated with cholera. To test his theory, Snow convinced local authorities to remove the handle from the pump (Figure 73), effectively shutting it down. Almost immediately, the number of new cases of cholera began to decline, and the outbreak eventually subsided.

Snow's work on the cholera outbreak is now recognized as a pioneering example of epidemiology, the study of how diseases spread and how to control them. His use of data and mapping to understand the spread of the disease and identify the source of the outbreak laid the groundwork for modern epidemiology and has had a profound impact on public health.



**Figure 73.** John Snow's map of cholera victims clustering around the Broad Street pump. (Image obtained from Wikimedia Commons, the free media repository)

## Zoonotic Diseases

Zoonotic diseases are diseases that can be transmitted from animals to humans. Despite the devastating impact of these and other zoonotic diseases throughout history, they have also played a significant role in shaping human culture and society.

For example, it was believed that the Black Death, a devastating pandemic that killed millions of people in Europe in the 14th century, was caused by the bacterium *Yersinia pestis*, which is transmitted by fleas that feed on infected rodents. The Black Death is thought to have contributed to the decline of feudalism in Europe and the rise of the middle class, as labor shortages led to higher wages and greater social mobility for many workers.

Another example is the Spanish Flu pandemic of 1918, which killed an estimated 50 million people worldwide. While the exact origins of the virus are still debated, it is believed that it may have originated in birds and then jumped to humans, possibly through close contact with infected poultry. Similarly, the Spanish Flu pandemic helped to spur advances in medical research and public health, as scientists worked to understand and combat the disease.

Hantavirus pulmonary syndrome (HPS) is a rare but potentially life-threatening zoonotic disease that is transmitted to humans by rodents, including deer mice and cotton rats. HPS is caused by a virus known as hantavirus, which is found in the urine, feces, and saliva of infected rodents. Humans can become infected with the virus by inhaling dust or particles contaminated with these materials, typically in enclosed spaces such as cabins or sheds where rodents may be present. While HPS is relatively rare, it can be extremely dangerous, with a mortality rate of up to 50%. Symptoms typically include fever, muscle aches, and coughing, and can progress to more serious respiratory problems and organ failure. While zoonotic diseases like HPS can be serious and even deadly, they also highlight the complex and interconnected relationship between humans and the natural world, and the important role that animal health and conservation can play in promoting human health and well-being.



Interestingly, some researchers are currently investigating whether hantavirus and other zoonotic diseases could be used as a tool for understanding and addressing global health disparities. These and other examples highlight the complex and often surprising ways in which zoonotic diseases can impact human health, culture, and society. By studying how these diseases are transmitted and treated in different populations, researchers hope to develop more effective strategies for preventing and treating a range of illnesses, both zoonotic and otherwise.

## Fleming, but no Bond

One fun fact about a medical advancement that was made by accident is the discovery of penicillin. In 1928, Scottish scientist Alexander Fleming left a petri dish of *Staphylococcus* bacteria uncovered while he went on vacation (Figure 74). When he returned, he found that a mold called *Penicillium notatum* had contaminated the dish and inhibited the growth of the bacteria. This accidental discovery led to the development of penicillin, the world's first antibiotic, which has saved countless lives and revolutionized the treatment of bacterial infections.



**Figure 74.** Petri Dish with *Staphylococcus* growth. (Image obtained from Wikimedia Commons, the free media repository)

## **Can ping pong balls cure tuberculosis?**

In the days before antibiotic treatments, tuberculosis was a devastating and often fatal disease. There were many treatments employed to stop its progress, both medical and surgical. One unusual treatment involved ping pong balls. A technique used from 1882 onwards was the deliberate collapse of the lung that contained the most tuberculosis. It was felt that this would “rest” the lung and allow it to heal. Doctors would place a needle in the chest and inject oxygen or nitrogen gas into the pleural cavity. This would collapse the lung. However, the collapse would last only a couple of weeks and the lung would expand again on its own. Patients would have to return frequently to their doctor’s office to have this painful and debilitating procedure repeated.

As a result, in the early 1900’s, a more permanent type of lung collapse was sought. Surgeons would fracture, or even remove several ribs on one side of the chest, in a procedure called a thoracoplasty. This would lead to a permanent lung collapse. While this was effective in collapsing lungs, it was very painful, had a long recuperation time, and resulted in a poor cosmetic outcome. Despite this, it is estimated that between the 1930 and 1950’s, approximately 1/3 of all patients with pulmonary tuberculosis underwent collapse therapy.

In an attempt to ameliorate the excessive pain and disfigurement, surgeons hit upon plombage. Plombage (from the Latin, *plumbum*, meaning lead) was a technique where an inert material was inserted into the chest cavity between the chest wall and the lung. These substances exerted a sustained pressure on the lungs and induced their collapse. When this surgery was new, substances such as fat, wax, oil or paraffin were used. However, these were deemed unsatisfactory as they could sometimes be absorbed by the body or move in the chest. Eventually, surgeons settled on methyl-methacrylate (Lucite) balls or ping pong balls. These were effective in collapsing the lung, were not absorbed by the body, and did not result in any cosmetic deformities. This procedure was performed until the advent of anti-tuberculosis antibiotics. Whether these therapies actually worked is unknown, as randomized clinical trials were never performed.



**Figure 75.** The Mad Hatter. (Image obtained from Wikimedia Commons, the free media repository)

## Mad as a hatter

In the 18th and 19th centuries, hat makers were at increased risk for developing a type of mental illness known as “mad hatter’s disease.” This was due to their frequent exposure to mercury, which was used in the process of felting animal fur to make hats. Mercury poisoning can cause a wide range of symptoms, including tremors, irritability, and memory loss. In severe cases, it can also cause hallucinations and delusions.

The term “mad hatter” comes from the portrayal of the character in Lewis Carroll’s “Alice’s Adventures in Wonderland” (Figure 75) who is depicted as eccentric and irrational. The character’s behavior was thought to be inspired by the strange behavior exhibited by some hat makers who had been exposed to mercury. While the use of mercury in hat-making has long since been discontinued, the term “mad hatter’s disease” is still used today to refer to cases of mercury poisoning and serves as a reminder of the dangers of occupational exposure to toxic substances.

## Disease — that inspired great art

One disease that has inspired great art is tuberculosis, also known as consumption. Tuberculosis is a bacterial infection that primarily affects the

lungs but can also spread to other parts of the body. It is highly infectious and was once a leading cause of death worldwide. In the 19th century, tuberculosis was a widespread and deadly disease that affected many artists, writers, and musicians. Despite the suffering and hardship that the disease caused, it also inspired some of the most beautiful and haunting works of art in history. Many artists who suffered from tuberculosis found solace and inspiration in their work, using their art as a means of coping with their illness and expressing their emotions. Some of the most famous examples of art inspired by tuberculosis include the paintings of Edvard Munch, the music of Frederic Chopin, and the poetry of John Keats. The influence of tuberculosis on art extends beyond individual works and artists. The disease also played a role in shaping the cultural and aesthetic movements of the time, such as Romanticism and the Gothic Revival, which were characterized by an emphasis on emotion, morbidity, and the sublime. The impact of tuberculosis on art serves as a reminder of the complex and often intimate relationship between illness and creativity, and the ability of art to inspire and transcend even the most difficult of circumstances.

## **Olé**

One disease that inspired a great piece of art is the Spanish flu, which was a deadly pandemic that swept across the world in 1918 to 1919. The Spanish flu, caused by the H1N1 virus, infected an estimated 500 million people worldwide and resulted in 50 to 100 million deaths. One of the most famous artworks inspired by the Spanish flu is the painting “The Sick Child” by Norwegian artist Edvard Munch. Munch’s sister, Sophie, died of the flu in 1919, and “The Sick Child” was his response to her death (Figure 76). The painting depicts a young girl lying on her deathbed, surrounded by her grieving family. The figures in the painting are distorted and twisted, conveying a sense of emotional turmoil and despair. Munch’s use of color and composition adds to the sense of unease, with dark and somber tones dominating the canvas. “The Sick Child” is widely regarded as one of Munch’s most powerful and moving works and is often seen as a symbol of the devastating impact of the Spanish flu on families and communities. The painting serves as a poignant reminder of the human toll of infectious diseases and the enduring power of art to capture and



**Figure 76.** Edvard's Munch's portrait of his sister, who died of the Spanish Flu. (Image obtained from Wikimedia Commons, the free media repository)

express the most profound and universal aspects of the human experience.

## **Cupid's Disease**

Syphilis, a bacterial infection that spreads through sexual contact has inspired a great work of art! Syphilis can cause a wide range of symptoms, including skin rashes, ulcers, and neurological problems. If left untreated, it can lead to serious health complications and even death. One of the most famous artworks inspired by syphilis his 1901 the painting, *The Beethoven Frieze* by Gustav Klimp. The frieze is an allegorical painting that illustrates the human desire for happiness in a suffering and tempestuous world. A world in which one contends not only against evil forces from without but also with one's own weaknesses. Klimt himself was known to have contracted syphilis, and the painting is often seen as a reflection of his own experiences with the disease. The painting's themes of love, loss, and mortality are all closely linked to the physical and emotional impact



**Figure 77.** The Beethoven Frieze. (Image obtained from Wikimedia Commons, the free media repository)

of syphilis on individuals and their relationships. The Beethoven Frieze is widely regarded as one of Klimt's masterpieces and is a testament to his skill as an artist and his ability to capture complex emotions and themes in his work (Figure 77). The painting serves as a powerful reminder of the impact of syphilis on individuals and society and the importance of addressing and treating this and other sexually transmitted infections.

## **Fits and Starts**

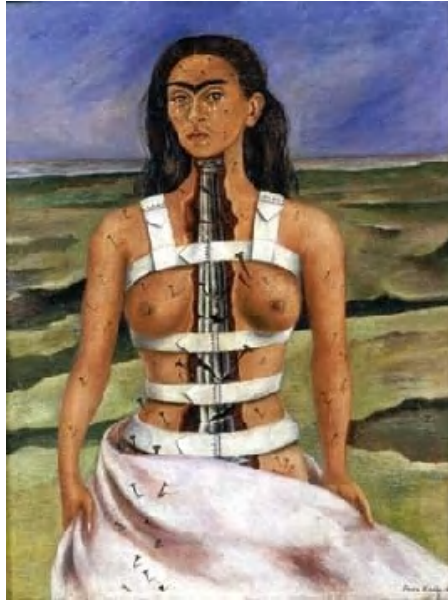
A disease that inspired a great piece of art is epilepsy, a neurological disorder characterized by recurrent seizures. Epilepsy can have a wide range of causes, including genetic factors, brain injuries, and infections. One of the most famous artworks inspired by epilepsy is Vincent van Gogh's "The Starry Night" (Figure 78). Van Gogh is believed to have suffered from epilepsy, and many art historians have suggested that the swirling, vibrant patterns in the painting were influenced by the visual hallucinations and other neurological symptoms he experienced because of his condition. "The Starry Night" is widely regarded as one of the greatest works of art of the 19th century and is known for its bold colors and striking visual style. The painting captures a sense of otherworldliness and mystery, and its evocative depiction of the night sky has inspired countless artists and art lovers around the world. The impact of epilepsy on Van Gogh's life and work serves as a reminder of the complex relationship between health and creativity and the ability of artists to find beauty and inspiration in even the most challenging circumstances.



**Figure 78.** Van Gogh starry night. (Image obtained from Wikimedia Commons, the free media repository)

## Broken Column

A disease that inspired a great piece of art is polio, a viral infection that can cause paralysis and in severe cases, respiratory failure. Polio was a major public health concern in the first half of the 20th century, affecting hundreds of thousands of people each year and causing widespread fear and panic. One of the most famous artworks inspired by polio is Frida Kahlo's "The Broken Column." Kahlo was diagnosed with polio at the age of six and later suffered a near-fatal accident that left her with chronic pain and mobility issues. "The Broken Column" depicts Kahlo's torso split open (Figure 79), revealing a shattered column in place of her spine. The painting is seen as a powerful symbol of Kahlo's own struggles with chronic pain and disability, as well as a broader commentary on the experience of illness and the fragility of the human body. Kahlo's art is known for its vivid and expressive style, and her depictions of pain, suffering, and resilience have resonated with audiences around the world. "The Broken Column" is a testament to Kahlo's artistic vision and her ability to capture the complex and often difficult experiences of living with chronic illness.



**Figure 79.** The Broken Column. (Image obtained from Wikimedia Commons, the free media repository)

## **HIV/AIDS**

A disease that inspired a great piece of art is HIV/AIDS, a viral infection that attacks the immune system and can lead to a range of health complications. HIV/AIDS emerged as a major public health crisis in the 1980s and has had a profound impact on individuals and communities around the world. One of the most famous artworks inspired by HIV/AIDS is the AIDS Memorial Quilt, a massive, ongoing project that began in 1987 as a way to commemorate the lives of those who had died from the disease. The quilt consists of more than 50,000 individual panels, each one created by friends, family members, and loved ones of people who had died from HIV/AIDS. The panels are made from a variety of materials and include personal items such as photographs, clothing, and letters. The quilt has been displayed at locations around the world and serves as a powerful reminder of the human toll of HIV/AIDS and the importance of addressing the disease and supporting those affected by it. The AIDS Memorial





**Figure 80.** AIDS memorial quilt. (Image obtained from Wikimedia Commons, the free media repository)

Quilt is not only a work of art but also a testament to the resilience and strength of the communities affected by HIV/AIDS (Figure 80). It is a powerful symbol of remembrance, healing, and hope, and a call to action to continue the fight against HIV/AIDS and other infectious diseases.

### **The Mann, the myth ...**

One disease that inspired a great piece of literature is tuberculosis, a bacterial infection that primarily affects the lungs but can also spread to other parts of the body. Tuberculosis was once a major public health concern and has been responsible for the deaths of millions of people throughout history. One of the most famous works of literature inspired by tuberculosis is “The Magic Mountain” by Thomas Mann (Figure 81). The novel is set in a sanatorium in the Swiss Alps and follows the story



**Figure 81.** *Der Zauberberg*; *The Magic Mountain*. (Image obtained from Wikimedia Commons, the free media repository)

of a young man named Hans Castorp, who is visiting his cousin for what he believes will be a brief stay but ends up becoming a patient himself. “*The Magic Mountain*” is known for its richly detailed portrayal of life in a tuberculosis sanatorium, as well as its exploration of the themes of time, mortality, and the human condition. Mann’s writing is characterized by its intellectual depth and philosophical insights, and the novel is widely regarded as a masterpiece of modernist literature. “*The Magic Mountain*” serves as a poignant reminder of the impact of tuberculosis on individuals and society and the enduring legacy of this once-deadly disease. The novel also stands as a testament to the power of literature to explore the most profound and universal aspects of the human experience and to capture the complexity and richness of the world around us.

## **La Bohème — ian Rhapsody**

Another famous works of literature inspired by tuberculosis is “*La Bohème*” by Giacomo Puccini. The opera tells the story of a group of struggling artists living in Paris in the 19th century, including the poet Rodolfo and the seamstress Mimì, who fall in love but are ultimately

separated by Mimì's worsening tuberculosis. Throughout the opera, tuberculosis is a recurring motif, serving as a symbol of the fragility of life and the inevitability of death. Puccini's music is characterized by its beauty and emotional power, and "La Bohème" is widely regarded as a classic of the operatic repertoire. "La Bohème" is not only a work of art but also a reminder of the impact of tuberculosis on individuals and society and the enduring legacy of this once-deadly disease. The opera stands as a indication of the power of music and art to capture the complexity and richness of the human experience and to inspire empathy and understanding for those who have been affected by disease and other hardships. The rock-musical "Rent" is an updated version of "La Bohème." Jonathan Larson, who was the composer of "Rent," updated the setting to New York City's East Village in the late 20th century during the height of the HIV/AIDS crisis. The disease plays a central role in the musical, affecting several characters. Mimi, in this version, is an exotic dancer who is HIV-positive. Despite the grim subject matter, both "La Bohème" and "Rent" celebrate the resilience of their characters, the strength of their friendships, and their commitment to living their lives fully, despite their circumstances. Both works are known for their powerful and emotionally resonant music, and "Rent" has been praised for its representation and humanization of characters living with HIV/AIDS.

## Leprosy

Leprosy, also known as Hansen's disease, also inspired a great piece of literature. Leprosy is a chronic bacterial infection that primarily affects the skin, peripheral nerves, and mucous membranes. It is highly infectious and was once feared and stigmatized by many societies around the world. One of the most famous works of literature inspired by leprosy is "Moloka'i" written by Alan Brennert. The novel tells the story of a young girl named Rachel Kalama, who was diagnosed with leprosy and sent to live on the remote island of Molokai, where she must confront the challenges of living with the disease and the discrimination and isolation that come with it. "Moloka'i" is known for its powerful portrayal of the human experience of living with leprosy and its exploration of themes such as identity, family, and resilience. Brennert's writing is marked by its sensitivity and

compassion, and the novel is widely regarded as a classic of historical fiction. The impact of leprosy on individuals and society serves as a reminder of the importance of compassion, empathy, and understanding in the face of disease and adversity. “Moloka’i” is a testament to the power of literature to shed light on the most challenging and difficult aspects of the human experience and to inspire empathy and compassion for those who have suffered and struggled with disease and other hardships.

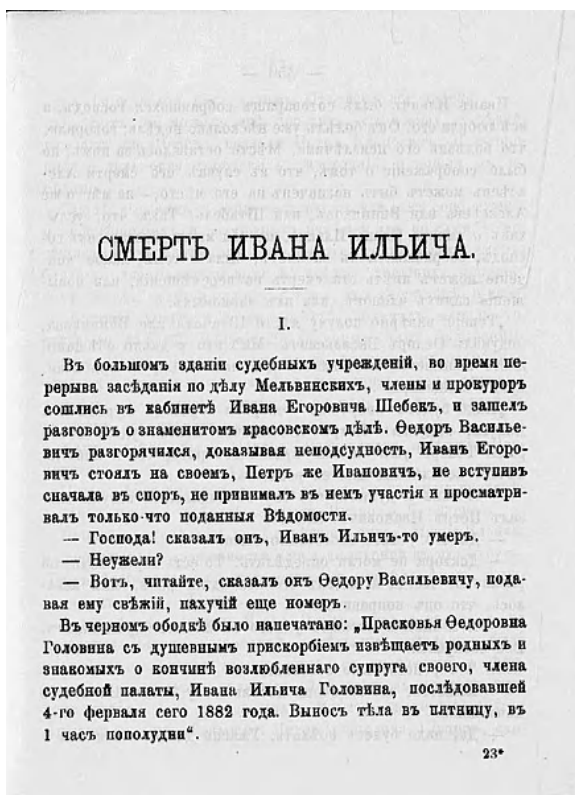
## **Ring around the Cholera**

Another disease that inspired a great piece of literature is cholera, which is a bacterial infection that causes severe diarrhea and dehydration and can lead to death if left untreated. Cholera has been responsible for several pandemics throughout history, including a devastating outbreak in the 19th century that killed tens of thousands of people in Europe. One of the most famous works of literature inspired by cholera is “Love in the Time of Cholera” by Gabriel Garcia Marquez. The novel is set in an unnamed Caribbean city during the late 19th and early 20th centuries and follows the story of a man named Florentino Ariza, who falls in love with a young woman named Fermina Daza but is rejected by her. Throughout the novel, cholera is a recurring motif, serving as a symbol of the fragility of life and the ever-present threat of death. Marquez’s writing is characterized by its magical realism and lyrical beauty, and the novel is widely regarded as a masterpiece of 20th-century literature. “Love in the Time of Cholera” is not only a love story but also a powerful exploration of the human experience of living with disease and the ways in which illness can shape and influence our lives and relationships. The novel captures the complexity and richness of the world around us and to inspire empathy and understanding for those who have been affected by disease and other hardships.

## **It takes an Ilyich**

Syphilis is a sexually transmitted infection caused by the bacterium *Treponema pallidum* that can cause a range of health problems, including skin ulcers, neurological damage, heart disease, and death. It has been a

major public health concern throughout history. One of the most famous works of literature inspired by syphilis is “The Death of Ivan Ilyich” by Leo Tolstoy (Figure 82). The novella tells the story of a man named Ivan Ilyich who becomes ill and gradually realizes that he is dying from an unspecified illness, which is widely believed to be syphilis. Throughout the novella, Tolstoy explores the themes of illness, death, and the meaning of life, painting a vivid portrait of Ivan Ilyich’s decline and the emotional and spiritual struggles he faces as he confronts his mortality. Tolstoy’s writing is marked by its psychological depth and keen insight into human nature, and the novella is widely regarded as a classic of Russian



**Figure 82.** The Death of Ivan Ilyich. (Image obtained from Wikimedia Commons, the free media repository)

literature. “The Death of Ivan Ilyich” explores the human experience of living with illness and the ways in which disease can force us to confront our own mortality and the meaning of our lives.

## **I’ll be Myshkin you**

Epilepsy, a neurological disorder characterized by recurrent seizures, also inspired a great piece of literature. Epilepsy has been the subject of many literary works throughout history and has been associated with religious and cultural beliefs in many societies around the world. One of the most famous works of literature inspired by epilepsy is “The Idiot” by Fyodor Dostoevsky. The novel tells the story of a young man named Prince Myshkin, who returns to Russia after spending several years in a Swiss sanatorium for treatment of his epilepsy. Throughout the novel, epilepsy is a recurring theme, serving as a symbol of the prince’s vulnerability and his struggle to find acceptance and understanding in a society that values strength and power. Dostoevsky’s writing is characterized by its psychological depth and its exploration of the most profound and universal aspects of the human experience, and “The Idiot” is widely regarded as a classic of Russian literature.

## **Still Alice Runs Deep**

Another disease that inspired a great piece of literature is the Alzheimer’s disease, a progressive neurological disorder that affects memory, thinking, and behavior. Alzheimer’s disease is a major public health concern and has been responsible for the deaths of millions of people worldwide. One of the most famous works of literature inspired by Alzheimer’s disease is “Still Alice” by Lisa Genova. The novel tells the story of a Harvard professor named Alice Howland, who is diagnosed with early-onset Alzheimer’s disease and must confront the challenges of living with the disease and the its impact on her relationships and identity. Throughout the novel, Alzheimer’s disease serves as a symbol of the fragility of memory and the human experience of loss and decline. Genova’s writing is characterized by its sensitivity and compassion, and “Still Alice” is

widely regarded as a groundbreaking work of literature that shines a light on the lived experience of Alzheimer's disease and its impact on individuals and families.

## **Double, double toil and trouble**

An interesting fact about the Salem Witch Trials is the possible role of rye mold in the outbreak of hysteria and accusations of witchcraft in Salem, Massachusetts in 1692. Historians and medical experts have suggested that the hysteria and unusual behaviors observed during the Salem Witch Trials may have been caused by the consumption of bread made from rye infected with a type of fungus called *Claviceps purpurea*. This fungus produces a toxin called ergotamine, which can cause hallucinations, muscle spasms, and other symptoms that may have been mistaken for demonic possession or witchcraft. Ergotism, also known as St. Anthony's Fire, was a common disease in Europe during the Middle Ages and was associated with outbreaks of mass hysteria and witch hunts. It is possible that a similar phenomenon occurred during the Salem Witch Trials, with the consumption of contaminated rye bread leading to the outbreak of hysteria and accusations of witchcraft. While there is no definitive evidence to prove the role of rye mold in the Salem Witch Trials, the theory has gained credibility among medical experts and historians in recent years. It remains an intriguing and controversial aspect of the history of medicine and the understanding of mass hysteria and its causes.

## **Chapter 10**

### **Fun Medical Facts**

#### **He's very gullible**

The most commonly swallowed foreign objects are coins. The people most likely to swallow foreign objects are children. However, prisoners are giving kids a run for their money. A man in Ireland upped the ante somewhat by swallowing his cell phone. The case was reported in the *International Journal of Surgery Case Reports* in 2016. The journal describes a 29-year-old prisoner who was admitted to the hospital 10 hours after he claimed to have swallowed a mobile phone and was vomiting. A clinical examination was conducted, which the doctors referred to as “unremarkable,” but X-rays revealed the phone in his stomach. The patient was admitted to the hospital and the plan was to let the phone pass naturally in his stool. However, after eight hours, it had not moved and concerns about bowel obstruction or battery acid leak prompted doctors to act more aggressively. Several attempts were made to remove the phone using an endoscope, but it could not be removed without injuring the man's esophagus. Ultimately, the patient had to undergo surgery to remove the phone.

#### **Indian Take Out**

Not to be outdone by an Irish poseur, in 2022, Raman Saini, a prisoner in Tihar jail number 1 in New Delhi, India, swallowed four phones to smuggle them into his jail. He swallowed them while outside the jail at a court



appearance. Unbelievably, the phones remained in Saini’s stomach for seven months and were only suspected by authorities after the prison metal detector beeped every time he passed through it. Unable to coax the contraband items out on his own, Saini eventually admitted to authorities that he had the phones and needed medical help. He had to undergo surgery to have them removed.

## I love you mummy

One bizarre medical practice from history was the use of “mummy powder” as a cure-all for various ailments. This powder was made from ground-up mummies, which were considered to have medicinal properties due to their association with the embalming practices of ancient Egyptian priests (Figure 83). Believed to have been first used in the 12th century, mummy powder became increasingly popular in Europe during the Renaissance and was used to treat a wide range of ailments, from headaches and stomach problems to epilepsy and even the plague. It was also believed to have anti-aging properties and was used in cosmetic products.



**Figure 83.** A close-up photo of an Egyptian Mummy. (Image obtained from Wikimedia Commons, the free media repository)

Of course, the use of mummy powder was not only ineffective but also highly unethical, as it involved the desecration of human remains. Thankfully, the use of mummy powder eventually fell out of favor as medical science advanced, and the true causes of disease were better understood. Today, we can look back on this bizarre and macabre practice as a reminder of the strange and often misguided ways in which humans have sought to cure their ailments throughout history.

## Crapsules

A fecal transplant, also known as fecal microbiota transplant (FMT), is a medical procedure where feces from a healthy donor are introduced into a patient's gastrointestinal tract to restore the balance of bacteria and treat conditions, such as *Clostridium difficile* infection. The concept of fecal transplants has been around for centuries. The ancient Chinese are said to have used "yellow soup" made from human feces to treat food poisoning and severe diarrhea. In more recent times, during World War II, Russian soldiers reportedly used fecal enemas to treat dysentery when antibiotics were not available. In 2014, a team of researchers at the Massachusetts Institute of Technology wanted to make the process of fecal transplant easier without requiring a colonoscopy or enema. They freeze dried fecal material and put it in gelatin capsules that were easy to swallow. While the idea of fecal transplants may seem unappetizing, they have become increasingly popular in modern medicine for treating a range of gastrointestinal conditions. In fact, some people have even started referring to them as "poop transplants" or "crapsules" in a lighthearted way. Despite the humorous nicknames, fecal transplants are a significantly effective treatment that improves the health and quality of life for many patients.

## Bloodletting

During the Middle Ages, a common treatment for illnesses and diseases was "bloodletting" (Figure 84). This involved the intentional removal of blood from the body, usually using leeches or by making incisions in the skin and draining blood into a cup. Bloodletting was believed to restore



**Figure 84.** Bloodletting. (Image obtained from Wikimedia Commons, the free media repository)

balance to the body's four humors (blood, phlegm, yellow bile, and black bile) and was used to treat a wide range of ailments, from headaches and fever to mental illness and epilepsy.

While bloodletting was certainly a bizarre and often painful practice, it did have some surprising benefits. For example, it was discovered that bloodletting could help to reduce high blood pressure, which is a risk factor for heart disease and stroke. However, overly enthusiastic bloodletting could be fatal. Today, bloodletting is no longer used as a medical treatment, but it remains a fascinating and somewhat gruesome reminder of the strange and often misguided ways in which humans have sought to cure their ailments throughout history.

## **MD 1**

The US president's official doctor is called the Physician to the President. This is the formal and official title given to the physician who is chosen by the president to serve as their personal physician. The Physician to the President is a prestigious office and he or she plays a critical role in providing medical care, advice, and support to the president regarding their health and well-being. However, this is not always the case. The first president of the United States, George Washington, likely died as the result of his doctor's treatment. Washington was known to have undergone bloodletting as a treatment for his throat infection. Contemporary accounts suggest that he underwent bloodletting on multiple occasions during his final illness. Although specific names of the physicians involved in the bloodletting procedure are not mentioned in these accounts, it is documented that Washington's physicians bled him multiple times over a short period. They drained an estimated 5 to 7 pints (equivalent to 2.365 to 3.318 liters) of blood from him in less than 16 hours, which amounted to approximately 40 percent of his total blood volume. The average adult male has a blood volume of approximately 5.5 liters. Some historians have suggested that the bloodletting may have been the cause of Washington's death.

## **Treat fever with fever**

Neurosyphilis was relatively common in the pre-antibiotic era, especially among individuals with untreated syphilis. Before the discovery of penicillin in the early 20th century, syphilis was a widespread and often incurable disease, and neurosyphilis was one of its most severe and feared complications as it was a fatal diagnosis. With no effective therapy available, malariotherapy was invented. "Malariotherapy" for neurosyphilis was introduced by Julius Wagner-Jauregg, an Austrian psychiatrist, who won the Nobel Prize in Medicine in 1927 for this work. The treatment involved intentionally infecting the patient with malaria to induce a high fever, which was found to kill the bacteria causing syphilis. Once the fever served its purpose, the malaria was then treated with quinine. This treatment, fortunately, is no longer used today due to the availability of more effective and safer treatments.

## **An electrofying experience**

In the 18th and 19th centuries, “electrotherapy” was a popular medical treatment for a variety of ailments, from headaches and constipation to paralysis and hysteria. The treatment involved the use of electric currents, generated by batteries or electrostatic machines, to stimulate the muscles and nerves of the body. Patients would often be connected to electrodes that were placed on their skin, or they might be submerged in water while electric currents were applied. The treatment was often painful but was believed to have a wide range of health benefits. Despite its popularity, electrotherapy was often criticized by medical professionals of the time for being ineffective and potentially dangerous. However, the treatment did have some surprising benefits. For example, it was found to be effective in treating certain types of muscle weakness and paralysis and was even used to treat some cases of mental illness. Today, electrotherapy is still used as a medical treatment, but in a much more controlled and targeted manner. It remains a fascinating and somewhat bizarre reminder of the strange and often misguided medical practices of the past.

## **One dragon on the floor**

In ancient China, “ground dragon bones” were used as a popular medical treatment for a wide range of ailments. These “bones” were actually fossilized remains of prehistoric animals, such as dinosaurs and giant mammals (Figure 85), which were ground up and ingested as a powder or decoction. Ground dragon bones were believed to have healing properties due to their association with dragons, which were considered to be powerful and mythical creatures with the ability to control the elements. The bones were used to treat everything from headaches and fever to seizures and insomnia. While ground dragon bones may sound like a bizarre and ineffective treatment to us today, they were actually used for thousands of years in traditional Chinese medicine and were believed to be particularly effective in treating pain and inflammation.

In fact, modern research has shown that certain fossils, such as those of dinosaur bones, can contain high levels of calcium, phosphorus, and other trace elements that may have some health benefits. So, while the



**Figure 85.** Dinosaur skeleton of a Triceratops. (Image obtained from Wikimedia Commons, the free media repository)

practice of using ground dragon bones may seem strange to us now, it is worth remembering that ancient cultures often had valuable knowledge and insights into the natural world that we can still learn from today.

## **Keeping our teeth and togas white**

In ancient Rome, urine played an intriguing and somewhat unorthodox role in personal hygiene and daily life (Figure 86). Beyond its commercial applications, urine found its way into various aspects of personal care. Urine, was employed by Roman launderers for cleaning clothes and dyeing fabrics, while tanners used it to facilitate the removal of flesh from animal hides. One of the most remarkable uses of urine was as a dental hygiene aid. Some Romans employed urine as a toothpaste, albeit a rather unconventional one by today's standards. The reasoning behind this practice lie in the ammonia content of urine, which had natural cleaning properties. While it may sound unusual, individuals in ancient Rome believed that using urine as toothpaste helped maintain oral hygiene and combat



**Figure 86.** Roman in white toga. (Image by Campion Quinn, MD and Dalle-2)

tooth decay. This practice speaks to the ingenuity of the time, where available resources were utilized for practical purposes.

Additionally, urine found its place as a mouthwash among certain segments of the Roman population. It was believed that rinsing one's mouth with urine could help freshen breath and maintain oral health. Again, the ammonia content in urine played a significant role in this usage, as it was thought to have cleansing properties that contributed to overall mouth cleanliness.

These practices may appear eccentric in the modern context, but they shed light on the resourcefulness of the ancient Romans when it came to making the most of the materials available to them. Urine's role as a toothpaste and mouthwash demonstrates the historical adaptability and creativity in personal care routines during that era. Due to its utility and versatility, urine was seen as a valuable resource. Like modern administrations, Emperor Vespasian (69–79 AD) enacted a rather peculiar tax called "vectigal urinae" or the urine tax. This tax was levied on urine collected from public restrooms, reflecting the common practice of collecting human urine to harness its cleaning properties.

Notably, this taxation scheme did not sit well with everyone, including *Vespasian's* son, *Titus*. According to the Roman historian *Suetonius*, *Titus* once criticized his father for profiting from unseemly taxes such as the urine tax. In response, *Vespasian* playfully placed a coin under his son's nose and inquired whether it emitted an unpleasant odor. *Titus* responded in the negative, to which *Vespasian* quipped, "Yet it comes from urine." This witty exchange gave rise to the Latin phrase "*pecunia non olet*," which translates to "money doesn't stink," signifying that even income derived from unconventional sources retains its value.

## **I see you**

Fluoroscopes (Figure 87) were widely used in medical imaging in the early 20th century before the dangers of radiation exposure were fully understood. In fact, they were often used in shoe stores to help customers find the right size and fit of shoe, with salesmen promising that the "X-ray vision" technology would ensure a perfect fit.



**Figure 87.** A shoe fluoroscope. (Image obtained from Wikimedia Commons, the free media repository)



However, the use of fluoroscopes for non-medical purposes was eventually banned due to the risks of radiation exposure, which can cause skin burns, cataracts, and an increased risk of cancer. It is estimated that the radiation exposure from a single fluoroscope examination from one of these machines was roughly equivalent to the radiation exposure from about 1,000 chest X-rays. This is because the fluoroscopes emit a continuous stream of radiation rather than a single burst like a chest X-ray. In the medical field, stricter regulations were put in place to limit radiation exposure to both patients and healthcare professionals. The history of fluoroscopes is a fascinating example of the many ways in which medical technologies have evolved over time. As we learn more about the risks and benefits of different approaches to diagnosis and treatment, this example serves as a reminder of the importance of ongoing research and safety monitoring in the field of medicine, ensuring that new technologies are used safely and responsibly.

## **Dermatographia**

Before there were tattoos, there was dermatographia (Figure 88). Dermatographia, also known as “skin writing,” is a unique and benign skin condition where the skin responds with raised red lines or welts when



**Figure 88.** An example of dermatographia. (Image obtained from Wikimedia Commons, the free media repository)

it is irritated by even minor scratching, rubbing, or pressure. These raised lines can resemble an artistic creation on the skin, almost as if the body itself is expressing its own form of art.

While it may sound like a superpower, dermatographia can be accompanied by itching and discomfort for some individuals, which can interfere with their daily lives. However, it is important to note that dermatographia is a common and generally harmless condition. Healthcare providers and researchers are still investigating the exact causes of dermatographia. It is believed that the immune system's response to scratching or pressure triggers the release of histamine, a chemical involved in allergic reactions, causing the raised lines and welts to appear. Fascinating, isn't it? Our bodies have their own creative ways of expressing themselves, even in unexpected ways like dermatographia.

## **Treatment for the vapors**

During the 19th century, a bizarre and somewhat comical medical treatment known as "smelling salts" was used to revive people who had fainted or lost consciousness. Smelling salts were actually small bottles filled with ammonium carbonate, a pungent and irritating chemical that would produce a sharp and unpleasant smell when the bottle was opened. When someone fainted or became unconscious, the smelling salts would be waved under their nose to stimulate their senses and bring them back to consciousness. While the treatment was often effective, it was also known for producing some comical and embarrassing side effects, such as loud sneezing, coughing, and even vomiting.

Despite their somewhat humorous reputation, smelling salts were actually an important medical treatment at the time and were used by doctors and first responders to quickly revive people in emergency situations. Today, more modern and less unpleasant treatments, such as oxygen therapy, are used to revive people who have lost consciousness.

## **Shock the gay out of you**

An interesting medical fact about electroshock therapy, also known as electroconvulsive therapy (ECT), is that it was once used as a treatment

for homosexuality. In the mid-20th century, many mental health professionals believed that homosexuality was a mental illness that could be treated with ECT. Patients were subjected to multiple rounds of ECT, often against their will, in an attempt to “cure” their homosexuality. ECT is still used today, but it is now reserved for treating severe mental illnesses such as major depression and bipolar disorder. While it can have significant side effects, it is generally considered to be safe and effective for certain patients with major depression.

## **Instrument Count Basie**

Now ... where did I put that forceps? This is one of the things you do not want your doctor to say after he has finished operating on you. Fortunately, that rarely happens because of a procedure that is performed in all operating rooms in modern hospitals. Surgical instruments are counted a minimum of three times during a surgical procedure. Before this procedure was set in place, there were occasions when surgeons would leave an instrument or a sponge inside a patient by mistake. Instrument counts are now an important part of surgical procedures and are performed to ensure that all surgical instruments used during the procedure are accounted for and have been safely removed from the patient’s body. The count typically takes place before the procedure begins, during the procedure, and at the end of the procedure.

There are several reasons why instrument counts are important. First and foremost, they help to prevent retained surgical items or foreign bodies, which can cause serious harm to patients if left inside their body after surgery. By counting and tracking the surgical instruments used during the procedure, surgical teams can ensure that all instruments have been removed before the patient is closed up and moved to recovery.

Instrument counts also help to prevent the accidental loss of surgical instruments, which can be costly to replace and can cause delays in subsequent procedures if they are not accounted for. By keeping careful track of the instruments used during a procedure, surgical teams can ensure that they are properly sterilized, maintained, and stored for future use.

## Mush

There is an odd association between a dog sled race and a diphtheria outbreak that can be traced back to a historical event known as the “Great Race of Mercy” or the “1925 Serum Run.” In the winter of 1925, a diphtheria outbreak occurred in the town of Nome, Alaska, which threatened the lives of its inhabitants, particularly the children. Diphtheria is a serious bacterial infection caused by the bacterium *Corynebacterium diphtheriae*. It primarily affects the respiratory system, leading to the formation of a thick, grayish membrane in the throat that can cause difficulty in breathing. Before the availability of vaccines, diphtheria was a leading cause of childhood death.

In 1925, there was no road or easy access to Nome, making traditional means of delivering medical supplies, such as by train or plane, impossible. The only way to transport life-saving diphtheria antitoxin serum to Nome was by using a relay of dog sled teams across the treacherous Alaskan wilderness. In what became a legendary feat, mushers and their sled dog teams participated in a relay race to deliver the serum from Nenana, Alaska to Nome, covering approximately 674 miles in freezing temperatures and harsh conditions (Figure 89). The race was a race against time to get the serum to Nome before the outbreak could spread further.

The heroic efforts of the mushers (the person that rides the sled) and their dogs during the 1925 Serum Run effectively prevented the diphtheria outbreak from becoming a widespread catastrophe. The relay of dog sled teams, including famous mushers like Leonhard Seppala and Gunnar Kaasen with his lead dog Balto, successfully transported the serum to Nome, saving many lives. This “Great Race of Mercy” is memorialized in the annual Iditarod race. The Iditarod race is a significant Alaskan tradition that brings together mushers and spectators from around the world.

## Nurse, Urine, Stat!

Did you know — urine was once used to clean wounds! It is interesting to note that the historical use of urine for wound cleaning was derived from



**Figure 89.** Sled dogs and musher. (Image obtained from Wikimedia Commons, the free media repository)

its properties as an antiseptic agent. While it may sound unconventional or unhygienic by today's standards, urine contains urea, which has mild antibacterial properties. Urea can break down into ammonia, creating an alkaline environment that can help inhibit the growth of certain bacteria and promote wound healing. Also, urine was often cleaner than the local water supply. In ancient times, including the medieval period, the use of urine as a wound cleanser was influenced by empirical observations and the limited resources available. The antimicrobial properties of urine, albeit limited, provided some level of disinfection for wounds when more effective antiseptics were scarce or unknown.

It is worth noting that the use of urine for wound cleaning is not recommended in modern medical practice due to the availability of more reliable antiseptic solutions. However, this historical practice serves as a reminder of the ingenuity and resourcefulness of our ancestors in attempting to prevent infection and promote healing in the absence of advanced medical knowledge and technology.

## Opioid Overdose Epidemic

A specter is haunting America — that of unintended addiction and tragic overdose. As the opioid crisis tightens its grip, ordinary homes have become crime scenes, with police left to chalk the outlines where loved ones drew their final breaths. Fentanyl, 50 times stronger than heroin, has hit streets and spiked deaths (Figure 90). Yet the roots of this scourge run deeper than clandestine labs. Many tumble into addiction through medicine cabinets stocked by doctors. Painkillers prescribed after injuries or routine procedures kindle new cravings. Sufferers chase the initial high with ever-mounting doses until the script runs dry. Then the siren song of heroin beckons.

Behind each chilling statistic lies a life that has been extinguished too soon. Sons and daughters, siblings and parents, rendered lifeless shells. Bereft families now walk on eggshells, haunted by empty chairs at dinner tables. The involuntary hand of accidental addiction has struck down over 70,000 in a single year, making poisoning the leading cause of accidental death. No longer confined to urban alleyways, the tragedy of overdose lurks within the most ordinary homes, indiscriminate in its fatal power.



**Figure 90.** Fentanyl. (Image obtained from Wikimedia Commons, the free media repository)

## **In vino, veritas**

From ancient times until the mid-19th century, wine was often used to clean wounds. This was particularly true of stronger varieties such as vinegar or red wine that possesses some antiseptic properties. The alcohol content and acidity of wine can help kill or inhibit the growth of certain bacteria, making it somewhat effective in disinfecting wounds.

In ancient times and throughout history, wine was often used as a wound cleanser when other antiseptic options were limited or unavailable. Even during biblical times, wine was sometimes used for its antiseptic properties and ability to clean wounds. According to the biblical account of the good Samaritan in the Gospel of Luke, wine is mentioned as being used to cleanse the wounds of the injured man. In Luke 10:34, it states that the Samaritan “went to him and bound up his wounds, pouring on oil and wine.” The wine, along with the oil, was likely used as a cleansing agent for the wounds.

This practice was based on the belief that the alcohol and acidic nature of wine could help cleanse the wound and prevent infection. One significant turning point was the mid-19th century, when advancements in medical science and the understanding of infection control started to emerge. This period marked the introduction of antiseptic principles by pioneers like Joseph Lister, who emphasized the importance of using chemical agents to prevent infection. By the late 19th and early-20th centuries, the use of wine as a wound cleanser had largely diminished in mainstream medical practice. Sterile solutions and antiseptic preparations specifically formulated for wound care became the standard, offering higher levels of sterility and effectiveness in preventing infection.

## **Unintentional Injuries**

Unintentional injuries are the leading cause of death for children under the age of 14 in the United States. According to 2019 data from the Centers for Disease Control and Prevention (CDC), approximately 4,500 deaths among children aged 0 to 14 were attributed to accidental causes. The most common types of lethal accidents affecting this age group are motor

vehicle crashes, drowning, suffocation, and unintentional firearm injuries. For children between 5 and 14 years old, motor vehicle crashes are the top cause of accidental fatalities. Drowning is a major risk for younger children, especially those who have access to swimming pools or other bodies of water without proper adult supervision. Suffocation incidents can occur when small children encounter items like plastic bags or have improper bedding in cribs. Unsecured firearms also pose a safety hazard to curious young children who may not understand the danger.

While tragic in nature, many accidental deaths among children can be prevented through increased safety measures, adult vigilance, and proper childproofing of environments. Understanding the most common causes of these incidents allows parents and caregivers to take proactive steps to protect children from unintended harm.

## **First we have to drink Tang and now this?**

Astronauts do not just undergo significant psychological stress during a space flight, there are many changes that affect their bodies too.

One of these changes is bone loss. In the microgravity environment of space, astronauts experience a significant amount of bone loss due to the lack of weight-bearing exercise. Bone loss can occur at a rate of up to 1% per month, which is much faster than the rate of bone loss experienced by postmenopausal women on Earth. Astronauts must engage in rigorous exercise programs to maintain their bone density during spaceflight.

Another change that astronauts experience is fluid redistribution. In microgravity, fluids in the body redistribute, causing the face to appear puffy and the legs to become thinner. This redistribution can also cause a decrease in blood volume and a rise in intracranial pressure, which can lead to visual impairments, headaches, and other health problems.

Astronauts also experience changes in their immune system. Exposure to the space environment can alter the human immune system, making astronauts more susceptible to infections. Studies have shown that certain types of immune cells decrease in number during spaceflight, while others increase. These changes can persist for some time after returning to Earth.



## **Scuba-doo**

Exploring the depths of the underwater world is an exhilarating experience for scuba divers, but it is important to be aware of the potential risks and challenges that come with it. As divers descend to depths of 100 feet or more, they face the possibility of encountering a fascinating, yet potentially dangerous phenomenon known as nitrogen narcosis. Nitrogen narcosis can affect divers by causing impaired thinking, confusion, and even a feeling of drunkenness. However, the good news is that this condition is usually reversible by ascending to a shallower depth, making prompt recognition and treatment crucial for ensuring diver safety.

Another concern for divers is decompression sickness, commonly referred to as “the bends.” This condition arises when divers ascend too quickly from deep depths, causing dissolved gases in their blood to form bubbles as the pressure decreases. The bends can result in symptoms such as joint pain, skin rash, and difficulty breathing. To address decompression sickness, divers require recompression in a hyperbaric chamber.

Additionally, changes in pressure can lead to barotrauma, which particularly affects the ears and sinuses of scuba divers. Barotrauma can cause discomfort, pain, and even damage if not properly managed. Divers must take precautions to equalize pressure during their descent and ascent to mitigate the risk of barotrauma.

While exploring underwater environments, divers should also be mindful of the potential for hypothermia, especially in cold water. Hypothermia occurs when the body’s core temperature drops below normal levels, and symptoms may include shivering, confusion, and loss of consciousness. To prevent hypothermia, divers must wear appropriate exposure protection to keep their bodies insulated and maintain thermal balance.

Ear infections are another concern for scuba divers, particularly if water enters the ears during a dive. These infections can cause pain, swelling, and hearing loss. Preventive measures such as using earplugs or other ear protection can significantly reduce the risk of ear infections. It is also essential for divers to avoid diving with a cold or sinus infection, as this can further increase the likelihood of developing ear infections.

By being aware of these potential challenges and taking necessary precautions, scuba divers can safely enjoy the wonders beneath the waves. Proper training, adherence to diving guidelines, and regular communication with diving partners are crucial in ensuring a safe and memorable underwater adventure.

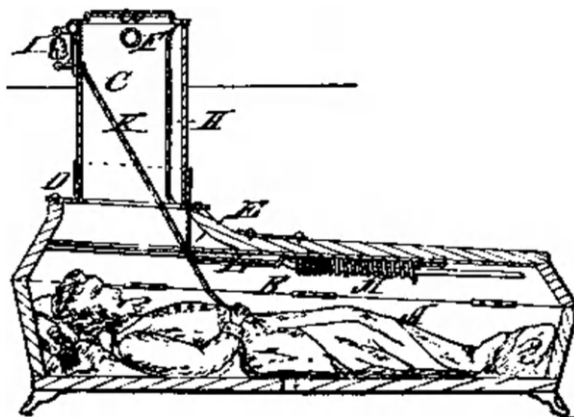
## **Live Long and Prosper**

In the early 20th century, the average life expectancy in the United States was only around 50 years. However, in just over 100 years, life expectancy has increased by almost 30 years, with the current average life expectancy in the United States at around 78 years!

One of the main reasons for this dramatic increase in life expectancy can be attributed to the advances in medical science and technology. Over the past century, medical researchers have made significant strides in understanding the causes and treatments of a wide range of diseases, from infectious diseases like polio and smallpox to chronic diseases like heart disease and cancer. In addition to medical advancements, improvements in public health and sanitation have also played a significant role in improving life expectancy. Clean water and sanitation systems, as well as improved nutrition and living conditions, have helped to reduce the incidence of infectious diseases and other health conditions that were once common causes of death.

## **Hey, wait a minute! Isn't this a bit premature?**

One interesting medical fact from history is the use of “safety coffins” or “coffin alarms” in the 18th and 19th centuries (Figure 91). These were special coffins equipped with a mechanism that would allow a person buried alive to signal for help. One common design for a safety coffin involved a string or wire that was connected to a bell above ground. If the buried person woke up or began to move, they could pull the string and ring the bell, alerting cemetery workers to their predicament. The use of safety coffins was a response to the fear of premature burial, which was a



**Figure 91.** Dr. Johann Gottfried Taberger's "safety coffin" invented in 1816. (Image obtained from Wikimedia Commons, the free media repository)

common concern in the 18th and 19th centuries due to the limited medical knowledge and technology of the time. While there are some documented cases of people being buried alive, it is unclear how effective safety coffins were in preventing this from happening.

## Vaccination Health

In the early 20th century, infant mortality rates in many parts of the world were as high as 1 in 10. However, due to medical advancements and improvements in public health, infant mortality rates have dramatically improved over the past century. One of the main reasons for this improvement has been the development of vaccines and other medical interventions that help prevent and treat common infant illnesses. For example, before the introduction of the measles vaccine in 1963, major epidemics occurred approximately every two to three years and caused an estimated 2.6 million deaths each year. Measles vaccination has led to a significant reduction in the number of infant deaths due to this disease. According to the World Health Organization, widespread vaccination has averted 56 million deaths between 2000 and 2021. In addition to medical advancements, improvements in public health and sanitation have also played a

significant role in reducing infant mortality. Access to clean water and proper sanitation can help prevent the spread of infectious diseases that can be particularly dangerous for infants.

## Phrenology, the “aura reading” of the 19<sup>th</sup> century

Phrenology was a popular pseudoscience in the 19th century that claimed to be able to determine a person’s character and personality based on the shape of their skull. This practice was based on the idea that different regions of the brain controlled different aspects of behavior (Figure 92), and that these regions could be identified by feeling the bumps and contours of the skull. Phrenology was not all bad. Some concepts of phrenology had an influence on the early science of neurology, such as the idea that different brain areas have different functions. This idea has been validated in modern neurology, though the specific ideas of phrenology about personality traits were incorrect.



**Figure 92.** A diagram showing phrenological areas of the skull and their corresponding characteristics. (Image obtained from Wikimedia Commons, the free media repository)

Phrenology had a dark side too. It was often used to justify racial and gender stereotypes under the guise of science. It played a role in promoting ideas of racial hierarchies and was used to argue against the intellectual capacity of women and certain ethnic groups.

While phrenology has been widely discredited and is no longer considered a legitimate medical practice, it did have some unexpected impacts on culture and art. For example, phrenology was sometimes used to create portrait busts, which were sculptures that depicted a person's head and shoulders. These busts were often displayed in homes and public spaces as a way of celebrating the individual's personality and character, as determined by phrenology.

Phrenology also had an impact on literature, particularly in the works of Charles Dickens. In his novel "Bleak House," Dickens satirizes the practice of phrenology, portraying it as a dangerous and misguided pursuit that can lead to false conclusions about a person's character.

Overall, while phrenology may seem like a strange and outdated practice today, it did have some unexpected impacts on culture and art during its heyday.

## **I saw the sign**

Are you curious about the fascinating world of medicine and how doctors diagnose and treat patients? When it comes to understanding our health, it is important to distinguish between medical signs and symptoms. Imagine visiting a doctor with a mysterious ailment — they carefully observe your body, run tests, and listen to your concerns. What they are looking for are signs, which are the objective clues that reveal what might be going on inside. However, what about those sensations you feel, those subjective experiences that only you can describe? Those are symptoms, and they hold valuable insights into your well-being. These signs provide valuable information to healthcare providers, aiding in the identification and monitoring of various medical conditions. In medical terminology, a sign and a symptom are two distinct aspects used to describe and assess a patient's condition. Understanding the difference between the two is essential for your doctor to make accurate diagnosis and effective treatment.

A medical sign is an objective and measurable indication of a disease or abnormality that can be observed or detected by a healthcare provider during a physical examination, laboratory test, or diagnostic procedure. Signs are typically external or observable manifestations that can be documented and assessed by healthcare professionals. Examples of medical signs include high blood pressure, rash, abnormal heart sounds, swollen lymph nodes, or an irregular pulse. These signs provide valuable information to healthcare providers, aiding in the identification and monitoring of various medical conditions. In contrast, a medical symptom is a subjective experience or sensation reported by the patient that indicates something is not right in their body or how they feel. Symptoms are typically described by the patient and are subjective in nature, meaning they cannot be directly observed or measured by others. Examples of medical symptoms include pain, fatigue, dizziness, nausea, itching, or anxiety. Symptoms provide important insights into the patient's experience and help healthcare providers understand the nature and severity of their condition.

While signs and symptoms are interconnected, they serve different roles in medical assessment. On one hand, signs are often used by healthcare providers to make a diagnosis, monitor the progression of a disease, and evaluate the effectiveness of treatments. Symptoms, on the other hand, help patients communicate their experiences, guide healthcare providers in narrowing down potential causes, and assist in developing personalized treatment plans. In summary, medical signs are objective and observable indications of a disease or abnormality, while medical symptoms are subjective experiences reported by the patient. Both signs and symptoms play crucial roles in medical evaluation, leading to accurate diagnoses and appropriate management of various health conditions.

## **Mercury, more dangerous than a Ford**

While mercury is a highly toxic substance that can cause serious health problems, it was once used in medical treatments because it was believed to have therapeutic benefits. In the past, mercury was used to treat a wide range of conditions, including syphilis, constipation, and even as a cure for baldness.

One of the most unusual uses of mercury was in the treatment of scabies, a skin condition caused by mites that burrow under the skin. In the late 19th and early 20th centuries, doctors would apply a mercury ointment to the affected areas of the skin, causing the mites to die off and the symptoms to subside. However, the treatment was not without risks, as mercury can be absorbed through the skin and cause serious health problems, including kidney damage and nerve damage. Despite the risks, the use of mercury in medical treatments persisted well into the 20th century, and it was not until the 1970s that the medical community began to recognize the dangers of mercury and phase out its use in medicine. Today, mercury is no longer used in medical treatments, and its use is strictly regulated due to its toxicity and potential harm to human health.

Mercurochrome is a topical antiseptic solution that contains a small amount of mercury. The active ingredient in Mercurochrome is merbromin, a red-colored organic mercury compound that is effective against a wide range of bacteria and fungi. However, due to concerns about the toxicity of mercury, the use of Mercurochrome has been phased out in many countries. Mercurochrome was phased out in the United States in the late 1990s and early 2000s. In 1998, the US Food and Drug Administration (FDA) issued a ban on over-the-counter (OTC) topical antiseptics that contain mercury, including Mercurochrome, due to concerns about the potential health risks associated with mercury exposure. The ban was implemented in stages, with full compliance required by 2001. Today, the use of mercury in topical antiseptics is strictly regulated in the United States, and mercury-containing products are no longer available over the counter.

The famous composer Wolfgang Amadeus Mozart is believed to have suffered from mercury poisoning, which may have contributed to his untimely death at the age of 35. During his lifetime, mercury was commonly used in the treatment of various medical conditions, including syphilis and rheumatism, and it is thought that Mozart may have been exposed to mercury through these treatments. One of the most compelling pieces of evidence for mercury poisoning in Mozart's case is the analysis of his hair, which was found to contain high levels of the element. Symptoms of mercury poisoning can include tremors, muscle weakness,

and mood swings, which are consistent with some of the health problems that Mozart experienced in the years leading up to his death. Although the exact cause of Mozart’s death remains a subject of debate and speculation, the possibility of mercury poisoning adds an intriguing layer to the life and legacy of one of the most brilliant and influential composers in history.

## Danbury Shakes

Danbury, Connecticut was once known as the “hat capital of the world,” with dozens of hat factories employing thousands of workers in the late 19th and early 20th centuries (Figure 93). One of the key materials used in the production of felt hats was mercury, which was used in the hat-making process to soften the fur and make it easier to shape. Unfortunately,



**Figure 93.** Hat workers in Connecticut. (Image obtained from Wikimedia Commons, the free media repository)



the use of mercury in hat factories had serious health consequences for the workers, who were exposed to high levels of mercury vapor and dust daily. Many workers developed symptoms of mercury poisoning, including tremors, mood swings, and memory loss, a condition which became known as the “Danbury Shakes.” The health risks of mercury exposure in hat factories eventually led to the passage of the first occupational safety laws in the United States, and the use of mercury in hat-making was gradually phased out in the mid-20th century. Today, Danbury is still home to several historic hat factories and has a museum dedicated to the history of the hat industry in the city.

## **Get the lead out!**

Plumbism, also known as lead poisoning, is a condition caused by exposure to high levels of lead. In the past, lead was used in a wide range of products, including paint, pipes, and even cosmetics, leading to widespread exposure and health problems. One of the most unusual and surprising sources of lead exposure in the past was “flying plates,” a popular carnival game in which participants would throw balls at targets to break them. The glaze on the plates used in the game were often made of large amounts of lead. When the plates shattered into small pieces when hit by the balls the participants and bystanders would be exposed to high levels of lead dust, leading to symptoms of plumbism such as abdominal pain, muscle weakness, and neurological damage.

Vincent van Gogh, one of the most famous artists in history, is believed to have suffered from plumbism due to his extensive use of lead-based paints in his artwork. Van Gogh was known to use bright, vivid colors in his paintings, which were achieved using pigments that contained high levels of lead. Although van Gogh was not diagnosed with plumbism during his lifetime, many experts believe that his symptoms, which included seizures, depression, and auditory hallucinations, were consistent with lead poisoning. In fact, some of van Gogh’s most famous paintings, including *The Yellow House* and *The Bedroom*, have been found to contain high levels of lead in the paint. Although van Gogh’s use of lead-based paints may have contributed to his health problems, it is also possible that he suffered from other medical conditions, such as epilepsy

or bipolar disorder. Nevertheless, the possibility of plumbism adds an intriguing dimension to the life and work of one of the most celebrated artists of all time.

Today, the use of lead in consumer products is strictly regulated, and lead poisoning is much less common. However, it is important to be aware of potential sources of lead exposure, such as lead-based paint in older homes and contaminated drinking water in some areas, to protect against this harmful condition.

## **The mouse will see you now**

At one time, doctors used mice to evaluate the health of patients' ears. The use of mice to examine the ears was a primitive and largely ineffective method that dates to ancient times. It was believed that mice, which have a strong sense of smell, could be used to detect ear infections and other ear-related problems by sniffing around the ear of a patient and indicating the presence of disease. To use this method, doctors would place a live mouse on the patient's ear and wait for the mouse to move or show signs of agitation. If the mouse exhibited any signs of distress, it was believed that this was an indication of a problem in the patient's ear.

However, this method was highly unreliable and potentially dangerous, as the mouse could easily bite or scratch the patient, and there was no way to determine the exact nature or severity of the problem based on the mouse's behavior. Fortunately, with the invention of more advanced medical tools such as the otoscope, the use of mice in ear examination became obsolete and is no longer practiced in modern medicine.

## **Here comes the debridement**

In medical parlance, cleaning a wound of dead and diseased tissue is called debridement. The word debridement is of German and French origin and it translates as "to remove the bridle or harness from." This type of wound cleaning can be a chore for doctors and nurses, and frankly, they are often not very good at it, frequently causing significant bleeding, pain, and sometimes introducing infections into the wound.

## Maggot therapy

Poultices, which are moist substances applied to the skin to treat various medical conditions, have been used for thousands of years and are still used today in some traditional medical systems.

One of the most unusual ingredients used in traditional poultices is “maggot therapy” (Figure 94), in which live maggots are applied to a wound or ulcer in order to help clean and debride the area. While the idea of using live maggots on a wound may seem strange or even repulsive, it is actually a well-established medical practice with a long history of use. In fact, maggot therapy was widely used in the 19th century, before the advent of modern antibiotics, and has experienced a resurgence in popularity in recent years as a way to treat chronic wounds that do not respond to other forms of treatment.

Using maggots to clean wounds has many advantages. For example, maggots provide painless debridement, unlike doctors who use scalpels to remove dead and diseased tissue. Using maggots as treatment also serves as an effective debridement, because maggots secrete enzymes that dissolve dead tissue, thereby quickly removing dead tissue from the wound and leaving behind healthy tissue that can facilitate healing. The use of maggots also provides infection control as maggots have natural antimicrobial properties, which can help reduce the risk of wound infection. Maggots have enhanced wound healing properties, stimulating rapid wound healing by increasing oxygen concentrations in the wound and



**Figure 94.** Maggots. (Image obtained from Wikimedia Commons, the free media repository)

promoting cellular growth. Furthermore, maggots aid in reducing the unpleasant smell associated with infected wounds, significantly reducing unpleasant odors.

Today, maggot therapy is typically performed under strict medical supervision, using sterilized maggots and carefully controlled conditions to ensure safety and efficacy. While it may seem barbaric, maggot therapy has been shown to be effective in treating a variety of wounds, including diabetic ulcers and infected surgical wounds. In fact, it has become an increasingly popular treatment option in recent years, and many hospitals now offer it as a viable alternative to traditional wound care methods. The use of maggots as a medical treatment underscores the enduring power of traditional healing practices, and the potential for unusual or unexpected treatments to provide real medical benefits.

## **Poultices**

In traditional Chinese medicine, poultices are commonly used to deliver herbal remedies directly to the skin (Figure 95). These poultices, which are made by blending various herbs with water or other liquids to form a paste, are applied to the skin and left in place for several hours or overnight. The herbs used in these poultices vary depending on the specific medical condition being treated but may include a wide range of plant-based ingredients, such as ginger, turmeric, licorice, and ginseng. Some



**Figure 95.** A poultice. (Image obtained from Freepik)

poultices may also include animal-based ingredients, such as dried and powdered insects or animal bones. One of the key benefits of using poultices in traditional Chinese medicine is that they can help to promote the flow of qi, or vital energy, through the body. By applying the herbs directly to the skin, the poultices can help to stimulate circulation and reduce inflammation, as well as promote relaxation and overall wellness. While the effectiveness of poultices in traditional Chinese medicine is still a subject of debate and ongoing research, they remain a popular and widely used form of alternative therapy, reflecting the enduring power of traditional healing practices.

## **I didn't come here to F\*#& Spiders**

The Brazilian wandering spider, also known as the “banana spider” (scientifically known as *Phoneutria nigriventer*) is one of the most venomous spiders in the world and is found throughout Central and South America. Its venom contains several different compounds, including a potent neurotoxin that can cause muscle paralysis and respiratory failure. However, what is perhaps most surprising about the venom of the Brazilian wandering spider is that it contains a compound known as PnTx2-6, which has been shown to cause priapism in male victims. Priapism is a medical condition characterized by a prolonged and painful erection that can last for several hours or more. In fact, the venom is being studied as a possible treatment for erectile dysfunction! However, it is important to note that the venom can also be deadly, so is not something to mess around with.

## **Ozzie Spider**

The venom of the Sydney funnel-web spider contains a compound that could help protect the brain from damage after a stroke. This venomous spider is found in eastern Australia and is known for its aggressive behavior and potent venom. The compound in question is known as Hi1a, and it works by blocking a type of ion channel in the brain that can become overactive after a stroke, leading to cell death and brain damage. By inhibiting this channel, Hi1a has been shown to reduce the severity of stroke damage in animal models. Researchers are currently investigating whether

H11a or other compounds in funnel-web spider venom could be used to develop new stroke treatments that protect the brain from damage and improve outcomes for patients. While the idea of using spider venom as a medical treatment may seem unusual, it's just one example of the many fascinating and potentially life-saving discoveries that can come from studying these fascinating creatures.

## **Less desirable than a golden globe**

Some species of spiders have venom that is powerful enough to paralyze or kill their prey, but not strong enough to harm humans. One example of this is the golden orb-weaver spider, which is found in tropical regions around the world. Despite their formidable size and impressive webs, golden orb-weaver spiders are not considered a threat to humans. While their venom can cause pain and swelling if bitten, it is not typically dangerous and is unlikely to cause serious harm. In fact, some researchers are actually studying the venom of golden orb-weaver spiders as a potential source of new pain medications. The venom contains a compound called  $\omega$ -Hexatoxin-Hv1a, which has been shown to block certain pain receptors in the body without causing harmful side effects.

## **Leave me alone**

The venom of the brown recluse spider (Figure 96), also known as the violin spider, contains a unique compound that has been studied for its potential to treat certain types of cancer. This spider is found in the central and southern United States and is known for its characteristic violin-shaped marking on its body. While its venom can cause a range of symptoms in humans, including pain, swelling, and skin necrosis, researchers have also discovered that it contains a compound known as sphingomyelinase D. Sphingomyelinase D is an enzyme that has been shown to trigger a process called apoptosis, or programmed cell death, in certain types of cancer cells. Researchers are currently investigating whether this compound, or derivatives of it, could be used as a targeted therapy for cancer, potentially helping to kill cancer cells without harming healthy cells in the body.



**Figure 96.** Brown recluse spider. (Image obtained from Wikimedia Commons, the free media repository)

## Spiders curing cancer?

While the idea of using spider venom as a cancer treatment may seem unusual, it is just one example of the many fascinating and potentially life-saving discoveries that can come from studying these often-misunderstood creatures. Research has identified certain peptides and proteins in spider venom that can inhibit tumor growth and induce cell death in cancer cells. For example, a study published in the *Journal of Biological Chemistry* found that a peptide from the venom of the Brazilian spider, *Phoneutria nigriventer*, inhibited the growth of melanoma cells, a type of skin cancer. Another study, published in *Toxins*, explored a peptide from the venom of the Australian funnel-web spider, which showed potential in killing breast cancer cells. These studies suggest that spider venom components could be developed into new cancer therapies. By studying the venom of these and other spiders, scientists may be able to uncover new compounds and insights that can help us develop better treatments for a range of medical conditions, from chronic pain to stroke and beyond.

## Snake in the grass

The venom of the Gaboon viper, found in the rainforests of sub-Saharan Africa, is the most potent of any snake species in the world. The Gaboon viper's venom is a complex cocktail of enzymes, proteins, and other compounds that can cause a range of symptoms in humans, including pain, swelling, and even death in severe cases. It is estimated that a single bite

from this snake can deliver enough venom to kill up to 100 adult humans. However, despite its formidable reputation, the Gaboon viper is actually a relatively docile and non-aggressive species and is known for its impressive camouflage and ability to blend in with its surroundings.

If you ever encounter a Gaboon viper in the wild, it is important to keep a safe distance and, if bitten, seek medical attention immediately. While their venom may be powerful, with prompt treatment and antivenom, most people who are bitten can recover fully.

## **Taipan Express**

The venom of the Taipan (Figure 97), a species of highly venomous snake found in Australia and Papua New Guinea, is so potent that it can kill a person within just 45 minutes of being bitten.

The Taipan's venom contains a mixture of neurotoxins, procoagulants, and other compounds that can cause rapid paralysis and internal bleeding in its prey. In humans, a bite from a Taipan can lead to symptoms such as vomiting, muscle spasms, and organ failure. Despite its deadly reputation, the Taipan is actually a relatively shy and reclusive species and will typically only attack humans if it feels threatened or cornered. If you ever encounter a Taipan in the wild, it is important to keep a safe distance and seek immediate medical attention if bitten. Interestingly, the venom of the Taipan has also been studied for its potential medical uses. Some of the compounds in the venom have been found to have analgesic and



**Figure 97.** Taipan. (Image obtained from Wikimedia Commons, the free media repository)



anti-inflammatory properties and are being investigated as potential treatments for chronic pain and other conditions.

## **On your Markov**

The castor oil plant, also known as *Ricinus communis*, produces a toxic compound called ricin that is considered one of the deadliest natural poisons known to man. Ricin is a protein that can disrupt protein synthesis within cells, leading to cell death and organ failure. Ricin, in fact, figured in an assassination of a Bulgarian dissident. On September 7, 1978, Giorgi Markov was crossing the Waterloo Bridge in London, he felt a sharp pain in his leg like a bug bite. When he looked behind him to see what had caused the pain, he saw a man picking up an umbrella and rushing to get in a taxi. Markov didn't think much of it at the time. The pain in his leg worsened during the day and he developed fever and headache. He was taken to St. James Hospital where he died 4 days later at the age of 49. On autopsy, a small pellet was found embedded in skin. The pellet was round, smaller than the head of pin and was composed of platinum and iridium. The pellet had two holes drilled into it, measuring 0.35 mm. The holes formed an x-shaped cavity. While the scientists couldn't find any trace of the poison left in the skin, it was theorized that ricin was the used since it fit the symptoms demonstrated by Markov and was one of the few poisons that were fatally toxic in such a small dose. The man with the umbrella was assumed to be a KGB assassin or a killer sent from the Bulgarian secret police. He was sent to stop Markov from talking about his life under Bulgaria's authoritarian regime to the BBC.

While ricin can be deadly in very small amounts, it is important to note that the castor oil plant is not typically considered a major threat to human health, as the seeds are typically processed to remove the toxic compound before being used for medicinal or industrial purposes. However, there is some research into the potential medical uses of ricin and other plant-based toxins. In recent years, scientists have been investigating whether ricin and other plant toxins could be used to develop targeted cancer therapies, as they may be able to selectively kill cancer cells without harming healthy cells in the body. While the idea of using a

deadly poison as a cancer treatment may seem counterintuitive, it is just one example of the many fascinating and potentially life-saving discoveries that can come from studying the natural world around us.

## **An ocean of Calomine Lotion**

An old boyscout rhyme goes “leaves of three, let it be, berries white, danger in sight.” This rhyme was made to help scouts to remember the signs of the poison ivy plant and to avoid it. The poison ivy plant, scientifically known as *Toxicodendron radicans*, produces an oily resin called urushiol that can cause a painful and itchy rash in humans. Urushiol is found in all parts of the poison ivy plant, including the leaves, stems, and roots. It can cause a range of symptoms in humans, including redness, swelling, and blistering of the skin. In severe cases, it may even lead to difficulty breathing or other systemic symptoms. While the rash caused by poison ivy is certainly unpleasant, it is important to note that it is not typically considered a serious medical condition and can usually be treated with over-the-counter remedies like calamine lotion or hydrocortisone cream. Unusual and tragic cases of urushiol respiratory exposure have occurred after people inhaled the smoke from burning poison ivy plants. In some cases, the urushiol in the smoke caused severe swelling of lung tissues leading to a fatal outcomes. Interestingly, however, some researchers are currently investigating whether urushiol and other plant toxins could be used to develop new treatments for autoimmune diseases like rheumatoid arthritis and psoriasis. While the mechanisms are not fully understood, it is believed that these toxins may be able to modulate the immune system and reduce inflammation in the body. So, while poison ivy may be best avoided, if possible, the compounds it produces may one day have valuable medical applications.

## **Night Shade**

The deadly nightshade plant, also known as *Atropa belladonna* (Figure 98), contains a group of alkaloid compounds that can be deadly in high doses. These compounds, which include atropine, scopolamine, and



**Figure 98.** Deadly nightshade; *Atropa belladonna*. (Image obtained from Wikimedia Commons, the free media repository)

hyoscyamine, can cause a range of symptoms in humans, including dilated pupils, dry mouth, blurred vision, confusion, and even coma or death in severe cases.

However, despite its deadly reputation, some of the compounds found in the deadly nightshade plant have also been used for medicinal purposes throughout history. Atropine, for example, has been used to treat a range of conditions, including bradycardia (a slow heart rate), asthma, and irritable bowel syndrome. Scopolamine, another compound found in deadly nightshade, has also been used to treat motion sickness, nausea, and vomiting. Interestingly, it is also sometimes used as a “truth serum” or mind-altering substance in some cultures. Of course, it is important to note that these compounds can be extremely dangerous in high doses and should only be used under the guidance of a qualified medical professional. However, the paradoxical history of the deadly nightshade plant highlights the complex and multifaceted relationship between humans and the natural world.

## Foxglove

The foxglove plant, also known as *Digitalis purpurea*, contains a group of compounds called cardiac glycosides that can be both deadly and

lifesaving. These compounds are highly toxic in large doses and can cause symptoms like nausea, vomiting, and heart palpitations. However, in controlled doses, they have been used for centuries to treat heart conditions like atrial fibrillation and congestive heart failure. The active ingredient in foxglove, called digoxin, is still used today as a medication to treat certain types of heart conditions. When taken in the proper dose, it can help to strengthen the heartbeat and improve cardiac function. However, it is important to note that digoxin can be extremely dangerous if not used properly and should only be taken under the guidance of a qualified medical professional. Interestingly, the foxglove plant has also played a role in folklore and mythology throughout history. In some cultures, it was believed to have magical or spiritual properties, and was used in rituals and ceremonies to promote healing or protect against evil spirits.

## Morphine

The opium poppy plant, scientifically known as *Papaver somniferum*, (i.e., sleep inducing poppy) produces a potent pain-relieving compound called morphine, which is used to treat severe pain in medical settings. Morphine was named after the Greek god, Morpheus, who could shape the dreams of the sleeping.

Morphine is an opioid medication that works by binding to certain receptors in the brain and spinal cord, helping to block pain signals and produce feelings of euphoria and relaxation. While it can be highly effective for treating pain, it can also be highly addictive and has a high risk of abuse and dependence. Interestingly, the opium poppy plant has played a significant role in human history and culture, both as a source of pain relief and as a recreational drug. The plant's sap, which contains morphine and other opiate alkaloids, has been used for centuries to produce a variety of substances, including opium, heroin, and codeine. While the use and abuse of these substances can have serious medical and social consequences, the opium poppy plant and its derivatives have also been used in a variety of medical and cultural contexts throughout history. From ancient Sumeria to modern medicine, the opium poppy plant has a rich and complex history that continues to be studied and debated today.



**Figure 99.** Jimsonweed. (Image obtained from Wikimedia Commons, the free media repository)

## Jimsonweed

The jimsonweed plant (Figure 99), also known as *Datura stramonium*, contains a potent mix of alkaloid compounds that can cause a range of symptoms in humans, including hallucinations, delirium, and even death in severe cases. Despite its toxic effects, however, some of the compounds found in jimsonweed have also been used for medicinal purposes throughout history. For example, atropine, which is found in jimsonweed and other plants in the nightshade family, has been used to treat a range of conditions, including bradycardia, asthma, and irritable bowel syndrome. In recent years, there has also been some interest in the potential medical uses of jimsonweed compounds for treating addiction and other conditions. Some studies have suggested that the compounds in jimsonweed may be able to modulate the activity of certain neurotransmitters in the brain, potentially helping to reduce cravings and withdrawal symptoms in people with addiction. Of course, it is important to note that jimsonweed

can be extremely dangerous in high doses and should only be used under the guidance of a qualified medical professional. However, the paradoxical history of this toxic plant highlights the complex and often unpredictable ways in which the natural world can interact with human health and medicine.

## **Humorous Egyptians**

In ancient Egypt, it was believed that a person's health and well-being were closely tied to their ability to maintain a balance between the four humors, which were considered to be the fundamental substances that made up the human body. These four humors included blood, phlegm, yellow bile, and black bile, and were thought to correspond to different aspects of a person's physical and emotional health. For example, blood was associated with courage and passion, while phlegm was thought to be linked to apathy and sluggishness. To maintain the balance of the humors, ancient Egyptian doctors relied on a range of treatments, including herbal remedies, diet and exercise, and even surgical procedures. They also believed in the power of amulets and talismans to protect against disease and promote healing. While these beliefs may seem quaint and outdated by modern standards, they reflect a deep and complex understanding of the human body and its relationship to the natural world. Moreover, many of the treatments and remedies used by ancient Egyptian doctors have continued to influence modern medical practice, underscoring the enduring legacy of these ancient medical beliefs.

## **Τέσσερα σωματικά χιούμορ**

In ancient Greece, it was believed that certain diseases and medical conditions were caused by imbalances in the four bodily humors — blood, phlegm, yellow bile, and black bile, which were thought to be related to the four elements of the natural world — air, water, fire, and earth. According to this theory, a person's physical and emotional health could be affected by various environmental factors, such as the weather, food and drink, and even the position of the stars and planets. For example, it

was believed that excessive heat or cold could throw the humors out of balance, leading to a range of health problems. To restore the balance of the humors, ancient Greek doctors relied on a variety of treatments, including herbal remedies, bloodletting, and even purging with laxatives or enemas. They also placed great emphasis on diet and lifestyle factors, such as exercise, sleep, and emotional well-being. While the ancient Greek theory of the humors may seem simplistic by modern standards, it reflected a sophisticated understanding of the complex and interconnected nature of the human body and its relationship to the natural world. Moreover, many of the treatments and remedies used by ancient Greek doctors have continued to influence modern medical practice, underscoring the enduring legacy of these ancient medical beliefs.

## Tai Chi

In ancient China, the concept of qi (Figure 100), pronounced “Chee”, and often translated as “life force” or “vital energy,” played a central role in medical theory and practice. According to this theory, a person’s health and well-being were determined by the balance and flow of qi throughout the body. Qi was believed to flow through a system of channels or pathways known as meridians, and was thought to be influenced by various factors, such as the environment, emotions, and diet. Imbalances in the flow of qi were thought to lead to a range of health problems, including pain, fatigue, and emotional disturbances. To restore the balance of qi, ancient Chinese doctors used a range of treatments, including acupuncture, herbal remedies, and various forms of massage and bodywork. They also placed great emphasis on diet and lifestyle factors, such as exercise, meditation, and emotional self-awareness.



**Figure 100.** Qi. (Image obtained from Wikimedia Commons, the free media repository)

## **Sex non-naturales**

In ancient Rome, it was believed that the human body was governed by a system of fluids known as the “Sex non naturales” or “six non-naturals,” which included air, food and drink, exercise and rest, sleep and wakefulness, evacuation and retention, and emotional balance. According to this theory, maintaining a proper balance of these six non-naturals was essential for good health and well-being. For example, too much or too little exercise could throw the body out of balance, as could eating or drinking too much or too little. To promote good health, ancient Roman doctors relied on a range of treatments, including herbal remedies, blood-letting, and even surgery. They also emphasized the importance of hygiene and sanitation, as well as the importance of a healthy diet and lifestyle. An interesting anecdote related to this concept involves the famous Roman physician Galen, who served several emperors. He was known for his extensive writings and his influence on medical theory. Galen often emphasized the importance of balancing the six non-naturals in maintaining health. One of his famous cases was treating the Roman philosopher Eudemus during a severe fever. Galen carefully regulated Eudemus’s environment and diet, demonstrating his belief in the power of the non-naturals. He adjusted the air quality and temperature in Eudemus’s room, prescribed a specific diet, and monitored his sleep patterns and emotional state. Remarkably, Eudemus recovered from a fever that was thought would be fatal. His recovery was attributed to the efficacy of Galen’s methods and the importance he placed on the six non-naturals. This episode help to cement Galen’s reputation.

## **Ayurveda**

In ancient India, the concept of Ayurveda, which means “the science of life,” played a central role in medical theory and practice. According to this theory, a person’s health and well-being were determined by a delicate balance of three fundamental energies or doshas — vata, pitta, and kapha. Each dosha was associated with different physical and emotional characteristics, as well as different elements of the natural world. For example, vata was associated with air and was thought to be responsible for movement and



flexibility, while pitta was associated with fire and was thought to be responsible for metabolism and digestion (Figure 101). To promote good health, ancient Indian doctors relied on a range of treatments, including herbal remedies, massage, and various forms of meditation and yoga. They also emphasized the importance of diet and lifestyle factors, such as exercise, sleep, and emotional well-being. An interesting modern anecdote about Ayurvedic medicine involves a well-known Indian Ayurvedic practitioner, Vaidya Balendu Prakash. He gained recognition for his unconventional and successful treatment of acute promyelocytic leukemia (APL), a rare type of blood cancer, using Ayurvedic principles and formulations.

One of his most notable cases involved the treatment of a young girl from Dehradun, India, diagnosed with APL in the late 1990s. After undergoing conventional treatment, including chemotherapy, without significant improvement, her parents turned to Vaidya Prakash as a last resort. He treated her with a specially formulated Ayurvedic regimen that included herbal medicines and a specific diet.

Remarkably, the girl's health improved significantly over the course of this treatment. Her blood counts normalized and her cancer went into remission. This case gained widespread attention and was even



**Figure 101.** Ayurvedic herbs. (Image obtained from Wikimedia Commons, the free media repository)

documented in a study published in a peer-reviewed journal, demonstrating the potential of Ayurvedic medicine in treating serious diseases like cancer.

Vaidya Prakash's approach exemplifies how Ayurvedic medicine, with its holistic focus on balancing the body's energies and using natural remedies, continues to find relevance and success in modern healthcare scenarios. His work has contributed to ongoing research and interest in integrating Ayurvedic principles with conventional medicine to enhance treatment outcomes for various diseases.

## **Knick-Knack -Theriac**

In medieval Europe, it was believed that certain medical conditions could be treated using “theriac,” a type of medicine made from a complex mixture of ingredients, including herbs, minerals, and animal products. In fact, the word “theriac” comes from the Greek words “therion,” which means “wild animal” and “theriake,” which means antidote for venomous beasts. The exact recipe for theriac varied depending on the region and the practitioner, but it often included exotic ingredients such as viper flesh, opium, and even powdered pearls or gold. The mixture was typically dissolved in honey or another sweet syrup to make it more palatable. Theriac was believed to have a range of healing properties, and was used to treat a variety of conditions, including fever, plague, and even snakebite. It was also thought to have a powerful purgative effect, helping to cleanse the body of toxins and restore balance to the humors. Despite its popularity, however, theriac was not always effective, and some formulations may have even been harmful.

## **Lithotomy**

In medieval Europe, one of the most common surgical procedures was the removal of urinary bladder stones called a lithotomy. *Lithos* in Greek means stone, and “*otomy*” in Greek is “a cutting.” These stones, which were formed from minerals and other materials in the urine, could grow to the size of a golf ball or even larger, causing intense pain, infections, incontinence, and other symptoms. To remove bladder stones, medieval

surgeons would use a special tool known as a “lithotome,” which was essentially a small knife or scoop designed to be inserted into the bladder through the urethra. Once the lithotome was in place, the surgeon would use it to break up the stone into smaller pieces, which could then be extracted from the bladder. While the use of the lithotome was often successful in removing bladder stones, it was also a risky and potentially dangerous procedure, particularly if the surgeon accidentally injured the bladder or other nearby organs. Nevertheless, the ability to remove bladder stones was seen as a major medical advancement and helped to establish surgery as a legitimate and important field of medical practice.

## Barbers of Seville and other locations

In medieval Europe, surgery was often performed by barbers rather than trained medical professionals. This was because barbers were skilled in the use of sharp tools, such as razors and knives, and were often called upon to perform minor medical procedures, such as bloodletting and tooth extractions. In fact, the modern-day barber pole has its origins in medieval barber surgeons (Figure 102). The pole itself was the staff that the patient would hold onto while the often-painful procedure was performed; the red and white stripes on the pole represented the bandages used during the procedure. The bandages would be hung out to dry after washing on the pole and would twist around the pole in the wind. However, this practice of barbers doing surgery led to some unfortunate consequences, as barbers



**Figure 102.** The barber pole is symbolic of the work of medieval barber surgeons. (Image obtained from Wikimedia Commons, the free media repository)

were not always well-equipped to handle more complex surgical procedures. This was particularly true when it came to operations involving the abdomen or chest, which required a high degree of skill and precision. To address this problem, some European cities began to establish guilds of “surgeons,” who were trained in the art of surgery and held to higher standards of education and expertise. These guilds helped to establish a more formalized system of surgical training and certification, laying the groundwork for modern surgical practice. Despite the limitations of medieval surgical techniques, however, many of the instruments and tools used in medieval surgery have continued to influence modern surgical practice. For example, the “scalpel,” a small, sharp knife used to make incisions in the skin, has been used in surgical procedures for centuries and is still a standard tool in many surgical settings today.

## **Epidemiology**

An epidemiologist is a public health professional who specializes in the study of disease patterns and their causes in human populations. Epidemiologists investigate the spread and distribution of diseases and identify risk factors and potential causes. Did you know that epidemiologists use a variety of tools and methods to track and analyze disease outbreaks? One of these tools is called “contact tracing,” which involves identifying and tracking down people who may have encountered an infected person. Contact tracing helps epidemiologists understand how a disease is spreading and can help prevent further transmission by identifying and isolating potentially infected individuals. In recent years, technology has made contact tracing easier and more efficient, with some health agencies using apps and digital platforms to track the movements and interactions of infected individuals. Contact tracing has played a critical role in containing many disease outbreaks, from Ebola in West Africa to COVID-19 around the world.

## **Medical Informatics**

Medical informatics has played a role in the development of a popular video game. Medical informatics, a newer science, is the application of

information technology and data analytics to healthcare, aiming to enhance patient care, enable efficient healthcare processes, and contribute to advancements in medicine and healthcare delivery. In 2018, the creators of the game “Minecraft” partnered with researchers at the University of Utah to develop a tool called “Eco,” which simulates an ecosystem and allows players to experiment with different variables and see how they affect the ecosystem. This type of simulation modeling is commonly used in medical research to study the effects of different interventions or treatments on patient outcomes. In the case of Eco, the tool could be used to study the impact of environmental factors on public health, such as air pollution or climate change.

## **Medical Mine Craft**

The tool was originally developed for research purposes, but the Minecraft team saw its potential as an educational tool and incorporated it into the game. The tool is based on principles of medical informatics, which involve using data and technology to improve healthcare and solve complex problems. By bringing medical informatics principles into the world of gaming, the Eco tool has helped raise awareness about the importance of data and technology in solving real-world problems.

## **Trephining**

Trephining, also called trepanning, the practice of drilling or cutting holes in the skull, has been used for thousands of years as a way to treat a variety of medical conditions, from head injuries to mental illness.

One of the most famous examples of trephining comes from ancient Peru, where the Paracas people practiced a form of trephination known as “craniotomy” as early as 200 BC. Archaeological evidence suggests that the Paracas used a variety of tools, including obsidian knives and drills made from animal bones, to create small holes in the skull.

While the exact reasons for trephining in ancient Peru are not entirely clear, it is thought that the procedure may have been used to treat a range of conditions, including headaches, seizures, and even depression. Despite the risks involved, including the potential for infection and brain damage,

trephining continued to be practiced in various forms throughout the ancient and medieval world, and even into the modern era. While the practice is no longer considered a valid medical treatment, it provides a fascinating glimpse into the often bizarre and unexpected ways that humans have sought to treat and understand the workings of the human body over the course of history.

## **Crispr**

CRISPR technology is a powerful gene-editing tool that uses a naturally occurring system in bacteria to cut and edit DNA. The CRISPR technology enables researchers to make precise changes to DNA sequences. CRISPR stands for “clusters of regularly interspaced short palindromic repeats,” which are specific regions of DNA consisting of short repeated sequences interspersed with spacer sequences. The CRISPR system consists of a protein called Cas9, which acts like a pair of molecular scissors, and a guide RNA molecule, which directs Cas9 to a specific location on the DNA strand. By making precise cuts in the DNA, researchers can remove, add, or modify specific genes, which has the potential to revolutionize fields such as medicine, agriculture, and biotechnology.

CRISPR technology has also been used to develop a new way to detect viruses such as Zika and dengue. In 2018, researchers at the Broad Institute of MIT and Harvard developed a technique called SHERLOCK (Specific High-sensitivity Enzymatic Reporter unLOCKing), which uses CRISPR enzymes to detect specific genetic sequences associated with viral infections. The SHERLOCK technique is inexpensive, easy to use, and can detect viruses even at very low levels. This technology has the potential to revolutionize disease diagnosis and surveillance in low-resource settings, where traditional diagnostic methods may be too expensive or difficult to use. It’s just one example of how CRISPR technology is being used to advance medical research and improve healthcare outcomes.

## **There’s a pill for that**

A fun fact about a medical advancement made by accident is the discovery of the therapeutic properties of Viagra for erectile dysfunction. Viagra,

also known as sildenafil, was originally developed by pharmaceutical company Pfizer with the intention to treat angina (chest pain) and high blood pressure. However, during early clinical trials in the early 1990s, it did not show significant benefits for these conditions. Interestingly, the men participating in the trials reported an unexpected improvement in their erectile function, leading researchers to further investigate the drug's potential as a treatment for erectile dysfunction.

In 1998, the U.S. Food and Drug Administration approved Viagra as the first oral treatment for erectile dysfunction. This marked a major breakthrough, as it provided an effective, non-invasive treatment for a condition that affects millions of men worldwide. The accidental discovery of Viagra's therapeutic properties revolutionized the treatment of erectile dysfunction and has improved the sexual health and quality of life for millions of men around the world.

## **Hi, Honey**

Honey has antibacterial activity due to the presence of various chemical compounds contained in it. These antibacterial properties were discovered by accident. In ancient times, honey was commonly used as a topical treatment for wounds due to its ability to prevent infection and promote healing. However, it was only in the 20th century that scientists discovered why honey was so effective at fighting bacteria.

In the 1980s, researchers were studying the antibacterial properties of various substances and decided to test honey. To their surprise, they found that honey was highly effective at killing a wide range of bacteria, including antibiotic-resistant strains. Further research showed that honey contains a range of antimicrobial compounds, such as hydrogen peroxide, methylglyoxal, polyphenol compounds, and bee defensin-1, that work together to prevent the growth and spread of bacteria. This accidental discovery has led to the development of medical-grade honey products that are now used as a natural and effective treatment for wounds and other infections.

Today, medical-grade honey is used in hospitals and clinics around the world to treat a variety of conditions, such as diabetic ulcers, burns, and

surgical wounds. It is a testament to the power of nature and the potential for unexpected discoveries to revolutionize the field of medicine.

## **Terminal Lucidity**

When a dying loved one experiences an unexpected surge of awareness, engages in conversations, or resumes eating, it can bring a sense of relief and hope to their family members. However, it raises a perplexing question: Is this a genuine improvement in their condition, or is it a conscious preparation for their inevitable death? Hospice workers have called this phenomenon terminal lucidity. Terminal lucidity, also known as paradoxical lucidity or “the rally,” is a fascinating phenomenon characterized by an unexpected return of mental clarity and memory shortly before death in individuals with severe psychiatric or neurological disorders. This remarkable condition, reported by physicians since the 19<sup>th</sup> century, defies conventional understanding and offers glimpses of renewed consciousness in patients who had previously experienced cognitive decline. Although the causes of terminal lucidity remain a subject of investigation and speculation, recent studies suggest that neuromodulation and the activation of specific brain circuits may play a role in promoting memory retrieval and mental clarity during this extraordinary period.

## **Warfarin**

The story of Warfarin (Figure 103), a powerful anticoagulant used to prevent blood clots, involves moldy silage, rat poison, and a suicide attempt. In the 1920's, some Wisconsin cows were bleeding to death after minor procedures or injuries due to an unknown cause. This was traced back to them eating moldy silage made from sweet clover that had gone bad. A farmer brought a blood-filled milk can, along with a dead heifer, to the University of Wisconsin in the 1930s. Biochemist Karl Paul Link and his team took on the challenge and eventually isolated the anticoagulant in the spoiled sweet clover, naming it dicoumarol. Link and his team went on to synthesize a more potent and predictable version of the compound, which they named Warfarin (the name comes from WARF, for the Wisconsin





**Figure 103.** Warfarin. (Image obtained from Wikimedia Commons, the free media repository)

Alumni Research Foundation, that funded the research, and “-arin” from coumarin, the type of compound).

Interestingly, Warfarin was first used as a rat poison in the 1940s before its therapeutic potential was recognized. In the 1950s, after a US soldier tried to commit suicide with Warfarin but survived with treatment, it was realized that the drug’s blood-thinning properties could be controlled and potentially beneficial. It has since become a crucial medication in preventing blood clots in conditions like deep vein thrombosis and atrial fibrillation. This story exemplifies how the journey of a medical discovery can start from an unexpected place, a mysterious disease in cattle, and lead to a life-saving medication for humans.

## Stay awake

Humans are the only mammal that willingly delays sleep. While other animals sleep when they are tired or when it is dark, humans often stay up late to work, study, or socialize. This behavior has been linked to our unique ability to use artificial light to extend our waking hours, but it can also have negative effects on our health, including increased risk of obesity, diabetes, and cardiovascular disease. So, while it may be tempting to stay up late binge-watching your favorite show or scrolling through social media, it is important to prioritize getting enough sleep for optimal health and well-being.

## **Always awake**

Night owls anyone? Some people are born with a genetic mutation that allows them to function normally on much less sleep than the average person. This rare genetic mutation is called DEC2, and people with this mutation can function normally on just four to six hours of sleep per night, compared to the recommended seven to nine hours for most adults. The mutation is believed to affect the body's ability to regulate sleep and circadian rhythms, but it is still not fully understood how it works. While having this mutation may seem like an advantage, it is important to note that most people still require a full night's sleep to function at their best, and chronic sleep deprivation can have negative effects on physical and mental health over time.

## **Nightmares**

People are more likely to have nightmares during times of stress. Nightmares are intense, frightening dreams that can cause a person to wake up feeling anxious, afraid, or upset. Studies have shown that stress can trigger nightmares by increasing the activity in the amygdala, which is the part of the brain that regulates emotions and fear responses. Additionally, people who have experienced trauma or have post-traumatic stress disorder (PTSD) may be more prone to nightmares, as the traumatic memories can manifest in their dreams. While nightmares can be distressing, they are a normal part of the sleep cycle and can often be managed through stress-reduction techniques, improved sleep hygiene, and seeking support from a mental health professional if needed.

## **Sawing Wood**

Snoring can be a sign of a serious sleep disorder called sleep apnea. Sleep apnea is a condition in which a person's breathing is interrupted or stops repeatedly during sleep, causing them to wake up briefly and gasp for air. Snoring is a common symptom of sleep apnea, and it occurs when the airway becomes partially blocked, causing vibrations in the throat tissues. Sleep apnea can have serious health consequences, including increased

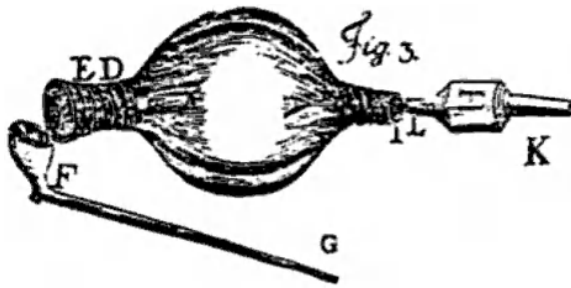
risk of heart disease, stroke, and diabetes, and it can also lead to daytime sleepiness, fatigue, and decreased quality of life. If you or someone you know snores loudly and experiences frequent daytime sleepiness or other symptoms of sleep apnea, it is important to talk to a healthcare provider for proper diagnosis and treatment.

## **Somnambulism**

Sleepwalking, also known as somnambulism, is a condition in which a person walks or performs other complex behaviors while still asleep. While sleepwalking can occur at any age, it is most common in children between the ages of 6 and 12, and it typically decreases as a person gets older. The exact cause of sleepwalking is not fully understood, but it is believed to be related to an imbalance in the brain's sleep-wake cycle. While sleepwalking can be alarming for parents and caregivers, most children outgrow the condition and do not experience any long-term effects. However, if sleepwalking continues into adulthood or is accompanied by other symptoms such as talking or screaming in sleep, it may be a sign of an underlying sleep disorder or other health condition that should be evaluated by a healthcare provider.

## **Tobacco Enemas**

Tobacco enemas were a real medical treatment used in the 18th century to resuscitate people who had drowned or were believed to be dead. The treatment involved inserting a tube into the rectum and pumping tobacco smoke into the colon, which was believed to stimulate the heart and lungs and bring the person back to life. It is believed that the phrase “blowing smoke up your ass” may have originated from the practice of tobacco enemas (Figure 104). While tobacco enemas were sometimes successful in reviving people, they were also extremely dangerous and could cause severe burns, inflammation, and even death. In modern times, tobacco enemas are no longer used as a medical treatment and are considered a dangerous and outdated practice.



**Figure 104.** A textbook drawing of a tobacco smoke enema device. A: pig's bladder; FG: tobacco pipe; D: mouthpiece to attach pipe; E: tap; K: cone for rectal insertion. (Image obtained from Wikimedia Commons, the free media repository)

## Leeching Chair

During the 18th and 19th centuries, doctors sometimes used live animals as part of medical treatments. One such treatment was called the “leeching chair,” which involved sitting in a chair with leeches attached to various parts of the body. The leeches were believed to suck out “bad blood” and improve circulation, and they were used to treat a variety of conditions, including headaches, arthritis, and even mental illness.

## Viper Therapy

“Viper therapy,” was a medical treatment which involved using venom from live vipers to treat a variety of conditions. The practice was particularly popular in the 18th and 19th centuries, and it was believed that the venom contained powerful healing properties that could be beneficial for a range of ailments. Viper venom was applied to the skin, either by rubbing it directly onto the affected area or by applying a poultice made from crushed viper heads. The venom was believed to have pain-relieving and anti-inflammatory effects, and it was used to treat conditions such as arthritis, gout, and even cancer. However, the use of live vipers for medical purposes was often dangerous and could result in serious injury or even death. Today, venom therapy is still used in some cases,

but it typically involves the use of synthetic venom rather than live animals.

## **Bee venom Therapy**

Another medical treatment that used live animals was called “bee venom therapy,” which involved using live bees to treat various medical conditions. The practice was based on the belief that bee venom contained anti-inflammatory and pain-relieving properties that could be beneficial for conditions such as rheumatoid arthritis, multiple sclerosis, and chronic pain. The therapy involved placing live bees on the skin, usually on the affected area, and allowing them to sting the patient. The venom would be released into the skin, causing pain and inflammation, but also potentially providing therapeutic benefits. The practice of bee venom therapy is still used today in some alternative medicine circles, but it is not widely accepted by the medical community and can be dangerous for people who are allergic to bee stings. Additionally, there is little scientific evidence to support the effectiveness of bee venom therapy for most medical conditions.

## **Blood transfusions with Sheep**

Blood transfusions are commonly thought to be a modern invention. However, the first human transfusions were first performed in the early 17th century, long before the discovery of blood types and the modern understanding of blood transfusion. In 1628, a physician named William Harvey performed a transfusion of sheep’s blood into a human patient (Figure 105), to treat a fever. While the patient initially appeared to improve, he later experienced severe reactions, including fever, chills, and a rapid pulse, and ultimately died. Despite this early setback, blood transfusions continued to be performed throughout the 17th and 18th centuries, often with disastrous results. It was not until the early 20th century that the discovery of blood types and the development of safe transfusion techniques revolutionized the practice of blood transfusion and made it a life-saving medical treatment.



**Figure 105.** Early blood transfusion from a lamb to a man. (Image obtained from Wikimedia Commons, the free media repository)

## The King's Touch

“The King’s Touch” is a historical medical belief that a monarch’s touch could heal certain diseases. This belief was particularly popular in medieval Europe and persisted until the 18th century. The practice was known as “touching for the king’s evil” or “royal touch,” and it was primarily used to treat scrofula (Figure 106), a type of tuberculosis that affects the lymph nodes in the neck.

The belief in the king’s touch was based on the idea of divine right, which held that kings and queens were chosen by God to rule, and therefore had a special connection to the divine. The touch of the monarch was believed to transfer this divine power to the patient, healing them of their affliction.



**Figure 106.** Image depicting Charles II touching the scrofulous. (Image obtained from Wikimedia Commons, the free media repository)

While the practice may seem superstitious to us today, there is some evidence to suggest that it may have had some therapeutic value. The psychological effects of receiving attention and care from a powerful figure may have helped patients feel better and boosted their immune systems. Additionally, some monarchs who were known for their healing powers, such as King Edward the Confessor of England, were skilled herbalists who may have provided effective treatments to their patients. Despite the lack of scientific evidence, the practice of the king's touch persisted for centuries, and many monarchs, including Queen Elizabeth I of England and King Louis XIV of France, were known to perform the ritual. It was eventually abandoned in the 18th century as medical knowledge advanced, and the power of the monarchy declined.

## Cupping

Cupping is a traditional Chinese medicine technique that involves placing heated cups on the skin to create suction (Figure 107). While cupping has



**Figure 107.** Cupping therapy. (Image obtained from Wikimedia Commons, the free media repository)

been used for thousands of years in China and other parts of the world, it has recently gained popularity in Western countries as well.

Recent research suggests that cupping may have a therapeutic effect on the body by increasing blood flow and reducing inflammation. In a 2015 review based on 135 studies of cupping, researchers found that cupping may be effective in treating conditions such as acne, facial paralysis, and cervical spondylosis, a type of neck pain. The review also found that cupping may help improve blood flow and reduce inflammation, although more research is needed to fully understand the mechanisms behind these effects. One theory is that the suction created by the cups draws blood to the affected area, increasing circulation and delivering more oxygen and nutrients to the tissues. This can help reduce pain and inflammation and promote healing. Cupping may also stimulate the immune system and promote the release of endorphins, which are natural painkillers. While cupping is generally considered safe, it can cause temporary side effects such as bruising, skin irritation, and dizziness.



## **Caffeine Overdose**

More than a morning “wake-me-up.” A tragic incident in the United Kingdom highlighted the dangers of caffeine overdose. On January 5, 2021, Tom Mansfield, a 29-year-old personal trainer, lost his life after consuming a fatal dose of caffeine. Immediately after ingesting the mixture, Mansfield experienced symptoms such as a rapid heartbeat and foaming at the mouth. He was taken to the hospital but died of a cardiac arrest. On autopsy, the coroner found that Mansfield had a caffeine level in his blood of 392 mg/L. The typical blood caffeine level after drinking a single cup of coffee is approximately 2–4 mg/L. Mansfield’s unfortunate demise was a result of an error in measuring caffeine powder. He had ordered a 100-gram bag of caffeine powder for use in supplement drinks. However, a mistake during measurement led him to consume several grams of the powder, equivalent to the caffeine content of up to 200 cups of coffee. This extreme overdose of caffeine proved to be fatal.

The high concentration of caffeine in powdered form poses a significant risk compared to regular caffeinated beverages. The United States Food and Drug Administration has warned about the potential dangers of caffeine powders, emphasizing the difficulty in accurately measuring safe doses. In this case, the absence of a measuring scoop likely contributed to Mansfield’s tragic outcome. Awareness of the potency of caffeine powders and proper measurement techniques are crucial to preventing such incidents in the future.

## **Typhoid Mary**

Typhoid Mary, whose real name was Mary Mallon, was an Irish immigrant who became notoriously known as the first identified asymptomatic carrier of typhoid fever in the United States. Her story began in the early 1900s when she worked as a cook for several families in New York City. During this time, typhoid fever was a feared disease, known for its high mortality rate. In 1906, a typhoid outbreak occurred in a household where Mallon worked, leading to an investigation by sanitary engineer George Soper. Soper identified Mallon as a potential source of the outbreak, as

she had worked in several households where typhoid cases had occurred. Despite showing no symptoms herself, tests later confirmed that she was a carrier of the typhoid bacteria.

Mallon's case was significant because it challenged the existing public health policies and understanding of disease transmission. She vehemently denied her role in spreading the disease and refused to cooperate with health authorities. This led to her being forcibly quarantined in 1907 on North Brother Island, where she spent three years before being released under the condition that she would not return to cooking. However, Mallon eventually resumed cooking under a pseudonym, leading to further outbreaks. She was detained once again in 1915 and remained in quarantine until her death in 1938. Her case highlighted the ethical and legal challenges in balancing individual rights with public health safety.

Typhoid Mary's story is a cornerstone in public health discussions, emphasizing the importance of asymptomatic carriers in the spread of infectious diseases. It underscores the need for effective public health policies that consider both the rights of individuals and the safety of the community. Her case also led to increased awareness and improvements in hygiene and sanitation, contributing to the development of modern public health practices. Additionally, it raised critical questions about stigma, social justice, and the responsibilities of carriers of infectious diseases, themes that remain relevant in contemporary public health discourse.

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# Chapter 11

## Conclusion

In the concluding chapter of this book, I aim to encapsulate the essence and purpose of the journey we have taken through the intriguing world of medical oddities. It has been a voyage into the exceptional and often baffling realms of human health and medicine. As readers, I hope you have found both enlightenment and fascination in these diverse tales, each showcasing the intricacies of the human body and the marvels of medical science.

Our exploration has revealed the extremes of human health, from the grotesque to the miraculous. We have seen individuals triumph over insurmountable odds. We have witnessed the dedication of medical professionals in their tireless pursuit of understanding and healing, even to the point of experimenting on themselves. We have explored how medicine was practiced in the distant past and can marvel at the progress we have made, especially in the past century. Moreover, we have uncovered the pitfalls of quackery and misinformation, underscoring the vital importance of evidence-based medicine.

One of my primary objectives in presenting this collection of stories is to underscore the wonder and complexity of the human body and the vastness of medical knowledge. Each story serves as a reminder of the fragility and resilience of life, prompting us to appreciate the value of health and the need for continuous advancements in medical science.

Furthermore, I hope this book encourages a deeper understanding of the human experience, fostering empathy and compassion for those facing extraordinary medical challenges. By delving into the lives of those

affected by rare conditions, we can gain a profound appreciation for the resilience of the human spirit and the power of determination in the face of adversity.

In the ever-evolving field of medicine, our understanding of the human body and its various manifestations is continually expanding. It is my hope that this book has inspired you to engage with the subject matter, to question and seek knowledge, and to remain curious about the endless mysteries that the realm of medicine holds.

As we conclude this journey, I encourage you to remember the individuals we have encountered, the conditions we have explored, and the lessons we have learned. Let us carry forth this newfound understanding and appreciation for the extraordinary and the ordinary in medicine, knowing that every tale contributes to the tapestry of our shared human experience.

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