Germs and bacteria

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Germs and bacteria drawing. Germs and bacteria love sweat and dirt. Germs and bacteria difference. Germs and bacteria under a microscope. Germs and bacteria pictures. Germs and bacteria images. Germs and bacteria are destroyed by. Germs and bacteria on hands.

Prevailing Theory of Diseases Electron microscope image of Vibrio cholerae. This is the bacterium that causes cholera. Germ theory is currently accepted scientific theory for many diseases. It states that microorganisms known as pathogens or “germs” can cause disease. These small organisms, too small to see without magnification, invade humans, other animals and other living hosts. Their growth and reproduction within their hosts can cause disease. The term “germ” refers to not just a bacterium, but any kind of microorganism, such as protists or fungi, or even non-living pathogens that can cause disease, such as viruses, prions, or viroids.[1] Diseases caused by pathogens are called infectious diseases. Even when a pathogen is the primary cause of a disease, environmental and hereditary factors often influence the severity of the disease and whether a potential host becomes infected if exposed to the pathogen. Pathogens are diseases that can be transmitted from one individual to another, in both humans and animals. Infectious diseases are caused by biological agents such as pathogenic microorganisms (viruses, bacteria and fungi) and parasites. Basic forms of germ theory were proposed in the late Middle Ages by physicians such as Ibn Sina in 1025,[2] Jerome Fracastoro in 1546 and expanded by Marcus von Plenciz in 1762. However, such views were despised in Europe, where Galen’s miasma theory remained dominant among scientists and physicians. In the early 19th century, smallpox vaccination was common in Europe, although doctors did not know how it worked or how to apply it to other diseases. Similar treatments were prevalent in India just before 1000 AD.[3][a] A period of transition began at the end of 1850 with the work of Louis Pasteur. This work was later expanded by Robert Koch in 1880. By the end of that decade, miasma theory was struggling to compete with disease germ theory. Viruses were first discovered in 1890. In the end, a “golden age” of bacteriology followed, during which germ theory quickly led to the identification of organisms responsible for many diseases.[4][5] Miasma Theory A representation of Robert Seymour’s cholera epidemic describes the spread of the disease in the form of poisonous air. Main article: Theory of Miasma The theory of miasma was the predominant theory of disease transmission before germ theory took hold towards the end of the 19th century, and is no longer accepted as a scientific theory of disease. She believed that diseases such as cholera, chlamydia infection, or Black Death were caused by a miasma (Ã©1â4Ã© ÌÃ¨Ã±Ã¯¨1â4Ã©Ã±, Ancient Greek: Â”pollutionÂ”), a harmful form of Â”catharia. emanating from decaying organic matter.[6] The Miasma was a poisonous steam or fog filled with particles of decomposed matter (mysmata) identifiable by its terrible smell. The theory suggested that diseasesthe product of environmental factors such as contaminated water, clean air and poor sanitation conditions. Such infections, according to theory, were not handed down among individuals, but would affect those within a local that gave rise to such vapors. [7] Ancient Israel Development The Mosaic Law, in the first five books of the Hebrew Bible, contains the first recorded thoughts of contagion in the spread of the disease, in contrast to classical medical tradition and hippocratic writings. In particular, it has instructions on quarantine and washing in relation to leprosy and venereal disease. [8] Greece and Rome In Antiquity, the Greek historian Thucydides (c. 460 – c. 400 BC) was the first to write, in his account of the plague of Athens, that diseases could spread from one infected person to another. [9] [10] A theory of the spread of contagious diseases that were not spread by direct contact was that they were spread by spore-like "seeds" (Latin: sowing) that were present and dispersible through the air. In his poem, De rerum natura (On the nature of things, c. 56 B.C.), the Roman poet Lucrezio (c. 99 B.C. – c. 55 B.C.) stated that the world contained various "seeds", some of which could sick a person if they were inhaled or ingested. [11][12] The Roman statist Marco Terentius Varro (116–27 BC) wrote, in his Rerum rusticarum books III (Three books on agriculture, 36 BC): "Precautions must also be taken in the marsh district... because there are raised some minute creatures that cannot be seen from the eyes, floating in the air and entering the body through the mouth and nose and causing us serious diseases. "[13] The Greek doctor Galen (AD 129 – c. 200/c. 216) speculated in his initial causes (c. AD 175) that some patients may have "fever seed".[14] In his on the different types of fever (AD 175), Galen speculated that the plagues were spread by "certi seeds of plague", which were present in air recovery. [16] Ancient India In the Sushruta Samhita, the ancient Indian doctor Sushruta theorized: "Leprosy, fever, consumption, eye diseases, and other infectious diseases spread from one person to another from sexual union, physical contact, eating together, sleeping together, sitting down, and the use of same clothes, garlands and pastes."[17][18] The book was dated to about the sixth century a. A basic form of contagious theory dates back to medicine in the medieval Islamic world, where it was proposed by the Persian doctor Ibn Sina (known as Avicenna in Europe) in The Canon of Medicine (1025), who later became the most authoritative medical manual in Europe until when16th century. In Book IV of El-Kanun, Ibn Sina spoke of epidemics, outlining the classical miasma theory and trying to merge it with his theory of early contagion. He mentioned that people can transmit the disease to others through the respiratory system, noted the spread of tuberculosis, and discussed the transmission of the disease through water and dirt.[2] The concept of invisible contagion was then discussed by several Islamic scholars in the Ayyubid Sultanate who called them “Impure Substances.” “The fiqh scholar Ibn al-Haj al-Abdari (circa 1250-1336), while discussing Islamic diet and hygiene, warned how the infection could contaminate water, food and clothing, and could spread through the water supply, and may have involved [20] During the High Middle Ages, Isidore of Seville (c. 560-636), mentioned “seeds carrying plague” (pestifera sowing) in his On the Nature of Things (c. 613 AD).[21] Later, in 1345, Thomas del Gar Bo (circa 1305-1370) of Bologna mentioned Galen’s “seeds of plague” in his work Commentaria non-parum utilia in libros Galeni (Useful commentaries on Galen’s books).[22] The Italian scholar and physician Girolamo Fracastoro proposed in 1546 in his book De Contagione et Contagiosis Morbis that diseases epidemic are caused by semi-transferable entities (seminar mor) that transmit infection by direct or indirect contact, or even without long-distance contact. Diseases were classified according to how they were transmitted and how long they could remain dormant. The first modern period The Italian physician Francesco Redi provided the first evidence against spontaneous generation. In 1668 he devised an experiment in which he used three vases. He put a meatloaf and an egg in each of the three vessels. He had one of the jars open, another sealed, and the last one covered in gauze. After a few days, he noticed that the meatloaf in the open jar was covered with worms, and the jar covered with gauze had worms on the surface of the gauze. However, the hermetically sealed jar had no worms either inside or outside it. He also noticed that worms were only found on surfaces accessible to flies. From this he concluded that spontaneous generation is not a plausible theory. It is said that microorganisms were first observed in 1670 by Anton van Leeuwenhoek, one of the first pioneers of microbiology, considered “the father of microbiology”. Leeuwenhoek is said to have been the first to see and describe bacteria (1674), yeast cells, life swarming in a drop of water. Water (such as algae) and the circulation of blood cells in the capillaries. The word “bacteria” didn’t exist yet, so he called these microscopic living organisms “animalcules”, which means “animals”. Those “small animals” that he managed to isolate from different sources, such as rainwater, the and water of well, mouth and human intestine. Yet German Jesuit priest and scholar Atanasio Atanasiomay have observed such micro-organisms before. One of his books of 1646 contains a chapter in Latin which reads: “On the wonderful structure of things in nature, investigated under a microscope”, stating: “Who would believe that vinegar and milk abound with an innumerable multitude of worms?” Kircher called “worms” the organisms invading the world. can be detected in decomposing bodies, meat, milk and secretions. His studies under the microscope led him to believe, perhaps the first to believe, that disease and rot (decay) were caused by the presence of invisible living bodies. In 1646 Kircher (or “Kirchner”, as it is often spelled), wrote that “in the blood of fever patients you could discover many things”.When Rome was struck by the bubonic plague in 1656, Kircher examined the blood of the plague victims under a microscope. He noticed the presence of “worms” or “animal coli” in the blood and concluded that the disease was caused by micro-organisms. He was the first to attribute the infectious disease to a microscopic pathogen, inventing the theory of disease germs, which he outlined in his Scrutinium Physico-Medicum (Rome 1658). Kircher’s conclusion that the disease was caused by microorganisms was correct, although it is likely that what he saw under the microscope were actually red or white blood cells and not the pathogen itself. Kircher also proposed hygienic measures to prevent the spread of diseases, such as isolation, quarantine, burning clothes worn by the infected, and wearing facial masks to prevent germs inhalation. It was Kircher who first proposed that living beings enter and exist in the blood. In 1700, the doctor Nicolas Andry claimed that the microorganisms he called “worms” were responsible for smallpox and other diseases[24]. In 1720, Richard Bradley theorized that the plague and “all pestilential distempers” were caused by “poisonous insects”, living creatures visible only with the help of microscopes.[25] In 1762 the Austrian physician Marcus Antonius von Plenciz (1705-1786) published a book entitled Medico-physical work. It outlined a theory of contagion according to which specific animal cells in soil and air are responsible for specific diseases. Von Plenciz noted the distinction between epidemic and contagious diseases (such as measles and dysentery) and contagious but non-epidemic diseases (such as rabies and leprosy).[26] The book cites Anton van Leeuwenhoek to show the ubiquity of these animalicules and was unique in describing the presence of germs in ulcerative wounds. Ottocento e Novecento Agostino Bassi, Italy The Italian Agostino Bassi was the first to demonstrate the emergence of a disease caused by a microorganism, when he conducted a series of experiments between 1808 and 1813, demonstrating that a “plant parasite” caused a disease in lime that was devastating the French silk industry of the time. The “plant parasite” is now known to be an insect pathogenic fungus called Beauveria bassiana (from the name Bassi). Ignaz Semmelweis, Austria Ignaz Semmelweis, a Hungarian obstetrician who worked at the Vienna General Hospital (Allgemeines Krankenhaus) in 1847, noticed the dramatically high maternal mortality due to puerperal fever after childbirth attended by doctors and medical students. However, those assisted by midwives were relatively safe. In further investigation, Semmelweis linked the puerperal fever to the examination of childbirth by doctors, and realized that these doctors usually came directly from autopsies. Claiming that puerperal fever was a contagious disease and that autopsy material was involved in its development, Semmelweis had his hands washed with chlorinated lime water before examining the pregnant women. He then documented a sudden drop in the mortality rate from 18% to 2.2% over a year. Despite this evidence, he and his theories were rejected by most of the contemporary medical establishment. Gideon Mantell, United Kingdom Gideon Mantell, the Sussex physician best known for discovering dinosaur fossils, spent time with his microscope and speculated in his Thoughts on Animalcules (1850) that perhaps “many of the most serious diseases afflicting humanity are caused by particular states of invisible animal life”.[27] John Snow, UK Main article: 1854 cholera epidemic on Broad Street John Snow was skeptical of the then dominant miasma theory. Although Girolamo Fracastoro’s pioneer theory of germs had not yet reached its full development and diffusion, Snow demonstrated a clear understanding of germ theory in his writings. He first published his theory in an 1849 essay, On the Mode of Communication of Cholera, in which he correctly suggested that the fecal-oral pathway was the means of communication and that the disease reproduced in the lower intestine. In his 1855 edition he even proposed that the structure of cholera be that of a cell. Snow’s 1849 recommendation to “filter and boil water before use” is one of the first practical applications of germ theory in the field of public health and sets the precedent for modern advice on boiled water. In 1855 he published a second edition of his paper, documenting his most elaborate investigations into the effects of the water supply in the Soho epidemic in London in 1854. Speaking with local residents, he identified the source of the epidemic as the public water pump on Broad Street (now Broadwick Street). Although the chemical and microscope examination of a water sample from the Broad Street pump did not definitively prove the danger, his studies on the course of the disease were convincing enough to convince the local council to disable the well pump by removing the handle. This actionwas commonly credited as ending the epidemic, but Snow noted that the epidemic may have already been in rapid decline. [28] Snow's study was an important event in the history of public health and geography. It is considered as one of the fundamental events of the science of epidemiology. After the cholera epidemic was subsurfaced, government officials replaced the handle on the Broad Street pump. They had responded only to the urgent threat posed to the population, and later, they rejected Snow's theory. Accepting his proposal would have meant accepting the transmission of the fecal-oral method of the disease, which they rejected. [29] Louis Pasteur, the pasteurization experiment of Louis Pasteur, illustrates the fact that the deterioration of the liquid was caused by particles in the air rather than by the air itself. These experiments were important pieces of evidence that support the idea of the germ theory of the disease. The most formal experiments on the relationship between germ and disease were conducted by Louis Pasteur between the 1860s and 1864s. He discovered the pathology of puerperal fever[30] and pyogenic vibrium in the blood, and suggested using boric acid to kill these microorganisms before and after confinement. Pasteur further demonstrated between 1860 and 1864 that the fermentation and growth of microorganisms in nutrient broths did not proceed from spontaneous generation. He exposed the freshly boiled broth in pots containing a filter to stop all the particles passing through the medium of growth, and even without filter at all, with the air being admitted through a long winding tube that did not pass dust particles. Nothing has grown in broths: therefore the living organisms that have grown in such broths have come from the outside, as spores on powder, rather than being generated inside the broth. Pasteur discovered that another serious disease of silkworms, pébrin, was caused by a microscopic organism now known as Nosema bombycis (1870). Pasteur saved the silk industry of France by developing a method to shield silk eggs for those who were not infected, a method that is still used today to control this and other silkworm diseases. Robert Koch, Germany Robert Koch is known for the development of four fundamental criteria (known as postulates of Koch) to demonstrate, scientifically healthy, that a disease is caused by a particular organism. These postulates grew from his seminal work with anthrax using purified cultures of the pathogen that had been isolated from sick animals. Koch's postulates were developed in the 19th century as general guidelines to identify pathogens that could be isolated with day techniques. [31] Even in Koch's time, it was recognized that some agentsthey were clearly responsible for the disease, although they did not satisfy all postulates. [32] [33] The attempts to rigidly apply Koch's postulates to the diagnosis of viral diseases at the end of the 19th century, at a time when viruses could not be seen or isolated in culture, culture,have impeded the early development of the field of virology.[34][35] Currently, a number of infectious agents are recognized as causes of disease, although they do not meet all of Koch’s postulates.[36] Therefore, while Koch’s postulates retain historical significance and continue to inform the approach to microbiological diagnosis, the fulfillment of all four postulates is not required to demonstrate causality. Koch’s postulates have also influenced scientists looking at microbial pathogenesis from a molecular point of view. In the 1980s, a molecular version of Koch’s postulates was developed to guide the identification of microbial genes encoding virulence factors.[37] Koch’s postulates: The microorganism must be abundant in all organisms affected by the disease, but not in healthy organisms. The micro-organism must be isolated from a diseased organism and grown in pure culture. The cultured micro-organism should cause disease if introduced into a healthy organism. The micro-organism must be isolated from the inoculated diseased host and identified as identical to the original specific causative agent. However, Koch completely abandoned the universalist need of the first postulate when he discovered asymptomatic carriers of cholera[33] and, later, typhoid fever. It is now known that asymptomatic or subclinical carriers of infection are a common feature of many infectious diseases, in particular viruses such as polio, herpes simplex, HIV, hepatitis C and COVID19. As a specific example, all doctors and virologists agree that poliovirus causes paralysis in a few infected individuals, and the success of the polio vaccine in preventing the disease supports the belief that poliovirus is the causative agent. The third postulate specifies “should”, not “should”, because, as Koch himself has shown for both tuberculosis and cholera,[32] not all organisms exposed to an infectious agent will become infected. Non-infection may be due to factors such as general health and proper functioning of the immune system; immunity acquired from previous exposures or vaccinations; or genetic immunity, such as resistance to malaria conferred by possession of at least one sickle cell allele. The second postulate may also be suspended for some microorganisms or entities that cannot (currently) be grown in pure culture, such as prions responsible for Creutzfeldt-Jakob disease.[38] In summary, a set of evidence that meets Koch’s postulates is sufficient but not necessary to establish causality. Joseph Lister, United Kingdom In the seventies of the nineteenth century, Joseph Lister was instrumental in developing practical applications of germ theory with regard to sanitization in medical settings and aseptic surgical techniques. the use of carbolic acid (phenol) as an antiseptic. See also Biology Portal Alexander Fleming Cell Theory Epidemiology Gender Theory Denialism History of Emerging Infectious Diseases Robert Hooke HookeVirchow Zymotic disease Note ^ In a 1767 report to the College of Physicians in London, John Zephaniah Holwell mentions the practice of smallpox vaccinations by Ayurvedic physicians and their explanations of the causes of the disease. ^ Other estimates of date range from 1000 B.C. to 500 CE.

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