Editorial

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Archives of Clinical Microbiology
1989-8436

2023
Vol. 14 No. 2: 228

History of Medical Microbiology

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Citation: Kahyesh S (2023) History of Medical Microbiology. Arch Clinic Microbio, Vol. 14 No. 2: 228.

Abstract

Using a unique single-lens microscope, Anton van Leeuwenhoek observed bacteria and other microorganisms in 1676. Edward Jenner came up with a way to successfully immunize a child against smallpox in 1796 using cowpox. Today, the same principles are used to create vaccines. In 1857, Louis Pasteur created vaccines against anthrax, avian cholera, and rabies as well as pasteurization for food preservation as a follow-up to this.

Antiseptic surgery is credited to Joseph Lister, who developed it in 1867. Post-operative infections were reduced by using diluted carbolic acid to sterilize the instruments and clean wounds, making surgery safer for patients. Between the years 1876 and 1884, Robert Koch shed a lot of light on infectious diseases. One of the first researchers to concentrate on the isolation of bacteria in pure culture was him. This led to the germ theory, which holds that a specific disease is caused by a particular microorganism. The Koch's postulates are a set of criteria he came up with in response to this.

The Gram stain is a significant milestone in medical microbiology. The technique of staining bacteria to make them more visible and easier to distinguish under a microscope was developed in 1884 by Hans Christian Gram. Today, this method is used extensively. On syphilis-infected rabbits, Paul Ehrlich conducted experiments in 1910 using various arsenic-based chemical combinations. After that, Ehrlich discovered that arsphenamine was able to kill syphilis spirochetes. In 1910, Silverman, the arsphenamines, were made available. In 1929, Alexander Fleming created the antibiotic that is still used the most frequently today: penicillin.

Gerhard Domagk discovered in 1939 that Protocol red did not harm mice and protected them from pathogenic streptococci and staphylococci. The sulfa drug's discovery earned Domagk the Nobel Prize in Physiology or Medicine. During the 19th century, Joseph Lister demonstrated the isolation of bacteria in pure culture, Louis Pasteur demonstrated the formation of antibodies, and Paul Ehrlich demonstrated the idea of vaccination with attenuated microorganisms. Medical microbiology has advanced rapidly since then (ASM, 1999). As medical advancements continue, numerous new pathogens are still being described (CDC, webpage). Our ability to identify, categorize, and comprehend microorganisms has undergone a revolution thanks to molecular diagnostic methods over the past two decades. Molecular methods are being used in an increasing number of diagnostic tests, including those that are available for purchase. Some proponents predict that they could eventually take the place of culture as the standard method of research in laboratories.

Most of the time, commensal and environmental organisms are to blame for serious nosocomial infections. It is not always easy to tell the difference between a primary pathogen, a commensal, and a contaminant. Immunocompromised patients frequently encounter this circumstance. Consequently, the clinician and medical microbiologist must work together closely to ensure that laboratory results are appropriately interpreted. Clinical microbiology is now more than just a service that processes specimens and provides results. It also offers advice on how to collect specimens, interpret results, manage patients, choose antimicrobials, and control infections that are acquired in hospitals.

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Keywords: Single-lens microscope; Antiseptic surgery; Environmental organisms; Medical microbiology; Antimicrobials infections

Received: 02-Feb-2023, Manuscript No. ipacm-23-13481; **Editor assigned:** 06-Feb-2023, Pre-QC No. ipacm-23-13481 (PQ); **Reviewed:** 20-Feb-2023, QC No. ipacm-23-13481; **Revised:** 22-Feb-2023, Manuscript No. ipacm-23-13481 (R); **Published:** 28-Feb-2023, DOI: 10.36648/1989-8436X.23.14.02.228

Introduction

Antiseptic surgery is credited to Joseph Lister, who developed it in 1867. Post-operative infections were reduced by using diluted carbolic acid to sterilize the instruments and clean wounds, making surgery safer for patients [1]. Between the years 1876 and 1884, Robert Koch shed a lot of light on infectious diseases [2]. One of the first researchers to concentrate on the isolation of bacteria in pure culture was him. This led to the germ theory, which holds that a specific disease is caused by a particular microorganism. The Koch's postulates are a set of criteria he came up with in response to this [3, 4].

The Gram stain is a significant milestone in medical microbiology. The technique of staining bacteria to make them more visible and easier to distinguish under a microscope was developed in 1884 by Hans Christian Gram [5]. Today, this method is used extensively. On syphilis-infected rabbits, Paul Ehrlich conducted experiments in 1910 using various arsenic-based chemical combinations [6].

The first genetically engineered vaccine for hepatitis B was developed in 1986, and a team at The Institute for Genomic Research sequenced the first bacterial genome in 1995 [7]. Synthetic insulin was produced using recombinant DNA in 1979. Influenza haemophilia. The first eukaryotic genome was completed a few months later [8].

Microbiology disease

All animals and people infected with the prion that causes Creutzfeldt–Jakob disease and mad cow disease will always die [9]. After an initial infection, the body is unable to eliminate the organism, resulting in persistent infections. The persistent presence of the infectious organism, usually as a latent infection with occasional recurrent relapses of active infection, is characteristic of persistent infections. Some viruses are capable of sustaining an ongoing infection by infecting various body cells. Some viruses remain in the body forever after infection. A typical illustration is the herpes virus, which has a tendency to hide in nerves and reactivate under certain conditions. Worldwide, persistent infections account for millions of deaths annually [10].

Conclusion

Although “Medical Microbiology” is a new book in the Instant Notes series, its logic is to present the information in bite-sized chunks, not expecting students to start at the beginning and read through it, but it is still a substantial volume. Despite the fact that the entirety of Biochemistry can be found in 438 pages (not including Molecular Biology, which occupies a separate volume), this is probably inevitable given the subject's size. This suggests, I suppose, that authors have been given a fairly broad mandate to express what they believe their subject covers at the moment. According to the current authors, students may find medical microbiology to be an intimidating subject with its own language and range of topics, including diagnosis and management as well as the molecular biology of infectious agents. As a result, a significant amount of information must be presented: However, the outcome typically resembles a list, even at 350 pages.

The text is presented in a few-page "Sections," which are not chapters like other books in the Instant Notes series. Each of these starts with a summary section called Key Notes, which can be half a page or more and is broken up into short paragraphs or sentences with bullet points. Reading these gave me a lot of information, often everything I wanted to know, and reading the "Section" didn't give me much more. This is a subject with a lot of information, and practitioners need to be able to access a lot of it, which is why I think many students will choose this path. The book is broken up into these sections: A general overview of microbial pathogenesis (including prions) can be found in the first 43 pages. Following this are extensive sections on bacteria and viruses, respectively. After that, there is a brief section on "Human pathogens: eukaryotic microorganisms, which contains a section on parasitic arthropods and helminths. Obviously, these are not "microbes" at all, but I suppose they are included for completeness's sake and because some of them serve as vectors for microscopic pathogens. The diagnosis, treatment, and prevention topics in the final two sections include extensive information on antibiotic use and clinical manifestations. Although it might have been expected that the clinical manifestations should come after the diagnosis and treatment, this section seems to fit in well. It has sections on the skin, bone, eyes, respiratory system, GIT, infections of the urinary and genital tract, and pregnancy. In this and other places, comprehensive consideration is given to how to handle immunocompromised patients. Overall, I think the coverage is pretty complete for the intended level, and the writing is clear and simple to read. Although there are a lot of chemical structures, such as those of antibiotics, and straightforward line diagrams of laboratory procedures and test results, there are not many diagrams or micrographs of actual organisms. In order to keep the book's size within acceptable limits, this may be the result of economy. However, pictures could have helped with many of the descriptions of microorganisms, including comments on their identification, which are said to be crucial for diagnosis and treatment.

Acknowledgement

None

Conflict of Interest

None

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