



Clinical Microbiology and Aseptic Techniques

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Description

Clinical microbiology is a medical field that identifies the microorganisms responsible for causing infections and provides information about antimicrobial drugs to treat them. It is essential to identify specific etiological agents of the disease to provide appropriate treatment. However, microorganisms are ubiquitous and require specific laboratory conditions to identify them accurately. Hence, aseptic techniques are used to reduce contamination from organisms in laboratory cultures.

Powerful contaminations like influenza can be identified clinically; however, most microorganisms can cause a wide range of clinical problems in individuals. In such cases, microbiological research laboratory techniques are necessary to identify a particular etiologic agent. The clinical microbial science research center's work is to test samples from patients for microorganisms that may cause illness and provide information about the *in vitro* growth of antimicrobial drugs against the identified microorganisms.

Aseptic techniques

Microorganisms require controlled lab conditions to be accurately identified. The key is to control the factors to which the culture is exposed. While working with microbial cultures, it is essential to ensure that organisms are specifically introduced into the culture, and other organisms do not contaminate it. Aseptic techniques are a procedure that includes target-specific practices and methodologies under appropriately controlled conditions to reduce the contamination from organisms. It is a mandatory lab skill to conduct research in microbiology, biotechnology, and medical fields.

Aseptic techniques involve the use of sterile equipment, media, and solutions, which are free from living microorganisms. It also includes preventing contamination through personal hygiene and proper handling of materials. Some common aseptic techniques used in microbiology include sterilization of instruments, hand washing, the use of sterile gloves, and the use of laminar flow hoods.

Sterilization of instruments is essential to prevent the introduction of contaminants into a culture. Autoclaving is a common method used to sterilize instruments, which involves heating the instrument to a high temperature and pressure to kill any microorganisms present.

Hand washing is another crucial aspect of aseptic technique. Hands must be washed with soap and water before and after working with cultures to prevent the spread of microorganisms. The use of sterile gloves is also recommended to prevent contamination from the hands.

A laminar flow hood is a specialized device used to maintain a sterile environment. The hood blows filtered air over the workspace, which removes any airborne contaminants. This technique is particularly useful when working with microorganisms that are easily spread through the air.

Aspectic technique application

Aseptic techniques are important to ensure the accuracy and reliability of microbiological experiments. By using these techniques, researchers can prevent contamination and accurately identify microorganisms, which are important in various fields, such as medicine, agriculture, and environmental science.

Medicine: Identifying microorganisms is essential in diagnosing infectious diseases and determining the appropriate treatment. For instance, a patient with a bacterial infection may require antibiotics, while a patient with a viral infection may not. Accurate identification of the microorganism causing the infection can prevent the inappropriate use of antibiotics, which can contribute to antibiotic resistance.

Agriculture: Identifying microorganisms is critical in understanding soil health and crop growth. Soil micro-biota play a significant role in nutrient cycling and plant health, and changes in microbial communities can impact crop productivity. Accurately identifying soil microorganisms can help farmers make informed decisions about fertilizer and pesticide use, leading to more sustainable agricultural practices.

Environmental science: Identifying microorganisms is crucial in understanding microbial diversity and ecology in various ecosystems. Microbes are involved in numerous ecosystem processes, including nutrient cycling, bioremediation, and carbon sequestration. Accurately identifying microbial communities can help researchers understand how different ecosystems function and how they may respond to environmental changes.

Conclusion

Accurate identification of microorganisms is crucial in various fields, and researchers use various techniques to prevent contamination and accurately identify microorganisms. Understanding microbial diversity and ecology can help us develop more sustainable practices in medicine, agriculture, and environmental science, ultimately leading to a healthier planet.

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