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Note on Different Stages of Pathogenesis

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Description

Pathogenesis is defined as the emergence and progression of the disease. Understanding the aetiology of the disease and its progression, two major components of pathogenesis, are crucial in the prevention, control, and treatment of various diseases. In many cases the mechanical properties of the tissue or the cellular environment contribute to the progression of the disease or its onset, and this is also true of infections caused by viral infections. For example, the ability of bacteria to invade a cell or tissue, to establish an infection in the body and to prevent or exploit even immune responses often depends on the bacterium's ability to use the cytoskeleton, and exploit various biochemical pathways that respond to changes in mechanical stimuli.

Types of pathogenesis include microbial infection, inflammation and damage and tissue deterioration. For example, a bacterial pathogenesis is a process in which bacteria cause infectious disease. Many diseases are caused by a number of processes.

Stages of pathogenesis

In order to cause infection, the pathogen must successfully reach four stages or stages of pathogenesis. They are exposure (contact), adhesion (colonization), invasion, and infection. The pathogen must be able to enter the host, move to an area where it can establish infection, prevent or overcome the host's immune response, and cause damage (i.e., disease) to the host. In most cases, the cycle ends when the pathogen leaves the host and is transferred to a new host.

Exposure: Contact with a potential pathogen is known as exposure or contact. The food we eat and the things we carry are all ways we can come in contact with potential germs. However, not all victims result in infection and disease. For a pathogen to cause disease, it needs to be able to reach the host tissue. An anatomic site where germs can pass into a tissue called the entry portal. These are areas where host cells are directly connected to the external environment.

Adhesion: After initial exposure, the pathogen attaches itself to the entry portal. The term adhesion refers to the ability of pathogenic bacteria to attach to body cells using adhesive properties, and different viruses use a variety of adhesion mechanisms to the host tissue.

Invasion: Once the adhesion is successful, the invasion can continue. The invasion involves the spread of the pathogen to all tissues of the area or body. Pathogens may produce exoenzymes or toxins, which act as virulence agents that allow them to accumulate and damage the underlying tissues as they spread deeper into the body. Pathogens may also produce harmful substances that protect them against immune system defences.

Infection: After an invasion, a successful replication of the pathogen leads to infection. Infections can be described as local, focal, or systemic, depending on the extent of the infection. Local infection is confined to a small area of the body, usually near the entrance. For example, a hair follicle infected with Staphylococcus aureus can cause abscesses in the area of infection, but the bacterium is most common in this small area. Other examples of local diseases that involve extensive tissue involvement include urinary tract infections that are blocked in the bladder or pneumonia that are trapped in the lungs.

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