



Synoptic Overview on Immunopathology

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Description

The immune system plays an essential role in protecting the body from invading pathogens and other harmful agents. However, in some cases, the immune response itself can contribute to the development and progression of disease. This phenomenon is known as immunopathology, and it has important implications for the prevention and treatment of a wide range of diseases, from infectious diseases to cancer and autoimmune disorders.

Immunopathology refers to the pathological consequences of the immune response. In other words, it is the study of how the immune system can contribute to the development and progression of disease. Immunopathology can take many forms, depending on the type of disease and the specific mechanisms involved. One of the most well-known examples of immunopathology is autoimmune disease. In autoimmune disease, the immune system mistakenly attacks the body's own tissues, leading to chronic inflammation and tissue damage. Examples of autoimmune diseases include rheumatoid arthritis, lupus, and multiple sclerosis.

Immunopathology can also play a role in the symptoms and progression of infectious diseases. For example, in COVID-19, the immune system's response to the SARS-CoV-2 virus can cause

inflammation and damage to the lungs and other organs, leading to severe respiratory symptoms and in some cases death. In addition immunopathology can contribute to the development and progression of cancer. The immune system plays an important role in identifying and eliminating cancer cells but in some cases cancer cells can evade detection by the immune system or even produce factors that suppress immune system function. This can allow cancer cells to proliferate and spread throughout the body.

Immunopathology can take many forms, depending on the type of disease and the specific mechanisms involved. However, there are several common mechanisms that can contribute to immunopathology in a wide range of diseases. Inflammation is a normal part of the immune response, and it helps the body to fight off infections and other harmful agents. However, chronic inflammation can contribute to the development and progression of many diseases, including cancer, autoimmune diseases, and neurodegenerative disorders.

Chronic inflammation can be caused by a variety of factors, including infections, environmental toxins, and lifestyle factors such as diet and exercise. In some cases, chronic inflammation can become self-perpetuating, meaning that the immune system continues to produce inflammatory molecules even in the absence of an ongoing stimulus.

Another mechanism of immunopathology is the production of autoantibodies. Autoantibodies are antibodies that target the body's own tissues, leading to chronic inflammation and tissue damage. Autoantibodies are a hallmark of autoimmune disease, and they can be detected in the blood of individuals with autoimmune diseases such as lupus and rheumatoid arthritis.

The production of autoantibodies is thought to be caused by a combination of genetic and environmental factors. In some cases, the immune system may become "confused" and begin to target the body's own tissues as if they were foreign invaders. In addition to chronic inflammation and autoantibody production, other mechanisms of immunopathology include the activation of immune cells such as T cells and macrophages, the production of cytokines and other inflammatory molecules, and the formation of immune complexes that can deposit in tissues and cause damage.

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