



Immunology of Hepatobiliary System and its Mechanism

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Description

The liver is an important organ in the human body that is responsible for a variety of functions such as metabolism, detoxification, and the production of important proteins. The hepatobiliary system, which includes the liver, gallbladder, and bile ducts, plays an essential role in the digestive process by producing and transporting bile. However, the hepatobiliary system is also susceptible to various immune-mediated diseases, which can cause significant damage to the liver and affect its functions. The immune system is essential in protecting the body against pathogens and foreign substances, and it also plays an important role in maintaining tissue homeostasis. In the hepatobiliary system, the immune system is involved in both protective and pathological processes.

The liver is significant in its ability to tolerate antigens and maintain immune tolerance, as it is constantly exposed to a wide range of antigens, including food antigens and gut-derived bacterial products. The liver contains various immune cells, including Kupffer cells, dendritic cells, Natural Killer (NK) cells, T cells, and B cells, that play different roles in the immune response. Kupffer cells are the resident macrophages of the liver and are responsible for phagocytosis of pathogens and dead cells. Dendritic cells are professional antigen-

presenting cells that capture antigens and present them to T cells to initiate an immune response. NK cells are cytotoxic lymphocytes that can kill infected or cancerous cells. T cells and B cells are involved in adaptive immune responses, with T cells recognizing and executing infected cells and B cells producing antibodies against pathogens.

Immune-mediated diseases affecting the hepatobiliary system include autoimmune hepatitis, Primary Biliary Cholangitis (PBC), Primary Sclerosing Cholangitis (PSC), and viral hepatitis. Autoimmune hepatitis is a chronic liver disease in which the immune system attacks and damages the liver cells, resulting to inflammation and fibrosis. PBC is a chronic liver disease in which the immune system targets and destroys the small bile ducts in the liver, causing to bile accumulation and liver damage. PSC is a chronic liver disease characterized by inflammation and fibrosis of the bile ducts, leading to bile flow obstruction and liver damage. Viral hepatitis, caused by hepatitis A, B, C, D, and E viruses, can lead to acute or chronic inflammation of the liver, with chronic hepatitis B and C infections being the most common cause of liver cirrhosis and hepatocellular carcinoma.

The treatment of immune-mediated diseases affecting the hepatobiliary system depends on the underlying cause of the disease. In autoimmune hepatitis, immunosuppressive agents such as corticosteroids and azathioprine are used to suppress the immune response and reduce inflammation. In PBC, ursodeoxycholic acid is the first-line treatment, as it can improve liver function and delay disease development. In PSC, currently exists no effective medical therapy, and liver transplantation is the only therapeutic option for end-stage disease. In viral hepatitis, antiviral therapy is used to suppress viral replication and prevent disease progression.

To evaluate, the hepatobiliary system is an important component of the digestive process, and the immune system is essential to its mechanism. Immune-mediated diseases that affect the system, on the other side, it can cause significant liver damage and impaired liver function. Establishing hepatobiliary immunology is essential to developing effective therapeutic approaches to treat these diseases and enhance the outcomes of patients.

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