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The Type II Immune Response in Acute and Chronic Pancreatitis Mediated by STAT6 in Murine

Authors : Hager Elsheikh

Abstract : Context: Pancreatitis is a condition characterized by inflammation in the pancreas, which can lead to serious complications if untreated. Both acute and chronic pancreatitis are associated with immune reactions and fibrosis, which further damage the pancreas. The type 2 immune response, primarily driven by alternative activated macrophages (AAMs), plays a significant role in the development of fibrosis. The IL-4/STAT6 pathway is a crucial signaling pathway for the activation of M2 macrophages. Pancreatic fibrosis is induced by dysregulated inflammatory responses and can result in the autodigestion and necrosis of pancreatic acinar cells. Research Aim: The aim of this study is to investigate the impact of STAT6, a crucial molecule in the IL-4/STAT6 pathway, on the severity and development of fibrosis during acute and chronic pancreatitis. The research also aims to understand the influence of the JAK/STAT6 signaling pathway on the balance between fibrosis and regeneration in the presence of different macrophage populations. Methodology: The research utilizes murine models of acute and chronic pancreatitis induced by cerulean injection. Animal models will be employed to study the effect of STAT6 knockout on disease severity and fibrosis. Isolation of acinar cells and cell culture techniques will be used to assess the impact of different macrophage populations on wound healing and regeneration. Various techniques such as PCR, histology, immunofluorescence, and transcriptomics will be employed to analyze the tissues and cells. Findings: The research aims to provide insights into the mechanisms underlying tissue fibrosis and wound healing during acute and chronic pancreatitis. By investigating the influence of the JAK/STAT6 signaling pathway and different macrophage populations, the study aims to understand their impact on tissue fibrosis, disease severity, and pancreatic regeneration. Theoretical Importance: This research contributes to our understanding of the role of specific signaling pathways, macrophage polarization, and the type 2 immune response in pancreatitis. It provides insights into the molecular mechanisms underlying tissue fibrosis and the potential for targeted therapies. Data Collection and Analysis Procedures: Data will be collected through the use of murine models, isolation and culture of acinar cells, and various experimental techniques such as PCR, histology, immunofluorescence, and transcriptomics. Data will be analyzed using appropriate statistical methods and techniques, and the findings will be interpreted in the context of the research objectives. Conclusion: By investigating the mechanisms of tissue fibrosis and wound healing during acute and chronic pancreatitis, this research aims to enhance our understanding of the disease progression and potential therapeutic targets. The findings have theoretical importance in expanding our knowledge of pancreatic fibrosis and the role of macrophage polarization in the context of the type 2 immune response.

Keywords : immunity in chronic diseases, pancreatitis, macrophages, immune response
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