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Opinion Article

Harnessing the Power of Immunity, Inflammation, and Tumorigenesis in Liver Diseases by miR-155

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DESCRIPTION

MicroRNAs (miRNAs) are small non-coding RNAs that play a critical role in post-transcriptional gene regulation. miR-155, a widely studied miRNA, has been implicated in the pathogenesis of various liver diseases, including viral hepatitis, alcoholic liver disease, Non-Alcoholic Fatty Liver Disease (NAFLD), and Hepatocellular Carcinoma (HCC). This essay aims to provide a perspective on the role of miR-155 in liver diseases, specifically by modulating immunity, inflammation, and tumorigenesis. Immune cells in the liver, including T cells, natural killer cells, and dendritic cells, play a critical role in the immune response to hepatic insults. miR-155 has been shown to regulate the function of these immune cells by modulating various pathways.

The liver is a vital organ involved in various metabolic and detoxification processes. Liver diseases, such as hepatitis, cirrhosis, and liver cancer, are major health concerns worldwide. Immune-mediated mechanisms play a crucial role in the pathogenesis of liver diseases. MiR-155 has been shown to modulate immune responses and inflammatory processes in the liver.

MiR-155 is expressed in various immune cells, including T and B cells, macrophages, and dendritic cells. It regulates the differentiation, activation, and function of these cells by targeting various genes involved in immune signaling pathways. In liver diseases, miR-155 has been shown to play a critical role in regulating the immune response to viral and bacterial infections. For instance, miR-155 was found to be upregulated in patients with chronic Hepatitis B Virus (HBV) infection, and its overexpression was associated with the progression of liver disease. MiR-155 was also shown to promote the antiviral response in hepatocytes by suppressing the expression of the HBV receptor, Sodium Taurocholate Cotransporting Polypeptide (NTCP).

In addition to its role in immunity, miR-155 is also involved in regulating inflammatory responses in the liver. Inflammation is a critical component of the liver injury response, and chronic inflammation can lead to liver fibrosis and cirrhosis. MiR-155 has been shown to modulate the inflammatory response by regulating the expression of various pro-inflammatory cytokines, such as Interleukin-6 (IL-6) and Tumor Necrosis Factor-Alpha (TNF-α). In a mouse model of liver injury induced by Carbon Tetrachloride (CCl4), miR-155 was found to be upregulated in liver tissues, and its overexpression exacerbated liver injury and fibrosis by promoting the expression of pro-inflammatory cytokines.

Finally, miR-155 has been implicated in tumorigenesis in the liver. Hepatocellular Carcinoma (HCC) is the most common type of liver cancer and is associated with chronic liver disease and inflammation. MiR-155 has been shown to promote HCC development by regulating various oncogenic signaling pathways. For instance, miR-155 was found to promote HCC cell proliferation and invasion by targeting the tumor suppressor gene, Suppressor Of Cytokine Signaling 1 (SOCS1). MiR-155 was also shown to promote HCC cell survival by targeting the pro-apoptotic gene, FOXO3a.

CONCLUSION

In conclusion, miR-155 plays a crucial role in regulating immunity, inflammation, and tumorigenesis in the liver. Its dysregulation has been implicated in various liver diseases, including viral hepatitis, liver fibrosis, and HCC. Targeting miR-155 may offer a promising therapeutic approach for the treatment of liver diseases. However, further studies are needed to better understand the molecular mechanisms underlying miR-155 regulation in the liver and its potential as a therapeutic target.

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