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Study the Multifaceted Therapeutic Properties of the IQGAP1shRNA Plasmid on Rat Liver Cancer Model

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Abstract : The study comprehensively investigated the multifaceted therapeutic properties of the IQGAP1shRNA plasmid, encompassing its hepatoprotective, immunomodulatory, and anticancer activities. The study employed a Prednisolone-induced immunosuppressed rat model to assess the hepatoprotective and immunomodulatory effects of IQGAP1shRNA plasmid. Using this model, IQGAP1shRNA plasmid was found to modulate haematopoiesis, improving RBC, platelet, and WBC counts, underscoring its potential in hematopoietic homeostasis. Organ atrophy, a hallmark of immunosuppression in spleen, heart, liver, ovaries, and kidneys, was reversed with IQGAP1shRNA plasmid treatment, reinforcing its hepatotrophic and organotropic capabilities. Elevated hepatic biomarkers (ALT, AST, ALP, LPO) indicative of hepatocellular injury and oxidative stress were reduced with GST, highlighting its hepatoprotective and antioxidative effects. IQGAP1shRNA plasmid also restored depleted antioxidants (GSH and SOD), emphasizing its potent antioxidative and free radical scavenging capabilities. Molecular insights into immune dysregulation revealed downregulation of IQGAP1, IQGAP3 interleukin-2 (IL-2), and interleukin-4 (IL-4) mRNA expression in the liver of immunosuppressed rats. IL-2 and IL-4 play pivotal roles in immune regulation, T-cell activation, and B-cell differentiation. Notably, treatment with IQGAP1shRNA plasmid exhibited a significant upregulation of IL-2 and IL-4 mRNA expression, thereby accentuating its immunomodulatory potential in orchestrating immune homeostasis. Additionally, immune dysregulation was associated with increased levels of TNF-α. However, treatment with IQGAP1shRNA plasmid effectively decreased the levels of TNF-α, further underscoring its role in modulating inflammatory responses and restoring immune balance in immunosuppressed rats. Additionally, pharmacokinetics, bioavailability, drug-likeness, and toxicity risk assessment prediction suggest its potential as a pharmacologically favourable agent with no serious adverse effects. In conclusion, this study confirms the therapeutic potential of the IQGAP1shRNA plasmid, showcasing its effectiveness against hepatotoxicity, oxidative stress, immunosuppression, and its notable anticancer activity.

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