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Curcumin modulation of liver immune cell infiltration and inflammatory biomarkers in diabetic rat models

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Introduction: Diabetes mellitus (DM) contributes to liver damage through pro-inflammatory cytokines. Curcumin, a natural anti-inflammatory compound, has shown potential to reduce inflammation, lower blood sugar, and prevent liver damage by inhibiting the recruitment of harmful monocytes and modulating key signaling pathways.

Study objectives: To determine if curcumin is linked to lowering blood sugar and managing type 1 diabetes in various diabetic rats and to examine the impact of curcumin on the expression of proinflammatory cytokines immune cell profiles infiltrating liver tissue of diabetic rats, such as IL-6, TNF-α, and macrophages.

Methodology: Animal diabetic models were induced in 30 albino rats, and were divided into three groups: control, diabetic, and curcumin (N=10 each). Type 1 diabetes (T1D) was induced in the diabetic and curcumin groups using a single intraperitoneal injection of alloxan monohydrate. The curcumin group received curcumin post-diabetes induction. After one month, liver tissues were collected for histological and immunohistochemically analysis to assess inflammation markers.

Results: A significant association was observed between IL-6 expression and curcumin ($p=0.000$). The macrophage level was slightly decreased in the curcumin group. Tumor Necrosis-Alpha (TNF-α) slightly decreased. Biochemical analysis revealed significantly higher glucose, triglyceride, and cholesterol levels in the diabetic group than controls (($p<0.005$)

Conclusion: The study showed that diabetes causes liver damage with increased inflammation. Curcumin helped reduce glucose levels, liver inflammation, and IL-6 expression. However, curcumin did not significantly mitigate TNF-α or macrophage expression. Further research is needed to enhance curcumin's therapeutic potential in managing diabetes-induced liver damage