REMOVAL OF DIETARY FIBER INCREASES THE SEVERITY AND DELAYS THE RECOVERY OF DSS-INDUCED COLITIS IN MICE, INDEPENDENT OF SHORT-CHAIN FATTY ACID RECEPTOR SIGNALING

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A fiber-free diet reduced colonic short chain fatty acids and worsened DSS-induced colitis in mice, with effects mediated in part by GLP-1 receptor signaling but independent of FFAR2/3 pathways.

KEY POINTS

- Twenty-one days of fiber-free feeding decreased total colonic SCFA concentrations by more than 50% in mice, with significant reductions in acetate, propionate, and butyrate.
- Fiber-free fed mice exposed to DSS colitis showed increased disease severity with 50% mortality by day 13 versus 100% survival in chow-fed mice, along with greater body weight loss (25% versus 10% at day 7) and significantly increased histological severity scores.
- SCFAs applied to isolated perfused colon increased GLP-1 secretion by 40%, and GLP-1 receptor knockout mice showed impaired body weight recovery during colitis compared to wild-type controls.
- Colitis severity was independent of FFAR2 and FFAR3 signaling, as knockout mice for these receptors were comparable to wild-type littermates in all measured parameters.
- This mouse study demonstrates that dietary fiber supports resilience to intestinal injury through mechanisms involving SCFA production and GLP-1 signaling.

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