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Summary

THE E3 UBIQUITIN LIGASE RNF31 MEDIATES THE DEVELOPMENT OF ULCERATIVE COLITIS BY REGULATING NLRP3 INFLAMMASOME ACTIVATION

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RNF31 stabilizes the NLRP3 inflammasome through K63 ubiquitination and its RBR domain, promoting inflammatory cytokine production and colitis development in experimental models.

KEY POINTS

- RNF31 interacts with NLRP3 through its RBR structural domain and increases K63 ubiquitination levels on NLRP3, making NLRP3 more stable as demonstrated by co-immunoprecipitation assays and cycloheximide-chase analysis.
- In RNF31-deficient mouse models constructed using adenovirus, expression of NLRP3 and inflammatory cytokines IL-18 and IL-1β were reduced compared to controls.
- The NLRP3 inflammasome is a multiprotein complex whose activation leads to increased proinflammatory cytokines that disrupt intestinal barrier function and induce ulcerative colitis development.
- This study used GEO database analysis, immunohistochemistry, RNF31-deficient cell models, and mouse models to elucidate the mechanism by which RNF31 regulates NLRP3 inflammasome expression in colitis.

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