

THE ROLE OF METHYLYXANTHINES IN THE MODULATION OF INTESTINAL INFLAMMATION AND EPITHELIAL BARRIER INTEGRITY

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Paraxanthine, a caffeine metabolite, increased tight junction protein expression in inflamed intestinal organoids from both ulcerative colitis patients and controls, suggesting potential benefits for epithelial barrier function.

KEY POINTS

- In 3D intestinal organoids derived from ulcerative colitis patients and non-IBD controls, paraxanthine increased expression of tight junction proteins TJP1 and OCLN in inflamed conditions (1.27 to 1.38-fold increases, $p \leq 0.05$).
- Caffeine and paraxanthine did not reduce inflammatory cytokine gene expression in inflamed organoids despite affecting these genes in initial Caco-2 cell screening.
- FITC-Dextran permeability assay showed a trend toward barrier restoration with paraxanthine treatment (34% vs 51% permeability in inflamed controls) but did not reach statistical significance ($p = 0.16$).
- The study used small sample sizes ($n=1$ ulcerative colitis patient, $n=1$ non-IBD control) and was approved by Kaunas Regional Biomedical Research Ethics Committee.
- This research may interest investigators exploring non-pharmacological approaches to intestinal barrier restoration in inflammatory bowel disease.

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