HUMAN EXTRACHROMOSOMAL CIRCULAR DNA IS AN EMERGING BIOMARKER IN INFLAMMATORY BOWEL DISEASE

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This first investigation of extrachromosomal circular DNA (eccDNA) in inflammatory bowel disease finds increased eccDNA production in colonic mucosa of IBD patients compared to healthy controls, with disease-specific patterns distinguishing ulcerative colitis from Crohn's disease and active from remission states.

KEY POINTS

- Colonic mucosal samples from 40 IBD patients showed significantly increased eccDNA compared to 13 healthy controls, with the increase observed across all chromosomes and a tendency for larger eccDNA fragments in IBD.
- Pathways involved in cAMP signaling were significantly overrepresented among the 80 gene-associated eccDNA fragments more abundant in IBD patients versus controls.
- Disease-specific patterns emerged with 157 gene-associated eccDNA found only in ulcerative colitis patients and 210 only in Crohn's disease patients when considering fragments appearing in at least 25 percent of patients.
- Patients with active IBD had on average more eccDNA than those in remission, with eccDNA from phosphodiesterase genes and lipid metabolism genes particularly enriched in active disease, though the difference did not reach statistical significance.
- The authors propose eccDNA identification as a potential prognostic marker for IBD and suggest these findings may be relevant to clinicians seeking biomarkers for disease monitoring and prognosis.

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