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Summary

BIOPSY-BASED SINGLE-CELL PROFILING OF ULCERATIVE COLITIS AND CROHN'S DISEASE REVEALS SHARED INFLAMMATORY ARCHITECTURE AND DISEASE-SPECIFIC IMMUNE PATHWAYS

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Meta-analysis of over 718,000 gut mucosal single cells from 262 IBD patients reveals that ulcerative colitis and Crohn's disease share a common inflammatory remodeling program but diverge in immune execution, with CD8+ T cells expanding in UC but declining in CD, and JAK-STAT signaling enriched only in UC monocytes.

KEY POINTS

- The study integrated four single-cell RNA sequencing cohorts comprising more than 405,000 cells from approximately 190 Crohn's disease patients and 313,000 cells from approximately 72 ulcerative colitis patients.
- Both diseases share epithelial cell loss and immune population expansion, with 65% of cell types changing in the same direction during inflammation.
- CD8+ T cells expanded in inflamed UC tissue but declined in inflamed CD mucosa, representing a key disease-specific immune divergence.
- B cells showed adaptive and humoral immune programs in UC versus innate and stress-response pathways in CD.
- JAK-STAT signaling was strongly enriched in UC monocytes but not observed in CD.
- Cell-cell communication analysis indicated stronger adaptive immune interactions in UC compared to CD, where communication was more centered on stromal, innate, and epithelial compartments.

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