Exploring colonic allergic response in irritable bowel syndrome (IBS)

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1. IBS & single-cell sequencing: an overview
- Irritable bowel syndrome (IBS) is a type of functional gastrointestinal disorder (FGID) that affects 5-10% of people in the US.
- Symptoms include diarrhea, constipation, abdominal pain, and bloating, and can coincide with eating.
- IBS etiology is unknown, but a risk factor is acute gastroenteritis¹ and recent studies have indicated a potential role for loss of oral immune tolerance.²
- We hypothesized that relative to people with IBD or other non-IBS FGIDs, those with IBS would have increased signs of allergic inflammation in their GI tract, including elevated levels of mast cells and differences in gene expression.

2. Approach
- We used clinical metadata collected from the PREDICT trial, a collaboration between academic, clinical, and industry organizations where duodenal, ileal, and colonic samples from pediatric FGID patients are obtained.
- We analyzed single-cell RNA-seq data to identify important cell states and pathways.

3. Analytical Pipeline
Using the Seurat package in R Program, we completed data analysis through quality control and SCTransform.

4. Mast cell genes regulation in IBS
Contrary to our hypothesis, more mast cell-like genes were upregulated in Non-IBS samples when compared to IBS.

- Genes of interest: MTRNR2LB, NFKBIZ, PPP1R15A, LMNA

5. Summary & Future Directions
- Mast cells are difficult to characterize based on gene expression due to their abundance in many tissues and complex roles we do not fully understand.
- Based on the findings thus far, we have reason to believe the biology of mast cells may not be different and further exploration is needed.
- We could examine type II immune activation in the samples collected to better understand XXX (need help).
- Looking at cell-to-cell interaction will inform us of XXX (need help).
- Collecting more comprehensive dietary intake patterns may also be beneficial in determining treatment options that will work alongside drug therapies to target the underlying cause and prevent future relapses.

6. References

7. Acknowledgements
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