**Potential Patterning Factors in the Small Intestine**

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Resection of the intestine due to Necrotizing Enterocolitis, Inflamatory Bowel disease and other conditions causes Short Bowel Syndrome (SBS). Short Bowel Syndrome is the most common cause of intestinal failure a loss of the ability to absorb sufficient nutritional elements. Improved treatments for this condition depend on a better understanding of the molecular mechanisms during the development of proximal or distal small bowel. Onecut2 is a temporal regulator expressed in the crypt and transit amplifying zone in proximal small intestine. Osr2 is a zinc-finger protein that is expressed in distal small intestine. We assessed the genes *Onecut2* and *Osr2* for a potential role in controlling regional identity of proximal and distal small bowel, respectively. We evaluated the structural integrity and gene expression in proximal and distal small intestine of Onecut2 and Osr2 knockout mice.

**Methods:** Duodenum, jejunum, ileum and colon sections from 11 Onecut2 and 1 Osr2 and knockout mice and 1 control mouse were harvested at embryonic day 18.5. RNA was extracted and gene expression of proximal gene markers fabp1, lct, pdx1, and gip, as well as the distal markers fabp2, fabp6, and cubn were used to assess gene expression patterns in duodenum, jejunum and ileum using quantitative RT-PCR. Tissue from the stomach, jejunum, ileum and colon was also fixed and frozen for histology and tissue was stained with H&E and Alcian Blue/PAS.

No significant histological changes were seen in the Onecut2 or Osr2 knockout mice intestine on H+E or Alcian Blue/PAS. Because mouse intestines differentiate and mature after birth, Onecut2 and Osr2 at embryonic day 18.5 is a model of determining these genes in intestinal regional patterning. In addition, enteroids were successfully created from the crypts of harvested duodenum, jejunum, and ileum of adult Onecut2 knockout and control mouse intestines. Enteroids are potential models for identifying differences in functions such as bile acid transport in intestines lacking Onecut2 and Osr2.