

ISCC Research Project Abstracts



Michael Helmrath, M.D.
Research Project Principal Investigator

Cincinnati Children's Hospital Medical Center



Noah Shroyer, Ph.D.
Co- Principal Investigator

Cincinnati Children's Hospital Medical Center



James M. Wells, Ph.D.
Co- Principal Investigator

Cincinnati Children's Hospital Medical Center

INVESTIGATION OF REGIONAL IDENTITY IN HUMAN INTESTINAL STEM CELLS

The small intestine bears similar morphology of crypts and villi throughout its length, yet marked regional differences in function are well known. The clinical relevance of these differences is highlighted by the region specific location of many human diseases throughout the bowel. Understanding the mechanisms that result in regional specific intestinal stem cells (ISC) is required to develop therapeutic approaches for restoring regional specific function. Our preliminary data supports the concept that patterning of the intestine occurs early in development and is maintained throughout life at the level of the ISC. Using our recently developed in vitro methods to culture human ISC-derived enteroids (hENO) and conditions that regionally pattern human ES/iPS-derived organoids (HIOs), combined with unique transplantation models, we will determine if intestinal regional identity (rID) is stably maintained by specific transcription factors together with a unique chromatin state within individual ISC. To test this hypothesis, we will define the molecular and cellular carriers of intestinal regional identity, determine whether human hENOs and HIOs maintain stable rID after transplantation and identify the network of molecular determinants of regional identity.