

INTESTINAL DISEASES STUDIED BY IMAGING

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The intestinal epithelium functions as one of the most important barriers in our body. It takes up water and nutrients, while at the same time it protects our body from infection and/or inflammation. The intestinal epithelium is characterized by an impressive turnover. It is completely renewed every 3-5 days. This property allows the tissue to rapidly repair upon damage, that for example is induced by pathogens, (food) particles, or chemical insults. The intestinal epithelial cell system has become a commonly used model for stem cell biologists, as the rapid turnover enable a relative ease to study how intestinal stem cells give rise to progenitors and differentiated epithelial cell lineages. Importantly, dysregulation of intestinal epithelial (stem) cell biology may lead to a variety of diseases including infection, inflammatory bowel diseases (IBD) and cancer.

The study of the intestinal epithelium during homeostasis and disease involves in vivo mouse experiments and in vitro studies of organoids. The research was performed includes the use of a range of microscopic techniques, like tiled confocal imaging of IF-stained intestinal tissues, 3D rendering of IF stained organoids and semi-automated quantifications of organoids cultures using ImageJ. Imaging and image analysis was performed at the Cellular and Molecular Imaging Core facility, CMIC.

