

3D HIGH-RESOLUTION IMAGING OF HUMAN INTESTINAL TISSUE

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Inflammatory bowel diseases (IBD) is a group of chronic, relapsing inflammatory conditions mainly affecting the gastrointestinal tract. Studies of IBD in patient samples often focus on changes in the expression level of proteins and genes of interest, and how the expression pattern changes with disease state. There are several changes in the cell distribution and anatomy of the intestinal lining associated with IBD. Traditionally, the study of such changes in expression and anatomy of human specimen have been limited to the use of immunohistochemistry and *in situ* hybridization on tissue sections. However, as the coupling of tissue clearing techniques and high resolution 3D immunofluorescence imaging becomes more prevalent, we see that these techniques can be beneficial in the study of expression pattern and morphology in human IBD samples.

As part of a study of an intestinal crypt formation called pyloric metaplasia (PM) commonly seen in IBD, it was found that neutrophil gelatinase-associated lipocalin (NGAL) protein was highly expressed in these crypts. Previous studies have shown that PM appears close to IBD wound formation, particularly in relation to small intestinal lesions in Crohn's disease (CD) patients. However, there are several uncertain aspects of PM, one of them being the extent and three-dimensional distribution of these crypts. In the present study, we used the iDisco method to clear and stain a human surgical specimen previously shown to contain PM crypts. The sample was further imaged using a confocal microscope, clearly demonstrating, for the first time, the spatial distribution of PB in a human sample.

