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Epithelial chymotrypsin: impact on the host-intestinal microbial biofilm interface

Doctoral candidate
Simon GUIGNARD

Doctoral adviser
Chrystelle BONNART (IRSD, Département MICA)
Nathalie VERGNOLLE (IRSD, Département MICA)

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Proteases perform different physiological functions important for the maintenance of our digestive health. Chymotrypsin (CTR) is a pancreatic protease that appears to have extrapancreatic functions. Indeed, our results indicate an important epithelial source in the human and murine intestine (small intestine and colon). Therefore, chymotrypsin could play a major role at the epithelial-microbiota interface.

We hypothesise, in the context of a PhD project, that intestinal epithelial chymotrypsin can exert both an autocrine control on the epithelial cell and have a paracrine effect on the architecture of the intestinal microbial biofilm. We have already demonstrated the ability of this enzyme to activate intra-epithelial MAPK signalling and calcium mobilisation by cleaving the epithelialPAR2 receptor. The study of the consequences of this activation on epithelial cell biology and on the intestinal barrier will be part of the objectives of this PhD project. In preliminary work, we have shown that host proteases are able to modify the physical and biological characteristics of the intestinal microbial biofilm.

Another question will therefore be to establish whether CTR can play a role in the structure and functions of the intestinal microbial biofilm. According to data in the literature, anti-inflammatory properties are attributed to chymotrypsin, but no studies have shown these effects in the context of intestinal inflammation.

We will evaluate whether chymotrypsin administration can improve the condition of the digestive mucosa and its bacterial biofilm in mouse models of intestinal inflammation. This research should shed light on the role of one of the proteolytic players in the intestinal mucosa, chymotrypsin, and its involvement at the host-microbiota interface.

Contact
holoflux@inrae.fr