Ting-jia Fan

“The Role of Enterococcus faecalis Sugar Transport in Experimental Colitis”

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3:30 P.M.

6004 Marsico Hall

Advisors: Drs. Jonathan J. Hansen and R. Balfour Sartor

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ABSTRACT

Ting-Jia Fan: The Role of Enterococcus faecalis Sugar Transport in Experimental Colitis
(Under the direction of R. Balfour Sartor and Jonathan J. Hansen)

Inflammatory bowel diseases (IBDs), which afflict 1.6 million people in the United States, are chronic, relapsing and immune-mediated intestinal disorders caused in part by aggressive T-cell-mediated immune responses to intestinal microbes in genetically susceptible individuals. However, relatively little is known about how intestinal inflammation affects the function of gut microbiota. We show that Il10−/− mice colonized with a simplified, defined microbial consortium that includes Enterococcus faecalis develop IBD-like colitis. Transcription of two putative E. faecalis phosphotransferase systems (PTS) that import sugars into the bacterium is upregulated in colitis. We identify gluconate, ribose, and glucosamine as potential substrates for these PTS. The presence of these PTS is associated with altered intestinal microbial ecology and worsened colitis, therefore suggesting a role for E. faecalis sugar metabolism in colitis development. This work highlights the complexity of host-microbial-environmental interactions underlying colitis development and could enable the development of safe and effective treatments for IBDs.