

## Engineering In Vitro Models To Investigate The Role Of The Gut Microbiome In Extracellular Matrix Remodeling

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**Faculty Host: Sarah Stabenfeldt**

**Abstract** The human extracellular matrix (ECM) is a complex system of cell-secreted proteins, glycosaminoglycans, and other molecules that provide mechanical and biochemical signals to support tissue structure and function. Because of its important role in maintaining tissue homeostasis, sustained ECM dysregulation is linked to the progression of a wide range of diseases. Existing paradigms point to host cells (e.g. fibroblasts, and macrophages) as the primary regulators of ECM remodeling. However, in tissues heavily colonized by microbiota, diseases characterized by high degrees of ECM remodeling like inflammatory bowel disease are also associated with microbiome dysfunction. Nonetheless, current hypotheses that seek to explain ECM imbalance in these tissues do not consider the contributions of human microbiota. In this talk, I will highlight two research projects from our lab that demonstrate commensal members of the gut microbiome can control ECM remodeling both directly (in the gut) and indirectly (at distant organs through metabolites). I will also describe the in vitro approaches we have begun to develop that allow us to study these phenomena in more physiologically relevant contexts. Our findings point to a potential paradigm shift in the way we think about ECM regulation in the human body.

**Biosketch** Dr. Ana Maria Porras is an Assistant Professor of Biomedical Engineering at the University of Florida, where she leads the Tissue-Microbe Interactions lab. Her group engineers models of disease to study human-microbe interactions mediated by the extracellular matrix. The TMI lab applies these models in the contexts of the gut microbiome, neglected tropical diseases, and cardiovascular health. Her lab is also interested in understanding and broadening global participation in microbiome and biomaterials science. Additionally, she is a science artist and an expert on inclusive bilingual science communication. Dr. Porras is the co-founder and Senior Advisor of the Latinx in Biomedical Engineering community. She is the recipient of the NSF Faculty Early Career Development (CAREER) Award, the NIH Maximizing Investigators Research Award (MIRA), the AAAS Early Career Award for Public Engagement with Science, and the Society for Biomaterials Diversity, Equity, and Inclusion Award. Prior to arriving in Florida, Dr. Porras was a Presidential Postdoctoral Fellow at Cornell University. She holds a B.S. in biomedical engineering from the University of Texas at Austin, and a Masters and Ph.D. from the University of Wisconsin-Madison, where she was an American Heart Association Predoctoral Fellow. When she isn't doing all that, she loves to read, dance, travel, do puzzles, and, above all, eat ice cream