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Mapping host-microbe interactions that impact postnatal islet development and health

Resident microbial communities are dynamic and integral components of our health. Despite their microscopic size, the commensal organisms (such as bacteria, fungi, and viruses) that inhabit our bodies have far-reaching effects. While many studies focus on the gut (where most resident microbes reside) we now appreciate that these teeming communities also impact systemic organs, including the nearby pancreas. Longitudinal sequencing of the microbiome from birth to adulthood has highlighted the dynamic development of resident communities within the gut, with postnatal populations being distinct and fleeting. Whether the short-term enrichment of distinguishing microbial taxa during infancy is uniquely important for postnatal developmental events and long-term health is an unexplored question. The Hill Lab uses germ-free model systems to study how the microbiota shapes postnatal development in the pancreas with the goal of discovering novel microbe-inspired therapeutics.

Short Bio

Jennifer completed her BSci at Humboldt State University in California, followed by her PhD at the University of Oregon under the mentorship of Dr. Karen Guillemin (2017). During her graduate career, Jennifer uncovered the role for resident microbes in host pancreatic development using the germ-free zebrafish model system. This was one of the first times the microbiota was attributed to development of systemic host tissues outside the gut. She found these effects were mediated by a unique secreted bacterial anti-microbial protein, BefA (Hill et al. *eLife* 2016, Hill et al. *Cell Metabolism*. 2022). This work resulted in receipt of the NOSTER and *Science* Award for early career microbiome scientists (Hill. *Science*. 2022) Curious if these effects were conserved in mammals, Jennifer moved to Utah in 2018 to do a postdoc with Dr. June Round. Using germ free mice, Jennifer found that resident microbes can impact early development of the mammalian pancreas in a number of ways, hinting at the existence of a complex network of early-life host-microbe interactions that have evolved to tune the efficiency of host metabolic tissue (Hill et al. *Science*. 2025). Her new lab at CUB is geared toward dissecting this molecular network.