**TITLE:**
CaSR: linking nutrition to microbial ecology and gut inflammation

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**RESEARCH PROJECT DESCRIPTION:**

The mucosal surfaces are continuously exposed to microbes, both pathogenic and commensal organisms. Accordingly, nature has evolved an array of microbe-sensing mechanisms such as pattern-recognition receptors to impose balance between immunity and tolerance. In this way, the host can detect and react against invasion of potential pathogens with minimal harm to beneficial commensal microbes and host cells. Also, different from other mucosa, the primary function of the gut is to handle daily nutrients. Thus, the gut mucosa must develop additional mechanism(s) to balance nutrition, microbes and functional immune responses. Understanding this mechanism(s) may lead to development of novel therapeutic approaches not only for autoimmune diseases but also for infections and nutritional disorders. Over the past years, we have generated evidence that the extracellular calcium/nutrient-sensing receptor (CaSR), a newly characterized unique G protein coupled receptor, is such a mechanism. Thus, candidate students will have the opportunity to address such basic questions as how the nutrient sensor interacts with bacteria sensors to maintain gut homeostasis and whether disruption of this interaction leads to disease. With this new knowledge, the students will be expected to participate in designing novel therapies or improving known treatments such as total enteral nutrition, a primary therapy widely used to induce Crohn’s disease remission. Besides routine molecular cellular genetic and immunopathological techniques, students will have the opportunity to learn state of art cell-imaging and classical physiological and electrophysiological techniques including Ussing chamber/short-circuit current recording and pH stat measurement. The project is funded by NIH and UF funds.


