Josean M. Reyes Rivera

MARC Program

Abstract

Effects of Apoptosis and Cell Proliferation Inhibition in the intestinal regenerative process of echinoderm *Holothuria glaberrima*

Josean M. Reyes, Valentina Grillo, Javier Jusino, Natalia, Ashley, José E. García-Arrarás

Department of Biology, University of Puerto Rico – Río Piedras, San Juan, PR.

Our lab focuses a great part of its studies on the cellular and molecular mechanisms of intestinal regeneration using the echinoderm sea cucumber *Holothuria glaberrima* as animal model. Under stressful conditions, *H. glaberrima* has the capacity to eviscerate their internal organs; including the digestive tract by rupturing it from the esophagus and the cloaca, while leaving the torn edges of the mesentery free in the body cavity. From the mesentery, they regenerate a new intestine within a few weeks. Our project focuses on three different cellular events that are involved in the early regenerative process: cell proliferation, cell death, and changes in inflammation/reactive oxygen species. We expect that these findings will allow us to know the temporal sequence of these events and to understand their dependence among themselves. We plan to study the effects of cell proliferation and apoptosis by inhibiting these mechanisms. After inhibition, we are going to measure cellular processes involved in the intestinal regenerative process using histological techniques. One of the main cellular processes that we are going to focus is muscle cell dedifferentiation. Our lab hypothesized that muscle cells dedifferentiate in order to migrate and form part of the connective tissue. During this process, they eject their contractile apparatus condensed in a Spindle-like Structure (SLS). We hypothesize that inhibition of cell proliferation will lead to an increase in the dedifferentiation process, increasing the number of SLSs in the mesentery and a larger area of dedifferentiation. On the other hand, inhibition of apoptosis will decrease the dedifferentiation of the mesenterial muscle. The other cellular processes that we are going to study after inhibition include: extracellular matrix (ECM) remodeling, epithelial to mesenchymal transition (EMT), and rudiment growth of the blastema-like structure.