

Understanding the Link Between the Gut Microbiome and Regeneration of the Sea Cucumber *Holothuria glaberrima*

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Abstract

The process of regeneration is not completely understood, nor the factors that modulate it. Recent studies suggest that the microbiome of an organism might play a role in this process. Because of this, our laboratory is studying the relationship between gut microbiome and intestinal regeneration using the sea cucumber *Holothuria glaberrima*, an echinoderm with a high regeneration capacity, as a model organism. Previous results from our laboratory suggest that treatment with some antibiotics, causing a dysbiosis in the gut microbiota of the sea cucumber, delays the animal's intestinal regeneration. The present project aims to expand these findings by restoring the microbiome of dysbiotic sea cucumbers using a fecal microbiota transplantation protocol. For this, holothurians will be treated with different antibiotic cocktails, eviscerated, and exposed to fecal matter solutions. Ten days after evisceration, the animals will be dissected, and their intestinal regeneration analyzed. The intestinal regeneration progress and bacteria samples of the groups treated with different antibiotics and fecal solutions will be compared to assess whether the fecal microbiota transplantation successfully restores the gut microbiome of the sea cucumber and whether this influences the intestinal regeneration of the animal. These findings will shed light on factors that contribute to organ regeneration.