

Microbial Symbiosis in Zooplankton Guts Releases Methane in the Sea

Project Abstract

Microorganisms capable of producing methane are known to occur in association with zooplankton (small animals and the immature stages of larger animals in planktonic communities), most likely as part of their gut microbiome. However, the specific metabolic pathways by which the microbial symbionts of zooplankton produce methane have not been identified. The goal of this project is to identify microorganisms that release methane from the degradation of methylamines. Methylamines are a natural product of many species of algae, which are a preferred food source of zooplankton. Our hypothesis is that during zooplankton consumption of algae rich in methylamines, anaerobic microorganism in the host's gut break down the methylamines and produce methane. For this project, we will collect zooplankton samples in Puget Sound waters in order to isolate and grow microorganisms that can degrade methylamine in the laboratory. We will also chemically analyze laboratory cultures of these microorganisms to test if they can produce methane when consuming methylamines.

Importance

The marine environment has long been known to be a source for atmospheric methane, a powerful greenhouse gas. Yet, the contribution and regulation of the different methanogenic pathways identified in the sea remain poorly constrained. Determining the ecological and environmental factors that control natural methane emissions is expected to help guide ecosystem management practices, build global models of methane budgets, and predict future atmospheric methane emissions from natural sources.

Student learning experiences

- Organization of field research and sample collection.
- Sterile microbiology technique and DNA sequencing.
- Exposure to analytical chemistry techniques.

Contact information

Dr. Oscar Sosa
ososa@pugetsound.edu
University of Puget Sound
Department of Biology
Phone: 253.871.2748

