Shedding light: nutritional and defensive interactions in ecologically important photosynthetic symbioses

Tuesday
February 21st, 2023
1 pm PT, 2 pm MT, 3 pm CT, 4 pm ET

WCPH classroom 460 - Arizona State University Tempe Campus

Elizabeth Hambleton

University of Vienna

elizabeth.hambleton@univie.ac.at

Symbioses between animals and microbes are widespread and have significant impacts on host physiology, ecosystem function, and evolution. In particular, symbiosis with photosynthetic organisms ("photosymbiosis"), like that between reef-building corals and Symbiodiniaceae dinoflagellate algae, allows hosts to dominate nutrient-poor tropical oceans worldwide. These algae form symbioses with other diverse, ecologically important marine animals including flatworms, sponges, and mollusks. My group's main questions include: how do these very different host organisms interact on the cellular level with the same intracellular algal symbiont? What are the molecular mechanisms underlying these symbioses? To address this, we combine functional experimentation in old and new model systems, single-cell transcriptomics, metabolomics/lipidomics, and metabolic imaging.

Specifically in this talk, I will discuss recent work on two marine photosymbioses: cnidarians and acoel flatworms. We have previously used the model sea anemone Aiptasia and corals to reveal the importance of sterol lipid transfer from symbiont to host cnidarians. In my group, we are also establishing the acoel flatworm Waminoa as a new model for photosymbiosis. Using MALDI-mass spec imaging, we find that sterol transport also occurs in this symbiosis, and hypothesize this could be a common currency across photosymbioses. We are also applying single-cell RNA sequencing in the coral Acropora and flatworm Waminoa to understand and compare the molecular processes in symbiont-containing cells. Overall the aim of our work is to understand globally widespread and evolutionarily important photosymbioses and their response to environmental change.

Can't attend in-person? Join via Zoom using the link or scanning the QR code below:

https://asu.zoom.us/j/82609477674?pwd=VW0xdlZKRjZWSWVDL1kyc21ld3RXZz09

ASU School of Ocean Futures
Arizona State University

ASU Research for Inclusive STEM Education Center
Arizona State University