
Woods Hole Oceanographic Institution
Biology Department Seminar



Thursday, July 20, 2023 – 12:00 Noon

***Emiliana Huxleyi* Virus Arrests Cell Growth, Triggers Shifts in Organic Stoichiometry and Influence to Life Cycle of the Phytoplankton-Host Cell**

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Blooms of the dominant coccolithophore *Emiliana huxleyi* are routinely infected by a specific lytic virus (EhV), which rapidly kills host cells and trigger bloom termination and the export of organic and inorganic materials. We tested the impact of EhV on the dynamic of resource acquisition and cellular stoichiometry remains unknown. Algal and viral cultures were used to determine the dynamics of alkalinity, modulated by calcification, nitrate and phosphate consumption and organic matter stoichiometry during infections. Calcification and nutrient uptake are rapidly arrested. In parallel, the stoichiometric ratio of carbon to nitrogen increased and the nitrogen to phosphorus ratio declined, which likely result from shift in macromolecular pool in infected cells. In addition, after the decline of the host population, a progressive enrichment in phosphorus was detected in cell lysates. We estimate that this stoichiometric shift is driven by heterotrophic bacteria consuming organic materials. We conclude that viral-mediated cell remodeling and consequent shifts in biomass stoichiometry likely impacts the patterns of nutrient cycling and biological carbon pump efficiency during large-scale blooms in the oceans. In parallel, during infection host *E. huxleyi* cell can produce cell variants with radically different phenotypes that are resistant to infection. This may provide an escape strategy fueling population recovery post-infection. Evidence from advanced microscopy and transcriptome analyses provide novel insight on regulatory mechanism for cell differentiation, which possibly involve epigenetic control and genome reorganization, illustrating the complexity of coccolithophore life cycles.

HYBRID! **In person:** Redfield Auditorium **Zoom:** <https://whoi-edu.zoom.us/j/95699683374> Meeting ID: 956 9968 3374 **By phone:** Find your local number: <https://whoi-edu.zoom.us/u/aeDHWhbKaH>