Glycophenotype of *Oxyrrhis marina* displays truncated surface N-glycans during prolonged starvation

Nicholas Lorenz[1], Susanne Menden-Deuer[2] & Christopher W. Reid[1]

[1]*Bryant University*
[2]*University of Rhode Island*

Oxyrrhis marina is a globally distributed heterotrophic dinoflagellate commonly found in marine and saltwater coastlines. Heterotrophic protists play pivotal roles in aquatic ecosystems by transferring matter and energy from primary producers to higher trophic levels. Previous research in our lab investigated the changes to *O. marina* neutral lipid content during starvation, which ultimately led to curiosity of starvation induced changes to cell surface glycosylation. In this study, *O. marina* was used as a model to investigate the changes to cell surface N-glycans under satiated and starvation conditions. The *O. marina* cells in the satiated condition were actively fed with the prey *Isochrysis gambana*, a common laboratory alga. Changes to surface N-glycans were monitored over a 21-day starvation. N-glycans were liberated via treatment with PNGaseF and labeled with 2-aminobenzamide via reductive amination. Derivatized glycan profiles were analyzed by MALDI-TOF mass spectrometry. Resulting glycan profiles were annotated using available databases (ie Glycomod) and manual analysis. We hypothesized that during active feeding on the algae Isochrysis, the *O. marina* surface should present a unique set of N-linked glycans. Satiated *O. marina* displayed a diverse set of high-mannose and hybrid structures. Over a 3-week starvation period, a shift in the *O. marina* surface N-glycan profile was evident. Under prolonged starvation conditions, the *O. marina* surface presented a profile composed of elongated glycan structures with an increase in sulfation and sialylation observed. Our characterization of the *O. marina* surface provides opportunities for a greater understanding of cell signaling and communication in saturation and starved conditions in this organism. In addition, this work provides a first report of the N-linked glycome in this extensively studied marine dinoflagellate. Current endeavors include the synthesis of azido-sugars for potential metabolic labeling of *O. marina* glycans.