

Temperature Effects on Sea-Ice Diatoms Intracellular DMSP Levels

Barbara R. Lyon¹, Peter A. Lee², Michael G. Janech³ and Giacomo R. DiTullio^{1,2}

¹ Marine Biomedicine and Environmental Science, Medical University of South Carolina

² Hollings Marine Laboratory, College of Charleston

³ Dept. of Medicine, Division of Nephrology, Medical University of South Carolina

Dimethylsulfoniopropionate (DMSP) production by marine phytoplankton is a fundamental component in the global sulfur cycle and the earth's radiation budget. Furthermore, it is believed to have important intracellular roles as a cryoprotectant and antioxidant. Polar ice-diatoms have been implicated as major producers of DMSP, yet little work has looked at the environmental factors influencing DMSP production within these organisms. It was hypothesized that changes in growth temperature would affect DMSP production in polar diatoms. To test this hypothesis two dominant members of sea-ice algal communities, *Navicula glaciei* and *Fragilariopsis cylindrus*, were grown at 0° C and 4° C. Intracellular DMSP concentrations and photosynthetic efficiency (Fv/Fm) were compared between temperatures. While photosynthetic efficiency was found to decrease in both diatoms in response to increased temperature, DMSP to chlorophyll *a* ratios (DMSP:Chl *a*) decreased in *F. cylindrus*, but increased in *N. glaciei*. These findings were duplicated in a second, independent set of experiments. The results indicate that there are species-specific responses in intracellular DMSP levels to changing growth temperatures. Future work will utilize a proteomics approach to identify regulatory components of sea-ice diatom DMSP production.

This work was funded by NSF-OPP #0338097