Diurnal cycling of glutathione in marine phytoplankton: Field and culture studies

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ABSTRACT: Glutathione is an abundant intracellular thiol that is involved in the detoxification of reactive oxygen species generated in the presence of light. We used short-term continuous cultures of *Emiliania huxleyi* and *Thalassiosira pseudonana* to show that a diurnal light cycle causes intracellular glutathione to undergo at least twofold variations, with maximum concentrations occurring during light periods. Cysteine concentrations also appear to vary in *E. huxleyi* to a similar extent, with the highest concentrations occurring at night. A complementary field study conducted at Salt Pond in Falmouth, Massachusetts, yielded a similar diurnal cycle of glutathione concentrations in particulate samples. This cycling is important to consider when measuring particulate thiols in both culture and field studies and provides additional evidence that glutathione plays an important role as an antioxidant in eukaryotic marine phytoplankton.

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