

**Michaela Mauß**

## **Unraveling the (bio)chemical processes involved in phytoplankton-virus interactions**

Viruses, by far the most abundant entities in the ocean, have been noticed to play a crucial role in phytoplankton regulation. Due to their lytic activity, marine algal viruses influence phytoplankton dynamics by terminating blooms or acting as diversity regulators. Further, viruses manipulate the pelagic food web by changing nutrient flows from lower to higher trophic levels. Nevertheless, the complex (bio)chemical interactions between viruses and their hosts are not well understood. Employing the marine coccolithophore *Emiliana huxleyi* and its specific viruses as a model system metabolomic investigation will help us to understand signals involved in the infection process. It has been shown that only the diploid life phase of *E. huxleyi* is susceptible to viral infection, whereas the haploid is not. Therefore, we intend to detect metabolic differences between the life phases by the application of GC/MS. In addition the diploid stage was shown to possess an escape strategy during long term viral infection by transforming itself into the haploid form. Co-culture experiments will allow us to determine, if this observed phase shift is triggered by metabolites produced in the presence of the virus. We aim to isolate and identify such infochemicals. Resistance against viral infection also occurs in diploid strains. Immunization experiments and the metabolic comparison of resistant and non-resistant strains during the infection process might help to clarify the ecological costs or the reasons for resistance.

### **Publications**

Mausz MA, Segovia M, Larsen A, Berger SA, Egge JK, Pohnert G (2020) High CO<sub>2</sub> concentration and iron availability determine the metabolic inventory in an *Emiliana huxleyi*-dominated phytoplankton community *Environ Microbiol* [Epub ahead of print] [Details](#)

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Mausz MA, Pohnert G (2015) Phenotypic diversity of diploid and haploid *Emiliana huxleyi* cells and of

cells in different growth phases revealed by comparative metabolomics. *J Plant Physiol* 172, 137-148.

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Rosenwasser S, Mausz MA, Schatz D, Sheyn U, Malitsky S, Aharoni A, Weinstock E, Tzfadia O, Ben-Dor S, Feldmesser E, Pohnert G, Vardi A (2014) Rewiring Host Lipid Metabolism by Large Viruses Determines the Fate of *Emiliania huxleyi*, a Bloom-Forming Alga in the Ocean. *Plant Cell* 26(6), 2689-2707. [Details PubMed](#)

Paul C, Mausz MA, Pohnert G (2013) A co-culturing/metabolomics approach to investigate chemically mediated interactions of planktonic organisms reveals influence of bacteria on diatom metabolism *Metabolomics* 9, 349-359. [Details Open Access](#)

Paul C, Reunamo A, Lindehoff E, Bergkvist J, Mausz MA, Larsson H, Richter H, Wängberg SÅ, Leskinen P, Båmstedt U, Pohnert G (2012) Diatom derived polyunsaturated aldehydes do not structure the planktonic microbial community in a mesocosm study. *Mar Drugs* 10(4), 775-792. [Details PubMed](#)

#### **Supervisor**

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#### **Start of PhD**

February 1, 2010

#### **Doctoral Disputation**

May 21, 2014