

Project Title: Evolving the green model algae *Chlamydomonas reinhardtii* in the lab to extend the productive life-span and export of lipids into the medium.

Supervisor: AR Dr. Oliver Caspari

Institute/group: RG Caspari

Webpage: <https://www.ifmb.uni-bonn.de/en/research/rg-caspari>

Requirements: Independence, diligence, motivation, basic lab aptitude. Some prior knowledge of photosynthesis would be a plus, but is not essential.

Skills to be learned (max 50 words):

Lab skills: handling of bacteria and microalgae, fluorescence plate reader analysis, measurements of photosynthesis, HPLC analysis, statistical data analysis

Desk skills: time management, finding and handling relevant literature, scientific writing

Project Description (max. 150 words):

In this project, we aim to use experimental evolution to alter the microalgae *Chlamydomonas reinhardtii* and make it into a platform for generating products of biotechnological interest. To this end, we aim to extend the productive life-time of dense algal cultures by co-evolution with environmental microbes, in a bid to select highly microbial consortia that recycle nutrients. Furthermore, we aim to increase the natural release of lipid-containing vesicles into the medium. In both cases, algae will be grown in multi-well plates, desired phenotypes assessed in regular intervals using fluorescence plate reader and photosynthetic measurements of culture fitness in one case and HPLC-measurements of media lipid content in the other. The data will then be used to inform manual selection of which samples will be reinoculated for the next iteration of growth in multiwell plates.

Support concept (max. 75 words):

The student helper will be responsible for conducting aspects of the screen, including cloning a salient subset of cTP variants, transforming the constructs into the algae and extracting the information through statistical treatment of the resulting data.

The student will receive support to develop not just the lab skills involved, but also project management skills, and be involved in the eventual write-up of the project for publication.