URL: http://www.uni-jena.de/en/PM090813_FoGruppe_Mittag.pdf

Light - elixir of life

New DFG research group investigates light-driven processes in algae

Sunlight influences every kind of life on earth. That is true for complex organisms, like human beings, as well as for the tiniest single-celled organisms. Light is the basic resource of life, not just for highly-developed plants but also for green algae and diatoms. "*Algae use light not only for the generation of energy*", knows Prof. Dr. Maria Mittag from the Friedrich Schiller University Jena. "It also controls their movements and serves to adjust their biological clock", says the professor for general botany.

The different effects of the light spectrum on algae are communicated by specific proteins. Which proteins these are and how they interact is to be thoroughly investigated by Prof. Mittag and her team from all over Germany. The German Research Foundation (Deutsche Forschungsgemeinschaft (DFG)) supports the new research group "Specific Light-Driven Reactions in Unicellular Model Algae" currently for the next 3 years. The project is coordinated by Prof. Mittag.

One of the most important problems to be dealt with is the light regulation of the photosynthesis of the diatom Phaeodactylum tricornutum. "*Hardly anything is known about it, although diatoms are responsible for approximately one fifth of the world's photosynthesis process*", claims Prof. Mittag.

How does the biological clock of green algae work?

Apart from diatoms, the unicellular green alga Chlamydomonas reinhardtii is in the focus of the researchers' attention. "*We want to clarify how the biological clock of these algae works*", Prof. Mittag points out. Chlamydomonas reinhardtii has a well-developed day-and-night rhythm: During the day they tend to swim towards a light source with the help of their two flagellums. But during the night they seem to be unimpressed by light. For the perception of light green algae use a so-called eyespot - a primitive visual system. The Jena team around Prof. Mittag aims at finding out which proteins are involved in the process of light perception, which proteins control the day-and-night rhythm, and how they work.

On the whole, the new research group consists of seven projects at seven Universities. "Our group works interdisciplinarily", says coordinator Mittag. Apart from the Jena botanists, further molecular biologists, physiologists and biophysicists from the Universities of Frankfurt, Bielefeld, Konstanz, Würzburg, Leipzig and Berlin (Humboldt University) are integrated into the research group. Not only molecular-biological and biochemical methods are applied. Especially biophysical methods serve to characterize algae proteins. Since all genetic information have been known for both types of algae, modern high throughput technologies, i.e. for proteome research, can be used as well.

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