**Stefanie Seitz (née Kiaulehn)**

# Functional characterization of molecular components of the circadian clock of the green alga *Chlamydomonas reinhardtii*

The circadian RNA-binding protein CHLAMY1 from the green alga *Chlamydomonas reinhardtii* consists of two subunits that contain either three K-homology- (C1 subunit) or three RNA-recognition-motifs (C3 subunit). Changes in the C1 level cause arrhythmicity of the phototaxis rhythm, while alterations in the level of C3 lead to acrophase shifts. Thus, CHLAMY1 is involved in maintaining period and phase of the circadian clock. Moreover, C1 co-regulates the level of C3. For example, overexpression of C1 causes a parallel increase in C3. As CHLAMY1 complex, they bind together to (UG)≥7 repeats containing mRNAs and trigger their expression in a circadian manner. In previous experiments, it was shown that time-dependents complex formation may be responsible for the circadian activity of CHLAMY1. Whereas an app. 160 kDa CHLAMY1 complex is present at both, subjective day and night, an additional ≥680 kDa C1-containing complex was found only at subjective day. Moreover, the two subunits of CHLAMY1 can integrate temperature information, which is the basis for other key properties of circadian clocks, including entrainment by temperature cycles and temperature compensation. Applied temperatures (18°C and 28°C) were in the physiological range of *C. reinhardtii*. While C1 is hyperphosphorylated at low temperature, the C3 expression level is upregulated at 18°C. Therefore, this study aims to investigate the mechanism of c3 regulation by temperature and the C1 subunit including involved *cis*-acting element and factors. Further, it was of interest to identify novel interaction partner of the C1 that are potentially part of the additional ≥680 kDa C1-containing complex.

**Publications**

Seitz SB, Voytsekh O, Mohan KM, Mittag M (2010) The role of an E-box element: multiple frunctions and interacting partners. *Plant Signal Behav* 5(9), 1077-1080. Details PubMed

Seitz SB, Weisheit W, Mittag M (2010) Multiple roles and interaction factors of an E-box element in *Chlamydomonas reinhardtii*. *Plant Physiol* 152(4), 2243-2257. Details PubMed

Voytsekh O, Seitz SB, Iliev D, Mittag M (2008) Both subunits of the circadian RNA-binding protein CHLAMY1 can integrate temperature information. *Plant Physiol* 147(4), 2179-2193. Details PubMed

**Supervisor**

Maria Mittag

**Start of PhD**

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**Doctoral Disputation**

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