CONTROL OF LIGHT-DEPENDENT CELL CYCLE ONSET BY THE DIATOM-SPECIFIC CYCLIN *DSCYC2*

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Cell division in photosynthetic organisms is tightly regulated by light. Although light-dependency of cell cycle onset has been well characterized in various phototrophs, little is known about the cellular signaling cascades connecting light perception with cell cycle activation and progression. Here, we demonstrate that the *Phaeodactylum tricornutum diatom-specific cyclin 2* (*dsCYC2*) displays a transcriptional peak only minutes after light exposure, long before the onset of cell division. In accordance with a role for *dsCYC2* in controlling a light-dependent cell cycle checkpoint, *dsCYC2* silencing decreases the cell division rate due to a prolongation of the G1-to-S phase transition. Interestingly, transcriptional induction of *dsCYC2* is triggered by blue light in a fluence rate-dependent manner, hinting at a photoreceptor-mediated regulation of *dsCYC2*. Using yeast-one-hybrid screening we were able to identify a blue light photoreceptor of the aureochrome family as an interactor and activator of the *dsCYC2* promoter sequence. We are currently further investigating the light-regulated transcription of *dsCYC2* and control of cell cycle onset by analyzing the effect of silencing of this photoreceptor on the expression of *dsCYC2* and other cell cycle regulators. The functional characterization of a cyclin whose transcription is controlled directly by light and whose activity connects light signaling with cell cycle progression contributes significantly to our understanding of the molecular mechanisms that underlie light-dependent cell cycle onset in diatoms and possibly other eukaryotes.