

REGULATION OF THE CELL CYCLE IN THE DIATOM *PHAEODACTYLUM TRICORNUTUM*

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Despite the enormous importance of diatoms in aquatic ecosystems and their broad industrial potential, little is known about diatom life cycle control. Classical microscopic studies already suggested that cell division in diatoms differs structurally and mechanistically from mitosis in animals and plants. However, it is unclear how these differences are reflected at the molecular level. The recent genome sequencing of the centric diatom *Thalassiosira pseudonana* (Armbrust et al., 2004) and the pennate *Phaeodactylum tricorutum* (Bowler et al., 2008) provides the basis to explore the level of conservation of cell cycle components in diatoms.

Here, we present the annotation of key cell cycle regulators in *P. tricorutum*, including the identification of evolutionary conserved cell cycle molecules like cyclin-dependent kinases (CDKs), cyclins and their activators and inhibitors. We identified counterparts of both animal and plant cell cycle regulators, as well as a group of diatom-specific cyclins. Next, we developed a system to synchronize the cell cycle in *P. tricorutum* cells. This system allowed us to follow the transcript expression of the annotated genes during the different phases of the cell cycle using real-time quantitative PCR. Together, our data indicate that diatom division is regulated not only by highly conserved but also by new and unique mechanisms.

References

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