

STEROL BIOSYNTHESIS IN *P. TRICORNUTUM*

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Diatoms represent one of the more successful phytoplankton population and have a considerable influence on global climate and marine environment. Their evolutionary success is linked to their peculiar and flexible metabolism, which is also of great interest for industrial applications and sustainable production of bioenergy. To deepen our understanding and exploit the metabolic resources of diatoms, we recently developed DiatomCyc (www.diatomcyc.org), the online database on *Phaeodactylum tricorutum*'s metabolism. By using it as a laboratory tool, we are currently studying important lipid-related biochemical pathways, such as the sterol biosynthesis in *P. tricorutum*. The *in silico* reconstruction of this pathway, unknown in diatoms, resembles a mix between those occurring in plants and fungi. Additionally, the apparent lack of a conventional squalene monooxygenase, key enzyme of the pathway and well conserved among eukaryotes, suggests that in diatoms the pathway might have evolved differently. By using specific chemical inhibitors, gene silencing, genetic complementation in yeast and GC-MS analysis we are investigating gene functions and differential intracellular sterols accumulation. Preliminary results confirmed the correctness of both *in silico* and manually curated predictions reported in DiatomCyc. In addition, we observed a connection between the metabolism of sterols and the accumulation of triacylglycerols (TAGs) in *P. tricorutum*, which makes the regulation of this pathway an attractive target for metabolic engineering.