NUCLEOTIDE TRANSPORTERS IN DIATOM PLASTIDS

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Genome sequencing projects revealed that in diatoms, nucleotide *de novo* biosynthesis takes place in the cytosol. Nucleotides are essential metabolites for a variety of processes in the plastids; hence there is a constant demand for nucleotide import.

Two plastidic nucleotide transport proteins (NTTs) have been characterized in diatoms. The combined activities of these two plastidic NTTs facilitate net import of the complete set of nucleotides and their corresponding desoxy-forms. This function is different to the role of NTTs known in plant plastids, which solely counter-exchange ATP with ADP+Pi to provide energy to the organelle.

Unlike plant genomes, which usually encode not more than two NTT isoforms, the genomes of the diatoms *Thalassiosira pseudonana* and *Phaeodactylum tricornutum* harbor several distantly related *ntt* genes (8 in *T. pseudonana* and 6 in *P. tricornutum*).

The already characterized diatom NTTs (NTT1 and NTT2) are most likely targeted to the innermost plastid membrane, based on their pre-sequence structure and on GFP-fusion experiments. Interestingly, not all NTTs possess typical plastid targeting pre-sequences.

When compared to plant plastids (with two membranes), metabolite transport into diatom plastids is more complex due to the presence of two additional membranes surrounding the organelle.

The unusually high number of NTTs in diatoms might result from the complex plastid structure as well as from the need to transport newly synthesized nucleotides from the cytosol into the stroma.