

## Genome editing in microalga *Chlamydomonas reinhardtii* via CRISPR/Cas9

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### Statement of the Problem:

CRISPR/Cas9 genome editing in *Chlamydomonas reinhardtii* is a challenging task due to the lack of a suitable Cas9 ortholog and the presence of a highly repetitive genome. The first successful CRISPR/Cas9 genome editing in *Chlamydomonas reinhardtii* was achieved by expressing a Cas9 ortholog from *Staphylococcus aureus* (SaCas9) and a CRISPR array from *Streptococcus pyogenes* (SpCas9) in the microalga. This approach allowed for the targeted deletion of the *psaA* gene, which is essential for photosynthesis. The resulting mutant was unable to grow under photoautotrophic conditions. This study aims to optimize the CRISPR/Cas9 system for genome editing in *Chlamydomonas reinhardtii* and to identify the most efficient Cas9 ortholog and CRISPR array for this purpose. The results of this study will be used to develop a CRISPR/Cas9 genome editing system for *Chlamydomonas reinhardtii* that is suitable for high-throughput screening and genome-wide studies.