



Max-Planck-Innovation

## Technology Offer

### *Chlamydomonas* Strains that Efficiently Express Nuclear Transgenes

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## Background

Unicellular eukaryotic green algae from the *Chlamydomonas* genus are highly attractive for biotechnological production due to their rapid growth and the capability to produce high amounts of biomass at low costs. However, low expression levels of nuclear transgenes in algae have seriously limited the use of algae in production of e.g. "green chemicals", biofuels or recombinant proteins.

## Technology

Scientists from the Max Planck Institute of Molecular Plant Physiology were recently able to significantly enhance expression levels of nuclear transgenes in algae (1). Using a newly engineered genetic screen, the researchers isolated two mutants of the alga *Chlamydomonas reinhardtii* that express nuclear transgenes much more efficiently (to almost 0.2% of the total cell protein level) and more stably than previously described strains. Strikingly, the increase in expression levels is largely independent of transgene position, promoter usage, as well as the nature of the transgene, and is even accompanied by an up to 3-fold higher transformation efficiency. The scientists are currently working on the identification of the mutations involved, which could pave the way for a broader application of this technology. The described technology provides a solution for efficient expression of nuclear transgenes in *Chlamydomonas* and has the potential to significantly boost the usage of algae as an inexpensive production host for biotechnological production. We are currently looking for a partner who is interested in licensing this technology.

## Patent Information

PCT application filed 2009 (WO2009141164A1)  
AU, EP, US, CN, IL patent applications pending

## Literature

(1) Neupert, J. et al., The Plant Journal, 2008