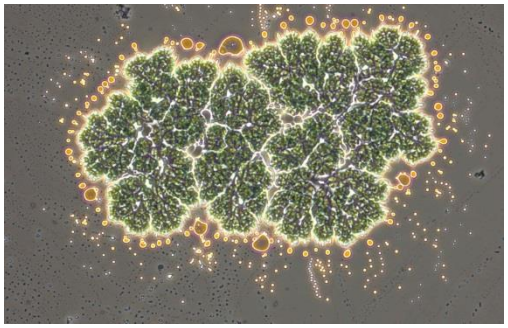
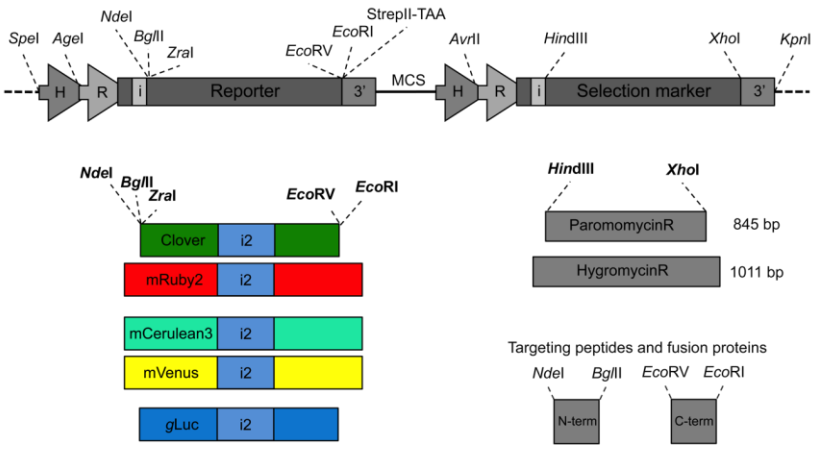
Algae Molecular Biotechnology 2.0

Design of highly efficient green algal cell factories
for the direct conversion of CO_2 into carbon-based products

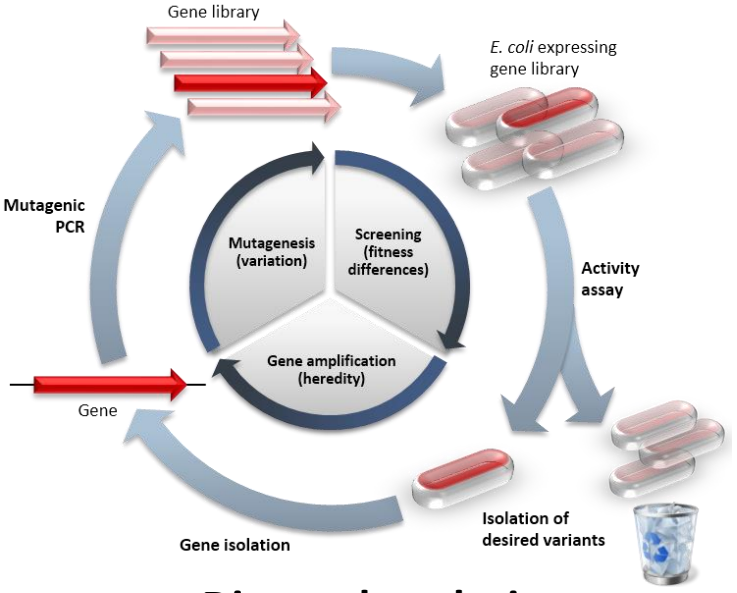


Synthetic Ecology:
Merging white and green biotechnology



Synthetic Biology GMO

Improving photosynthesis



Directed evolution
non GMO

Algae Molecular Biotechnology 2.0

Achievements:

- New molecular vectors for genetic engineering are developed
- Genetic tools have been developed for more algae species
- Metabolic engineeering of the introduction of heterologous pathways has been improved
- More robust strains isolated by directed evolution are introduced
- First success in showing direct biocatalytic production and secretion of products of interest

Algae Molecular Biotechnology 2.0

Design of highly efficient green algal cell factories

1. Applying advanced methods of Synthetic Biology (GMO) and directed evolution (non-GMO) in order to:

- Further improve photon conversion efficiencies (PCE rates >5)

- Isolate and construct more robust cell lines

- imrove efficient direct biocatalytic production pathways by metabolic engineering for the synthesis and secretion of products of interest (>100mg/g/day)

- combine threnghts of white microbial biotechnology with those of green algae biotechnology
    - develop strategies for co-cultivation and cross feeding to produce a product of interest (Synthetic Ecology)

2. Applying techniques to improve the molecular work with microalgae

- develop new strategies for high-throughput screening methods to further establish directed evolution approaches (e.g. the screening for PUFA enriched strains)

- Develop genetic tools on microalgae of interest for advanced Metabolic Engineering