

Study on Horizontal Gene Transfer between Haptophytes and viruses

Supervisors: António Pagarete, Research Fellow, Professor Ruth-Anne Sandaa, and Bente Edvarsen (UiO)

Background:

Haptophytes are a group of marine protists with deep branches in the Tree of Life. The recent discovery of giant viruses infecting these microalgae raised a number of ecological but also evolutionary questions. Among those, the impact of horizontal transfer of genes (HGT) between viruses and their eukaryotic host has been gaining increased interest.

This project intends to gain further knowledge on potential HGTs between haptophytes and their viruses. This work will be possible due to the existence of several haptophyte EST databases created in ours and Bente Edvarsen's group (UiO) and available viral sequences (including some Phycodnavirus genomes not yet published). These investigations are already under way (conducted by António Pagarete) with very interesting and promising results. This project will build upon that knowledge to help presenting an extensive characterization of HGT in the studied model systems.

Objectives:

During this project we will attempt to characterize host-virus HGT events between Haptophytes and their viruses.

Major tasks to be performed:

1. Identification (based on BLAST) of potential HGTs between Haptophytes and viruses, using host EST databases and a set of viral databases, including namely a new phycodnavirus genome not yet published.
2. Phylogenetic reconstruction of the genes potentially involved in HGT.
3. Analysis of the gene functions potentially involved in HGT

Practical competences the student should present / will acquire:

The proposed project will require acquaintance with bioinformatics tools to work with "big data", most notably BLAST and phylogenetic reconstruction tools. Essential knowledge of Linux shell will be fundamental. Students with general Biology formation may also be accepted, in which case basic bioinformatics training will be provided.

Place of work:

Marine Microbiology team, Department of Biology, UiB.

Outreach:

The results of this master work will be integrated with other data sources with the aim of making a publication in a high profile scientific journal: (e.g. Journal of Virology or Virology Journal).

Contact for further information:

António Pagarete (antonio.pagarete@bio.uib.no; Tel: 55584458)