Instytut Biologii Ewolucyjnej

student position in the project

ANALYSIS OF FUNCTIONAL AND TAXONOMIC DIVERSITY OF SYMBIONTS AMONG EUGLENOZOAN PROTISTS (SYMBIOZOANS)

Project description:

Symbiotic bacteria played a crucial role in the evolutionary success and diversity of eukaryotes. Through the uptake of once free-living bacteria, eukaryotes gained the mitochondrion for generating ATP at high yields as well as the photosynthetic plastid. The incorporation of bacteria into eukaryotic hosts has happened not only twice in the history of life. Numerous more recently acquired prokaryotic symbionts continue to play a major role in the evolution of eukaryotes, expanding their metabolic potential and diversifying ecological niches by nutrient provisioning, removing toxic metabolites, defending against predation and bacterial infections, and eliminating competitors. Such symbioses are extremely common among protists, which are single-cell organisms accounting for most of eukaryote diversity.

The project focuses on the analysis of the frequency and diversity of endosymbiotic (=intracellular) bacteria in euglenozoan protists that are very common and often dominant in soil, lakes, and the ocean. We will undertake a large-scale screening for endosymbionts among euglenozoans already available in culture and newly isolated strains, which we will establish from natural samples. In addition, we will evaluate the frequency and diversity of symbiont-bearing euglenozoans in natural environments, focusing on hypoxic and oxygenated freshwater and marine sediments sampled from the Baltic Sea and Masurian Lakes (Poland). For detection and characterization of symbionts, we will use a range of culturing, microscopy, and molecular methods, such as fluorescent in situ hybridization (FISH), fluorescent staining and microscopy, sequencing of 16S and 18S rRNA genes and single-cell sequencing. The most interesting protist-symbiont systems will be characterized in-depth using light and electron microscopy and sequencing genomes of symbionts and their euglenozoan hosts. With this approach, we aim to understand the nature of the symbiotic relationship and the advantages that symbionts provide to their hosts.

Specific Tasks

- Isolation and culturing of protists and bacteria
- DNA & RNA isolation from environmental samples and laboratory cultures, PCR, preparation of libraries for genome, transcriptome & amplicon sequencing, Nanopore sequencing
- Fluorescent in situ hybridization, fluorescence staining and microscopy

Requirements

- Bachelor's degree in biology, biotechnology or related field
- Being self-motivated, organized, and team-oriented
- Proficiency in English (oral and written)
- Familiarity with basic culturing, microscopy & molecular biology techniques and eagerness to learn bioinformatic techniques will be additional assets.

What do we offer?

We offer a scholarship for the student within the project funded by the National Science Centre

Starting date: December 1st, 2023

The scholarship of 2000 PLN for up to 20 months.

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Application process

Application deadline: November 15th, 2023

Interested candidates should e-mail project leader Daria Tashyreva (tashyreva@gmail.com) with (1) their CV, (2) a motivation letter, (3) contact information of two potential references, and (4) a scan of signed, written permission for recruitment-related personal data processing, which states: *„I give permission to the University of Warsaw, registered at the address of ul. Krakowskie Przedmieście 26/28, 00-927 Warszawa, to process my personal data for the purposes of carrying out the recruitment procedure, choosing the employee, and entering into an employment contract with the University of Warsaw, if applicable. I have been informed about my legal rights and obligations in relation to these actions. I acknowledge that providing the aforementioned personal data is done by me on a voluntary basis.“*

Selected candidates will be invited for the interview until November 21st, 2023. The final decision will be made before 23rd of November, 2023.