Join out team and study the origin of plants!

Call for postdoc:

Evolutionary basis of auxin perception in green lineage

- **Time-lapse imaging of rapid auxin response in algae and bryophytes**
- **Searching for auxin signalling components in land plant ancestors**

Background: The mechanism of action of auxin, a plant hormone with numerous morphogenic effects, has been investigated since pioneering Darwins' experiments. Upon auxin binding, the TIR1/AFB F-box complex steers specific gene expression changes that are required for the response to developmental and environmental cues. In addition, the TIR1/AFB F-box proteins also stimulate very rapid responses leading to changes in ion fluxes and specific protein modifications, including their phosphorylation. We still do not know how plants adopted in their evolutionary history this complex mechanism. In both early and late diverging streptophyte algae, there is now quite good evidence for the auxin biosynthesis and metabolism, auxin effects on the cell division and morphogenesis, as well as the presence of homologs of auxin influx and efflux carriers. However, these algal relatives lack clear homologs of TIR1/AFBs-AUX/IAAs receptory machinery and the mechanism of auxin perception is elusive, although in some of their clades, there are reported TIR1/AFB precursors with domains related to hormone receptor domains from land plants.

Aims of the project:

- Analysis of the dynamics of rapid responses of both early and late diverging streptophyte algae and selected bryophytes to the phytohormone auxin. In particular, growth and physiological responses (ion fluxes), as well as subcellular responses (such as calcium transients), will be monitored.
- Evaluation of the physiological relevance of such responses for the particular organism.
- Reconstruction of signalling pathway underlying such responses using bioinformatic evo-devo and proteomic approaches.

Mentoring: This project will be carried out under the shared supervision and mentoring of the **Jan Petrasek** and **Matyas Fendrych** laboratories. In the Petrasek lab, representatives of streptophyte algae are well-established, including sequenced strains of complex shape Chara braunii and single cells models of Mesotaenium (late-diverging) and Mesostigma (early-diverging). It holds expertise in LC/MS analysis of auxinic compounds, transgenosis of selected algae strains and in vivo time-lapse microscopy, image analysis, micromanipulation and in-silico approaches guaranteed be third co-mentor **Stanislav Vosolsobe**. The Fendrych lab has the know-how and equipment to study rapid cellular responses of plants, including the microfluidic accessories and spinning disk microscopy.

Challenging approaches: Biolistic transformation of germinating Chara | introduction of transgenic mRNA into the Chara by micromanipulation | observation of fast response upon auxin treatment by calcium reporters (GcAMP, rGECO1) in Chara | spinning disc time-lapse microscopy | bioinformatic analysis

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Jan Petrasek Lab https://sites.google.com/natur.cuni.cz/petraseklab/en
Matyas Fendrych Lab https://cellgrowth-lab.weebly.com/

Petrasek Lab web page

Project duration: 2 years from 1st January 2023 with possible extension
Funding: gross salary 2000 € per month (equal to average salary in Prague)
How to apply? Send your motivation letter and CV to *vosolsob@natur.cuni.cz*
Deadline: 20th July 2022, the selected candidate will be announced in September