

Bachelor thesis

Molecular fight - Commonalities between pathogen and pollen tube cell-cell communication

School year	2024-2025	Workplace	Department of Experimental Plant Biology, Faculty of Science, Charles University; Institute of Experimental Botany of the CAS
Type of work	Bachelor thesis	Supervisor	Said Hafidh, Ph.D.
Language	Czech / English	Consultant	prof. RNDr. David Honys, Ph.D.

Preliminary work description

Flowering land plants possess **no motile sperm cells** for fertilisation. To reach the female gametes, they have evolved a **single cell polar extension** termed a **pollen tube** that **penetrate** and delivers the two sperm cells in the **female embryo sac**. This closely resembles the **fungal hyphae** penetration of plant cells during fungal **infection**. In response, plant immune "**machinery**" releases an armour of molecules including **salicylic acid** and **callose deposition** to prevent hyphae penetration. How pollen tubes **convince** and **lure** female reproductive cells to allow penetration and even support the pollen tube journey is intriguing. The aim of this thesis is to **systematically explore** the known regulators of cell-cell communications in plant reproduction (**pollen tube-stigma**) and compare with those mechanisms of fungal hyphae penetration to piece together a **common theme** as well as **unique regulation** between the two systems. The elaborate knowledge gathered will contribute to a **better understanding** of plant reproductive biology and provide **molecular tools** to **combat pathogen infection** in plants and advance the use of **symbiotic microbiota** to improve **plant fitness** and **stress resilience**.

Principles for a good thesis

The recipe for successful thesis are a **pure interest** in the subject, self **motivation** to learn, write and defend the thesis as a proud product of your ground work. A basic **knowledge of plant biology is helpful** but not a must. **Independence** to search for **new subject stimulus** (with the all-round support of the supervisor and consultant) and **open communications** with good **provoking ideas** are advantageous. The thesis will be based on a variety of literature, overwhelmingly in English, including relevant reviews. The Bachelor's thesis may be followed by an **experimental Master thesis** based on the stimulating ideas gathered. **Examples of theses** from our lab: <http://www.pollenbiology.cz/team/>.

Scientific literature

Original scientific articles and reviews in English, e.g. here: <http://www.pollenbiology.cz/publications/>.

We offer

Work in a young and inspiring team; the successful candidate may get a **position in** the Laboratory of Pollen Biology of the **Institute of Experimental Botany** of the CAS. This includes, e.g., the possibility to cover **conference** expenses (presentation of own results) and financial support for ongoing projects.

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