

Affiliation: Masaryk University, Faculty of Medicine
Study program: Biomedical sciences
Specialization: Department of Histology and Embryology
Supervisor: Mgr. Jan Křivánek, Ph.D. (jan.krivanek@med.muni.cz)
Supervisor-specialist: doc. RNDr. Marcela Buchtová, Ph.D.
Head of Department: doc. MVDr. Aleš Hampl, CSc.

Title: Mechanisms controlling tooth growth and repair

Annotation

Tooth development is precisely controlled system with the involvement of different pools of stem cell niches and virtually all known signalization pathways. However, the basic mechanisms of tooth growth had been described decades ago several key fundamental questions still remain to be answered.

The main aim of the PhD project is to uncover cellular and molecular mechanisms that regulate the tooth growth and the contribution of these processes to the healing of dental tissues. Rodent teeth and their tooth-bone interphase area will be used as a model to study continual grow and stem cell activity in incisors and damage of soft tissues surrounding the teeth leading to ankylosis.

Using recently developed state-of-the-art techniques and approaches, the applicant during his/her studies will become familiar with multiple lab techniques including working with genetically modified laboratory animals (including non-stereotypical species), state-of-the-art visualization techniques (confocal microscopy, μ CT, scanning electron microscopy etc.) or single-cell RNA sequencing. Student will be part of the international research team and will have an opportunity to spend several weeks to months (depending on mutual agreement) on collaborative institutions as well as to be active participant on international conferences.

This project will help us to understand mechanisms involved in reparative and regenerative odontogenesis and to tack more general questions extending beyond the dental field, which will provide new insight to the regulation of developmental and healing processes.

Requirements:

- Completed Master degree (or close to the graduation) in the field of cell, molecular or developmental biology
- Good level of spoken and written English
- Willingness to learn new things, travel and be excited about work that makes sense

Additional information

Visit our website to find more information about the supervisor, publication activity, current international collaborations and grants, and successful graduates:

<http://www.med.muni.cz/histology/jan-krivanek>

<https://www.sci.muni.cz/ofiz/en/marcela-buchtova-en/>