

ANIMAL PHYSIOLOGY

Chronophysiology of the dentine and bone tissue in ectotherms and endotherms

supervisor: doc. RNDr. Martin Kunderát, PhD.

(<https://www.researchgate.net/profile/Martin-Kundrat>), E-mail:martin.kundrat@upjs.sk

consultant: prof. RNDr. Beňadik Šmajda, CSc.

study form: full time

Annotation: Formation of skeletal tissues is known to show biological rhythms including seasonal rhythms, and is sensitive to different stressors and climatic events. Dentine increments are usually deposited with finer periodicity whereas bone compacta is usually interrupted by growth marks on a yearly base or lacking any cessations in growth. How these two different tissues develop under the same external conditions in cold-blooded and warm-blooded tetrapods remain unclear when it comes to quantification of micro-structure changes in three dimensions and over million years. The doctoral student is expected to investigate these microstructural specializations on different sets of extant and extinct animals. Particularly, this project has been centered on organismal types such as: (under)ground dwellers *versus* gliders/fliers, eastivating *versus* hibernating specialists, and miniature *versus* gigantic forms. The student will use both approaches: invasive physical sectioning and non-invasive micro-tomographic imaging (based on both conventional and synchrotron sources). The student will analyze the imaging outcomes by tools of geometric morphometry and biostatistics. The stable isotope spectroscopy datasets will be available for this study as well. Active participation in field work is required. We aim to find significant correlations between osteo-physiology and environmental stresses as well as behavioral specializations on a broad interdisciplinary platform. The project will be funded through the project APVV-18-0251 and several synchrotron-based grants.