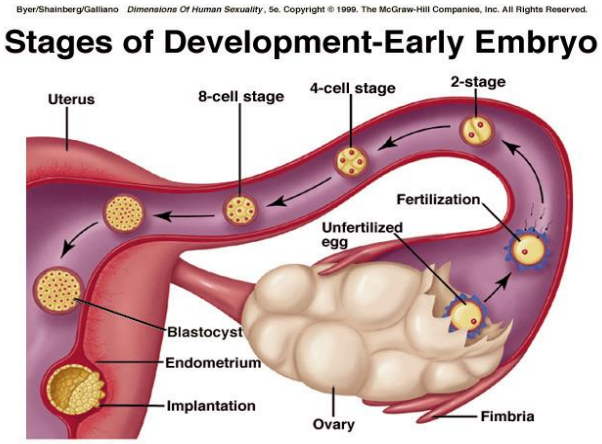
ANIMAL PHYSIOLOGY

Radiofrequency interface in the biology of ixodide ticks.
supervisor: RNDr. Viktória Majláthová, PhD. (viktoria.majlathova@upjs.sk)
consultant: RNDr. Igor Majláth, PhD. (igor.majlath@upjs.sk)
study form: full time
Annotation: Environmental exposure to electromagnetic fields (EMF) is increasing with increasing requirements of human society for more sophisticated electronic devices, technologies and services in the last decades. Humans and animals are permanently exposed to a complex of EMF of whole spectrum of frequencies and intensities. Notable effect of EMF has been shown for a number of living organisms, from invertebrates to vertebrates, plants and bacteria. Epidemiological studies provided evidence of increased risk for disorders ranging from mild behavioral alterations to deleterious effect on variety of cell types or whole organisms. The aim of proposed project is to obtain new knowledge about interactions between electromagnetic field and ticks, about the impact of artificial physical radiation on ecological and ethological characteristics and on parasite-host interactions, regarding to tick-borne pathogens presence to assess the degree of alteration of the reaction of ticks to the presence of the electromagnetic field. To characterize the spatio-temporal variations of electromagnetic radiation in vicinity of artificial radiation sources used for electricity transmission, telecommunication and TV and radio broadcasting could answer the question if EMF of certain frequencies affects the distribution of ticks in nature and is responsible for mosaic distribution of ticks under natural conditions. Proposed project aims to find frequencies that are attractive to ticks, but also frequencies that repel the ticks. EMF of certain frequencies affects the distribution of ticks in nature and is responsible for mosaic distribution of ticks under natural conditions.

Study of possibilities of functional recovery of injured neural pathways in laboratory rat.
supervisor : RNDr. Ján Gálik, PhD. (galik@saske.sk) /Institute of Neurobiology, Biomedical research center Slovak Academy of Sciences Košice
study form: full time
Annotation: The proposed theme of doctoral study includes:
- Study of mechanisms and models of traumatic injury of spinal cord and peripheral nerve.
- Understanding the principles and methods of electrophysiological recordings.
- Functional diagnosis of injured nerve pathways.
- Therapy based on application, or combination of methods of electrical stimulation, exercise and supportive pharmacological treatment.

***In Vitro* Systems for Modulation of Spinal Cord and Brain Injury and their Use in the Study of Repair of Damaged Nervous Tissue**
supervisor: RNDr. Lucia Slovinská, PhD. (slovinska@saske.sk) /Institute of Neurobiology, Biomedical research center Slovak Academy of Sciences Košice
study form: full time
Annotation: Traumatic CNS damage generates a sequence of destructive processes in cells, resulting in tissue damage. There are currently a lot of animal models that we can model a large number of different diseases and CNS damage. Organotypic slices- OTS- represent a transient system between cell culture screening *in vitro* and animal models *in vivo*. This system is accessible to experimental manipulations, with inducing the neurodegeneration by many mechanisms.

Molecular mechanisms of preimplantation embryo responses to the factors of environment
supervisor: RNDr. Štefan Čikoš, CSc. (cikos@saske.sk) /Institute of Animal Physiology, Centre of biosciences Slovak Academy of Sciences Košice
study form: full time
Annotation: The preimplantation embryo (i.e. the embryo in the period from oocyte fertilization to implantation of blastocyst into uterus) can finish its development to the blastocyst stage relatively autonomously. On the other hand, recent data indicate that maternal environment influences significantly developmental potential of oocytes, quality of preimplantation embryos, implantation success rate, and can also have long term consequences on the offspring health. Model of laboratory mouse (*in vitro* as well as *in vivo* approaches) will be used in experiments. Modern biochemical methods, molecular biology techniques as well as morphological methods will be used to analyze cell receptors, activated signaling pathways and physiological responses of early embryo cells.



Morphological and physiological changes in the Amazonian hoatzin (*Opisthocomus hoazin*) locomotory system development
supervisor: doc. RNDr. Martin Kundrát, PhD. (martin.kundrat@upjs.sk) / Technology and Innovation Park UPJŠ Košice
consultants: Dr. Gareth Dyke./Technology and Innovation Park UPJŠ Košice
prof. RNDr. Beňadik Šmajda, CSc. (benadik.smajda@upjs.sk)
study form: full time
Annotation: The hoatzin is known as a ‘reptilian’ bird because it retains functional claws on its wings in juveniles. Newly hatched chicks accordingly exhibit an advanced level of coordination in the use of their wing claws and feet to clamber amongst tree branches. Although the hoatzin is unique amongst modern birds in having adapted its wings for climbing, this locomotory module was likely common in the non-avialan dinosaurian ancestors of birds and was certainly functional in basal large-clawed birds during postnatal ontogeny. The locomotory and morphological compatibility of hoatzin and extinct Mesozoic birds therefore provides researchers with an optimal living analogue for experimental simulations of a grasping forelimb that was subsequently adapted for flight. A hoatzin developmental sequence can also be established to trace the reorganization of bone, muscle, feathers and neurosensitive properties coupled with this shift in forelimb functionality.