

INSTITUTE OF MOLECULAR GENETICS
OF THE CZECH ACADEMY OF SCIENCES
and DOCTORAL STUDY PROGRAMS IN BIOMEDICINE
at CHARLES UNIVERSITY
and THE CZECH ACADEMY OF SCIENCES in PRAGUE
invite you to the lecture course

47th ADVANCES IN MOLECULAR BIOLOGY AND GENETICS 2023

Typical attendees are **the first and second year PhD students from biomedical programs.** The main aim of the two-week course is to inform the participants about the recent progress in the fields of molecular biology, genetics and biomedicine together with selected new biotechnology approaches. **The course is accredited (MPGS0034) at the Charles University.**

Time and place:

October 30th - November 10th, 2023

in the Milan Hašek Auditorium of the Institute of Molecular Genetics of the Czech Academy of Sciences [IMG],
Vídenská 1083, Praha 4 Krč.

Please follow <https://pokroky.img.cas.cz/> for possible changes.

Program of the course

All lectures will be given **in English** by active scientists.
The course consists of ~ **43 lectures** organized into the following thematic blocks:

DNA/cell nucleus: nuclear microstructure-function relationship, organization and function of the 3D genome, retroviruses and mobile elements, human genome structure and evolution, biology of telomeres and telomerases. **RNA:** mechanics of procaryotic RNA polymerase, transcription and splicing regulation, tRNA metabolism and editing, small RNAs and dsRNAs pathways: genome defense, innate immunity/ADARs. **Proteins:** eukaryotic protein synthesis, structural biology tools, proteomics and proteomes, protein structure predictions, protein turnover in cancer and development. **Cell biology and signaling:** ensemble dynamics of cytoskeletal proteins, microtubules and signal transduction, biology of flagella and cilia, cytoskeletal organization and tissue mechanics, cellular iron metabolism and oxygen radicals in DNA damage and ferroptosis, biology of mitochondria, nuclear mechanobiology and aging, cell biology of lipids. **Developmental biology:** oocyte-to-zygote transition, induced pluripotent stem cells and organoids, zebrafish as a model system in developmental biology, comparative developmental biology, hematopoiesis. **Biomedicine – genomics:** rare genetic variants in Mendelian complex diseases, high-throughput sequencing methods, epigenetic disorders and therapy, guided nucleases and their use in biomedicine. **Biomedicine – cancer biology:** metabolic communications in tumors, chromosomal alterations in cancer cells, ADP-ribose metabolism and DNA breaks in human disease, DNA replication, cancer metabolism, DNA damage response and cellular checkpoints in cancer. **Biomedicine – hematology & immunology:** proinflammatory cytokines in autoimmune diseases, epigenetic regulation in leukemia predisposition and myelodysplastic syndromes, metabolic vulnerabilities in leukemia, gene editing in bone marrow failure syndromes, immune cell signaling as a therapeutic target, current concepts in tumor immunology and cancer immunotherapy. **Workshops:** career paths in science-research and alternatives, life with science, scientific communication, research ethics and scientific misconduct.

At the end of the course participants receive the credit.

Registration: If you wish to attend the course, please fill-in an online registration form at the address: <https://pokroky.img.cas.cz/> before **October 20, 2023**. Any questions concerning the registration and payments, please, send to pokroky@img.cas.cz.

Course fee:
FREE

Professor Jiří Jonák, M.D., D.Sc. and Professor Petr Svoboda, Ph.D. [organizers of the course]

More information about the course, including transport and accommodation, can be found on the course website:

<https://pokroky.img.cas.cz/>