

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

# 48<sup>th</sup> ADVANCES IN MOLECULAR BIOLOGY AND GENETICS 2024

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:

**4 – 15 November 2024**

in the Milan Hašek Auditorium of the Institute of Molecular Genetics of the Czech Academy of Sciences (IMG),  
Vítěňská 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, nuclear lamina, organization and function of the 3D genome, human genome structure and evolution, germline restricted chromosomes in birds. **RNA:** organization and regulation of RNA polymerase II transcription, noncanonical RNA caps, transcription and splicing regulation, non-coding RNAs, small RNA pathways. **Proteins:** eukaryotic protein synthesis, ribosome structure, structural biology tools, proteomics and proteomes, prions. **Cell biology and signaling:** microtubules and signal transduction, microtubules in neuronal development, cytoskeleton and plant organelles, centrosomes and cilia, integrative biology of intermediate microfilaments. **Developmental biology:** oocyte-to-zygote transition, planarian regeneration, induced pluripotent stem cells and organoids, zebrafish as a model system in developmental biology, comparative developmental biology of facial shape. **Biomedicine – genomics:** rare genetic variants in Mendelian complex diseases, high-throughput sequencing methods, epigenetic disorders and therapy, antiviral prospects of gene editing, base and prime editors. **Biomedicine – cancer biology:** germline mutations in cancer, ADP-ribose metabolism and DNA breaks in human disease, fibroblasts in mammary gland development and breast cancer, mitochondria and liver regeneration, ovarian cancer and extracellular vesicles. **Biomedicine – hematology & immunology:** regulation of production of immune cells, immune memory, molecular tricks of bacterial pathogens to manipulate the host, central and peripheral immune tolerance, autoimmunity. **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 **24 October 2024**. Any questions concerning the registration and payments, please, send to [pokroky@img.cas.cz](mailto: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/>