



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

46th ADVANCES IN MOLECULAR BIOLOGY AND GENETICS 2022

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 31st - November 11th, 2022

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 **~ 40 lectures** organized into the following thematic blocks:

DNA/cell nucleus: nuclear microstructure-function relationship, organization and function of the 3D genome, human genome structure and evolution.
RNA: pivotal role of RNA polymerase in gene expression, organization and regulation of RNA polymerase II transcription, non-canonical RNA caps, piRNA pathways, regulation of RNA splicing. **Proteins:** eukaryotic protein synthesis, ribosome structure and function, structural biology tools, proteomics and proteomes. **Cell biology and signaling:** microtubules and signal transduction, membrane microdomains, cellular iron-oxidative stress-DNA damage-ferroptosis, eukaryotic flagella and cilia, genome integrity in healthy cells and cancer, endothelial cells: metabolism and heterogeneity in disease, multifaceted mitochondrial ATP synthases, insect hormonal signaling exploration via molecular genetics and chemical biology, memory of immune system.
Genomics: meiotic recombination and hybrid sterility, strategies for manipulating gene expression, high throughput gene expression analysis, gene editing in antiviral research. **Biomedicine:** current concepts in tumor immunology and immunotherapy, prion, prion strains and prion diseases, rare genetic variants in Mendelian complex diseases, genetics of intellectual disability and autism, leukemogenesis: genetics vs epigenetics, comparative biology of aging, ameloblastin in enamel formation and beyond, molecular tricks of human bacterial pathogens, germline genetic changes causing human tumors, DNA strand breaks and neurodegenerative disease, transcriptional regulation during blood formation, biological clock. **Developmental biology:** converting cellular-scale chirality to organismal left-right symmetry breaking, development of the head and neck, Notch signaling. **Workshops:** writing in scientific English, research ethics and scientific misconduct, career paths in science-research and alternatives, scientific communication. Life with science.

At the end of the course participants receive the credit and the presentations will be available for download from a password-protected website.

Registration: If you wish to attend the course, please fill-in an online registration form at the address: <https://pokroky.img.cas.cz/> and pay the course fee before **October 21, 2022.** Any questions concerning the registration and payments, please, send to pokroky@img.cas.cz.

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

Course fee:

2 900 CZK

[incl. VAT / participant]

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

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