Foreign medical students at our workplace

Content

2025 – Exchange research study stay within the Erasmus

In **February 2025**, **Yijun Dong**, a fifth-year general medicine student at the China Academy of Chinese Medical Sciences or Peking Union Medical University (Dongcheng, Beijing), completed an Erasmus stay at our Institute of Medical and Clinical Biochemistry.

During her stay, Yijun worked in the cell culture laboratory under the supervision of RNDr. Ivana Špaková, PhD., who introduced her to the principles of precise work with cell cultures (Fig. 1). Yijun actively participated in subcultivation procedures as well as in experiments designed for individual cell lines, which served both as a model system for her studies and for the independent verification of previous research results obtained at our department. Yijun also delivered a lecture presenting the results of her scientific work conducted during her studies, in collaboration with the Department of Neurosurgery at Peking Union Medical College Hospital (Fig. 2).

Fig. 1: International student Yijun with RNDr. Ivana Špaková, PhD. Fig. 2: Presentation of Yijun's research results.

2025 – Research Exchange Stay within the IFMSA

In **July 2025**, **Achmad Syarifhidayatullah**, a third-year medical student from Surabaya, Indonesia, completed an **IFMSA** (International Federation of Medical Students Associations) research exchange stay at our department. During his stay, Achmad worked on a project focused on miRNA analysis in biological fluids under the supervision of **RNDr. Ivana Špaková, PhD.**, his other supervisors included **doc. Ing. Beáta Hubková, PhD.**, **Mgr. Peter Artimovič**, and **RNDr. Monika Švecová, PhD.** (Fig. 1).

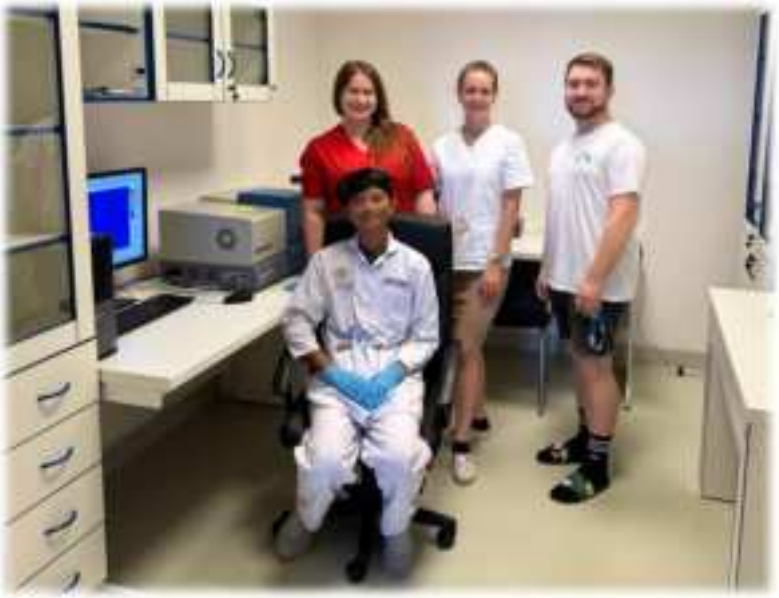

Fig. 1 Achmad with RNDr. Ivana Špaková, PhD., Mgr. Peter Artimovič, and RNDr. Monika Švecová, PhD.

He gained valuable hands-on experience in molecular biology, particularly in miRNA isolation, reverse transcription, real-time PCR, and subsequent data analysis. His work also included lipoprinting, cell culture, fluorescence profiling, and bioinformatics, providing him with a comprehensive overview of the methods used in our department (Fig. 2a). In addition to his laboratory project, Achmad also had the opportunity to observe and participate in our Children's University activities, where he was introduced to how we present medical biochemistry to child audiences. This combination of laboratory practice and educational outreach enriched his overall research stay and broadened his perspective on biomedical sciences.

As part of the exchange, he took part in a two-day visit to a medical laboratory **Medirex, a.s.**, **Košice** guided by **MUDr. Renáta Lenártová, PhD.** During this visit, he was introduced to the workflow of a large-scale diagnostic facility and had the opportunity to observe a wide range of departments, including sample intake, the biochemical laboratory, the urinalysis and toxicology units, the genetics laboratory, and the cytological and Bioptic Laboratory (Fig. 2b).

Fig. 2a) Achmad presenting the results obtained during his research stay; b) Achmad at Medirex, a.s. with MUDr. Renáta Lenártová, PhD. and RNDr. Monika Švecová, PhD.

In **August 2025**, **Anastasiia Sakhno**, a third-year medical student from Ukraine studying in Estonia, and **Po Yeh (Max) Chen**, a third-year medical student from Taiwan, completed an IFMSA (International Federation of Medical Students' Associations) research exchange stay at our Department of Medical and Clinical Biochemistry. During their stay, Anastasiia and Max worked under the supervision of **RNDr. Ivana Špaková, PhD.** (Fig. 3) and their other supervisor was **RNDr. Monika Švecová, PhD**. They were introduced to a broad range of molecular biology techniques with an emphasis on cell culture as a model system, combined with molecular and analytical methods. Their research training included DNA and RNA isolation, reverse transcription, real-time PCR, and subsequent evaluation of results, as well as the use of biostatistics and bioinformatics workflows for the interpretation and integration of experimental data specifically on fluorescent data. These experiences provided them with an integrated view of experimental approaches and computational analyses used in biomedical research at our department.

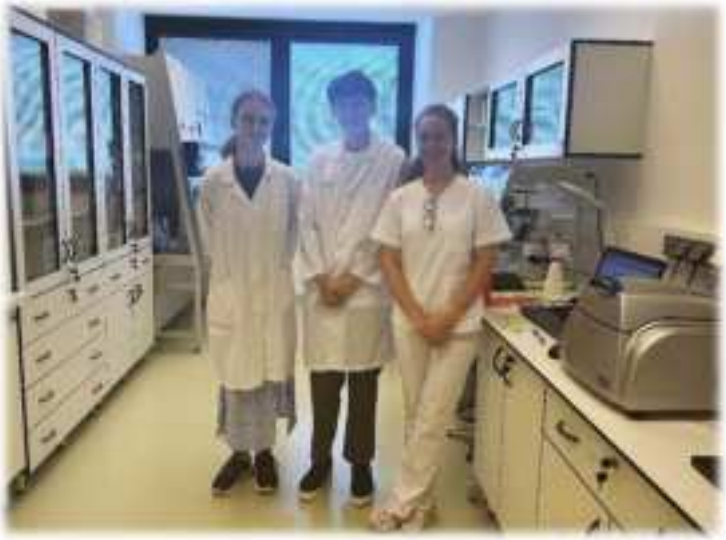

Fig. 3 Anastasiia and Max with RNDr. Ivana Špaková, PhD.

As part of their exchange, they also visited medical laboratory **Medirex, a.s., Košice**, guided by **MUDr. Renáta Lenártová, PhD.**, where they were introduced to the workflow of a high-capacity diagnostic facility. They had the opportunity to observe the operation of several departments, including sample intake, the biochemical laboratory, urinalysis, the toxicological laboratory, and the immunological laboratory (covering both allergology and hematology) (Fig. 4).

Fig. 4 Anastasiia and Max at Medirex, a.s. with MUDr. Renáta Lenártová, PhD. and RNDr. Monika Švecová, PhD.

In **October 2025**, **Kerem Memet** from the **National and Kapodistrian University of Athens (NKUA), Greece**, completed a research exchange program at the Department of Medical and Clinical Biochemistry within the IFMSA (International Federation of Medical Students' Associations).

During his stay, he worked under the supervision of **RNDr. Ivana Špaková, PhD.** (Fig. 5). He became familiar with a wide range of molecular biology techniques, with a particular focus on working with cell cultures as model systems in combination with molecular and analytical methods. He gained practical experience in cell cultivation, processing, and their application in experimental procedures.

His training included DNA and RNA isolation, reverse transcription, real-time PCR, and subsequent analysis of results. He also gained experience in applying biostatistical and bioinformatic approaches to interpret and integrate experimental transcriptomic data. The exchange stay provided him with a comprehensive insight into the experimental procedures and computational analyses used in research at our department.

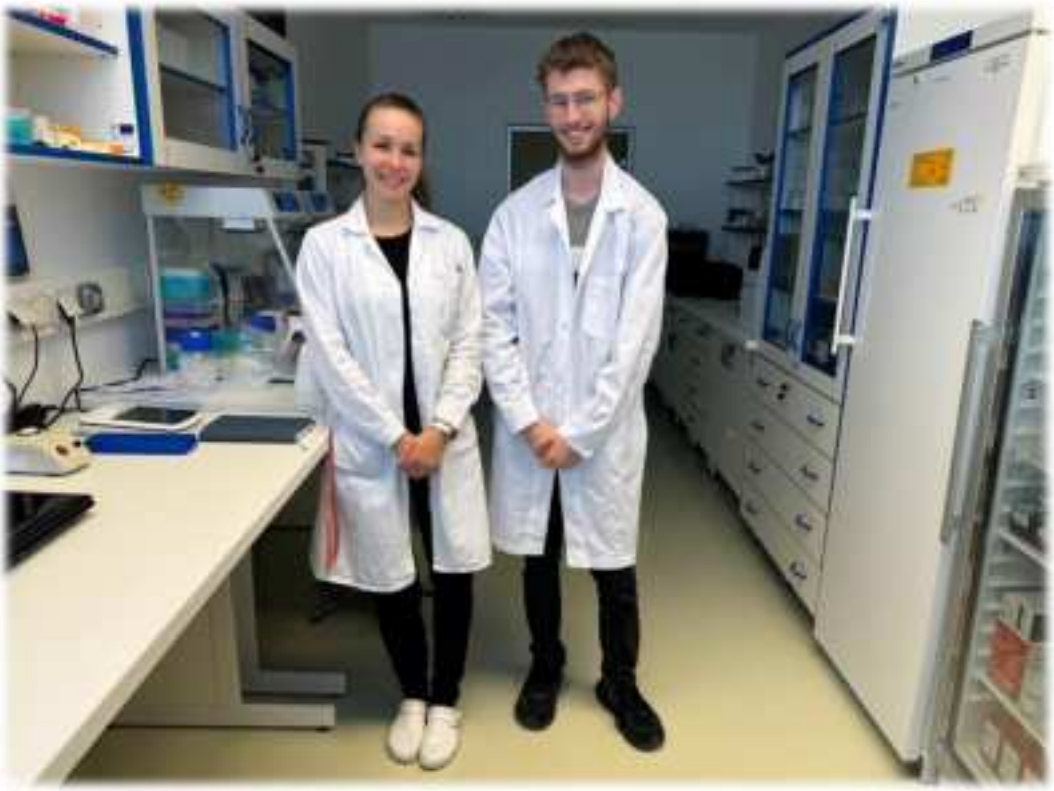

Fig. 5: Kerem Memet with RNDr. Ivana Špaková, PhD.

2024 – Exchange stay within the Erasmus program

In addition to the summer holidays, many students decided to complete an internship abroad, and this year was no exception for our Department of Medical and Clinical Biochemistry, when two general medicine students visited us in August as part of the Erasmus program. We welcomed **Mai Nagy Nasr Helal**, a fifth-year general medicine student at the Faculty of Medicine of Zagazig University, located in Zagazig (Egypt), and **Cáudia Ribeiro**, a second-year general medicine student studying at the Beira Interior University Faculty of Health Sciences, located in Covilhã (Portugal).

Mai and Cláudia were welcomed and introduced to the issues we deal with at our department by RNDr. Zuzana Badovská, PhD. Then, the students worked on a project to determine the cell-specific DNA-intercalation potential of newly designed therapeutic substances under the guidance of RNDr. Ivany Špaková, PhD. Students were actively involved in laboratory work in the culture laboratory, where they became familiar with precise work with cell cultures (Fig. 1). With our doctoral student, Mgr. Petr Artimovič isolated nucleic acids from the cell cultures they had grown. The female medical students were also introduced to gene analysis using reverse PCR and qRT-PCR and learned to evaluate the measured data. They also actively participated in fluorescence analyzes in cooperation with doc. RNDr. Lukáš Smolko, PhD. In the clinical laboratories of Medirex, a.s. they had the opportunity to learn the routine operation of the clinical application of biochemical methods and their evaluation procedures in diagnosing various pathologies (Fig. 2).

Fig. 1: Foreigner students Mai and Cláudia with RNDr. Ivana Špaková, PhD.

Fig. 2: Students in clinical laboratory MEDIREX, a.s. with MUDr. Renáta Lenártová, PhD. and Mgr. Peter Artimovič

2023 – Research stay within the IMSA program

It has already become a good practice that in the summer our team is enriched by students within the International Medical Students Associations **(**IMSA) program, and this year was no different. In August 2023, we welcomed **Cai-Ti Li** (**Talia**), a third-year general medicine student at Mackay Medical College, Department of Medicine in New Taipei City, Taiwan, and fourth-year general medicine student Eleanna Kallikurdi, studying at Aristotle University of Thessaloniki, Faculty of Health Sciences, Medicine School in Greece, to our workplace.

Taila and Eleana started their month at our workplace under the guidance of Assoc. Prof. RNDr. Vladimíra Tomečková, PhD. introduced them to the workplaces of the Faculty of Medicine, where they greatly appreciated the interactive teaching in the Center for Simulator and Virtual Medicine UPJŠ LF. Together with the associate professor, they collected tears from patients, which will later be used in research work. For the next three weeks, under the guidance of RNDr. Ivana Špaková, PhD. and they became familiar with various laboratory techniques used in clinical-biochemical laboratories.

The medical students were actively involved in laboratory work in the cell culture laboratory, where they learned precise techniques for working with cell cultures, growing "their own cells" in 2D and 3D models. They used the grown cell cultures to isolate nucleic acids, which they isolated separately and determined the gene expression strength of selected inflammatory genes

using reverse PCR and qRT-PCR. In addition to the skills in the laboratory, they learned to evaluate the measured data and draw meaningful conclusions from them in support of the established hypothesis (Fig. 1a/b).

In the clinical laboratories of Medirex, a.s., they had the opportunity to observe the routine operation of biochemical methods and their evaluation procedures in the diagnosis of various pathologies (Fig. 1c).


Fig. 1a


Fig. 1b

Fig. 1a/b: The students at work in the laboratories of the Department


Fig. 1c

Fig. 1c: Medical students in the clinical laboratory MEDIREX, a.s. with MUDr. Renáta Lenártová, PhD.

2023 – Exchange stay within the Erasmus program

As part of the Erasmus program, the medical students from Chile came to spend a month on a foreign continent, traveled 17 hours by plane, and saw the world a little differently. In January 2023, we welcomed **Constanza Doren Ilabaca**, a fifth-year general medicine student at Andrés Bello Medical University in the capital city of Santiago, and Javier Ferreira, a fourth-year general medicine student at Finis Terrae Medical University in Providencia.

During their stay, students became familiar with various laboratory techniques used in clinical-biochemical laboratories. Constanza and Javier worked for a whole month under the guidance of RNDr. Ivana Špaková, PhD. They have been actively involved in laboratory work in the cell culture laboratory, where they became familiar with precise cell culture techniques. They became proficient in gene analysis using reverse PCR and qRT-PCR, and learned to evaluate the resulting data (Fig. 1a). They also participated in ELISA analyses in collaboration with doctoral students of our institute, Mgr. Zuzana Klepcová, Mgr. Michaela Abrahamovská, and Mgr. Peter Artimovič.

In the clinical laboratories of Medirex, a.s., they had the opportunity to observe the routine operation of biochemical methods and their evaluation procedures in the diagnosis of various pathologies (Fig. 1b).

Our guests also had the opportunity to try interactive teaching at the Center for Simulator and Virtual Medicine of UPJŠ LF, where, in addition to CRP and blood sampling, they also tried using a sonograph, or drilling teeth.

Figure 1a: The students working with RNDr. Ivana Špaková, PhD., and 1b: in the MEDIREX, a.s. clinical laboratory. with MUDr. Renáta Lenártová, PhD., and student coordinator of Erasmus programme Laura Tomečková (on the right)

2022 – Exchange stay within the Erasmus program

Today, it is no longer the case that if you want to experience an international environment, you have to travel abroad. In July 2022, our Institute of Medical and Clinical Biochemistry welcomed two foreign medical students. **Molka Hatit** arrived from the second-largest city in Tunisia, where she is in her fourth year of studies at the Faculty of Medicine at the University of Sfax. **Miguel Acuña Reveles** came to us from Mexico and is a 5th-year student at Universidad Autónoma de Zacatecas, Francisco García Salinas. During their stay, they had the opportunity to learn various laboratory methodologies, evaluate patient results, and visit the clinical laboratory MEDIREX, a.s.

They worked under supervising doc. Ing. Katarína Dubayová, PhD. Work was focused primarily on 3D fluorescence spectrophotometry and its application in the diagnosis of several malignancies and inflammatory diseases. During the analyses, they also collaborated with doctoral students of our institute, including Mgr. Zuzka Klepcová, Mgr. Ivana Večurkovská and Mgr. Monika Švecová (Fig. 1).. Students analyzed the proteins using different methodologies, such as SDS-PAGE, ELISA too. They had the opportunity to try RNA isolation and subsequent cDNA synthesis, as well as the qRT-PCR reaction and its interpretation. At MEDIREX laboratories, they had the opportunity to observe the clinical application of different methodologies and the analysis of various pathologies (Fig. 2).

Fig. 1 The students working in the fluorescence laboratory together with doc. Ing. Katarína Dubayová, PhD. and PhD student Mgr. Monika Švecová.

Fig. 2 The students in the MEDIREX clinical laboratory with MUDr. Renáta Lenártová, PhD. and PhD student Mgr. Monika Švecová