Department of Physiology

Scientific research work together with teaching activities and activities related to the running of the faculty are the three basic pillars of the work activities of the staff of the Institute of Physiology. Academic staff of the Institute annually publish the results of their scientific research activities in renowned impacted journals and present them at professional national and international conferences. In addition to solving a number of their own grant projects, employees of the Institute of Physiology participate in the review process of national and international grants and scientific publications for international renowned journals. Academic staff of the Institute also participate in the preparation of scientific monographs. The scientific research activities of the Institute of Physiology have long focused mainly on experimental hepatology and mitochondrial physiology (non-alcoholic fatty liver disease), experimental cardiology (cardiotoxicity of antineoplastic agents) and the study of protein and amino acid metabolism in health and disease.

Main research topics

- Metabolism and bioenergetics study of non-alcoholic fatty liver disease (NAFLD) with emphasis on bioenergetic aspects; nutritional and pharmacological influences on the development of NAFLD (NASH); reversal of more advanced forms of NAFLD; use of ketodiet in the treatment of hereditary ATP synthase disorders; disorders of lipid and carbohydrate metabolism in obstructive sleep apnea syndrome
- · Cardiotoxicity of antineoplastic agents; study of myocardial remodeling in various pathological conditions
- · Protein and amino acid metabolism in health and disease, prof. Holeček

Scientific research groups

- Experimental Hepatology and Mitochondrial Physiology Group
- Experimental Cardiology Group
- · Group Protein and Amino Acid Metabolism in Health and Disease

Achievements

- Organization of the international conference MiP 2017 "12th Conference on Mitochondrial Physiology: the role of mitochondria in lifestyle and metabolic syndrome - COST MitoEAGLE perspectives and MitoEAGLE WG and MC Meeting" in Hradec Králové in 2017.
- Invited lectures at International Council on Amino Acids, Tokyo, 2018 (prof. Holeček); Society on Sarcopenia, Cachexia and Wasting Disorders, Lisbon, 2022 (prof. Holeček).
- Professional monograph by prof. Holecek "Amino acids physiology, pathophysiology and as a dietary supplement", GRADA (February 2023); chapters in professional monograph "Hepatology", GRADA 2022 (prof. Červinková, doc. Kučera, dr. Šafka).

Czech Hepatological Society of the Czech Academy of Sciences for the best published work in the field of hepatology (2009, 2013, 2015, 2017 and 2020). Award of the Czech Physiological Society of the Czech Academy of Sciences for the best scientific paper (2015). Awards of the Czech Society of Hepatology ČLS JEP for the best poster (2006, 2013, 2014, 2015 and 2022) and lecture (2009, 2010) at the May Hepatology Days. Elucidation of the pathogenesis of the increase of branched chain amino acids (valine, leucine and isoleucine) in diabetes and their decrease in liver cirrhosis (Prof. Holecek).