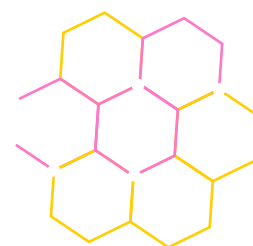
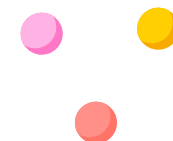
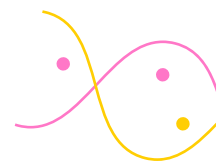
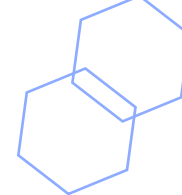


University of
Hradec Králové



Young Scientists Conference



"IGRÁČEK UHK"

May 17, 2023



Overview



Investigators

Mentor

Project

Mgr. Eliška Prchalová
Mgr. Zuzana Kohoutová
Mgr. Karolína
Knittelová
Mgr. Markéta
Miškeříková

prof. PharmDr. Kamil
Musílek, Ph.D.

Research of small
molecules for
scavenging of
organophosphorus
compounds



Mgr. Michaela Vašková
Mgr. Annamária
Halečková
Mgr. Marie Hamšíková
Mgr. Aneta Rotterová
Mgr. Katarína Jurková

PharmDr. Ondřej Benek,
Ph.D.

In vitro study of 17 β -
HSD10 activity



Nikola Jokanović M.A.
Asnake Anteneh Chanie,
M.A.
Elvin Francisco
Rodríguez Fabilena

Mgr. et Mgr. Pavlína
Springerová, Ph.D.

Regional security
implications of the
Sino-US strategic
competition in Latin
America and the Horn of
Africa



Mgr. Tadeáš Vala
Mgr. et Mgr. Jakub
Zbýtovský

Mgr. Jan Prouza, Ph.D.

Islamic insurgency in
Northern Mozambique:
Its causes,
consequences and
possible solutions



Overview




Investigators

Mentor

Project



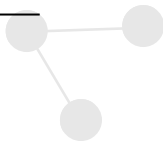


Mgr. Lenka
Michalčíková
Ing. Karolína Bjelková



RNDr. Alena Myslivcová
Fučíková, Ph.D.

Detection and
identification of
potential human
pathogens in
ectoparasitic
arthropods with a focus
on *Borrelia miyamotoi*

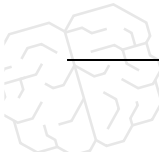





Mgr. Damián Bušovský
Mgr. et Bc. Kateřina
Voglová




RNDr. Filip Studnička,
Ph.D.

Investigation of limits
of unobtrusive sensors
developed at the
Faculty of Science for
vital functions
monitoring



Ing. Sudha Prathyusha
Jakkaladiki MSc.
Ing. Jan Krunčík
Ing. Martina Janečková



doc. Ing. Filip Malý,
Ph.D.

UHK Decision Support
System



Research of small molecules for scavenging of organophosphorus compounds

Annotation:

Commonly used treatment of organophosphate (OP) poisonings consists of rapid administration of oxime reactivator of acetylcholinesterase (AChE; EC 3.1.1.7.), atropine, and anticonvulsant. Reactivators bind to the OP in OP-AChE complex and restore AChE catalytic activity. Alternatively, butyrylcholinesterase (BChE; EC 3.1.1.8) can be used as a bioscavenger to stoichiometrically bind OPs. However, the OP can be bound prior to reaching its molecular targets by using chemical scavengers. Such chemical scavengers could be used for decontamination of unbound OP in living organisms both for pre- and post-exposure to OP. Thus, this project is focused on designing, preparing, and thorough evaluation of novel nucleophiles as potential chemical scavengers. The novel nucleophiles will be evaluated by physicochemical, in vitro, and ex vivo methods to determine their effectiveness for OP decontamination and applicability for OP binding.

Mentor:

prof. PharmDr. Kamil Musílek, Ph.D.

Principal investigator:

Mgr. Eliška Prchalová

Student's profile:

I am a 3rd year toxicology Ph.D. student at the University of Hradec Kralove. I have studied my bachelor's and master's at the same university, and my research topic was reactivators of AChE and BChE. Currently, I am working on fluorescent and MRI active molecular probes of reactivators. So far, I have been included in several projects as a part of the research team, but this is my first time being a principal investigator. It was a unique experience that allowed me to learn multiple important skills, including team management. I was also able to travel to Sweden to Umeå, where I learned the basics of molecular docking. I like to spend my free time actively. Therefore, I do lots of sports, including martial arts, fencing, and recently I tried a bit of climbing. I think it is a great way to relax and come up with new ideas.



Investigator:

Mgr. Zuzana Kohoutová

Student's profile:

I finished my bachelor's and master's degree at the University of Hradec Kralove in the study programmes toxicology and bioorganic chemistry. My bachelor's and diploma thesis were focused on the synthesis of new molecules as potential adjuvants. After that, I started my Ph.D. studies at the same university in the toxicology programme, focusing mainly on the synthesis and in vitro testing of novel potential reactivators of AChE and BChE. Apart from that, I also worked on the synthesis of new potential therapeutics for urinary incontinence and also on the synthesis of molecules with potential in the therapy of Alzheimer's disease. Thanks to the project "Igráček UHK", I was in Paris at Sorbonne University to study silico methods. I love to spend my free time with my dog, her name is Birgitte, and she is the best girl! I also like studying languages and playing video games.

**Investigator:**

Mgr. Karolína Knittelová

Student's profile:

I was born in Hradec Kralove. I am studying for a doctorate in toxicology at the Faculty of Science of the University of Hradec Kralove, I am currently in my second year. The topic of my dissertation is Reactivation of acetylcholinesterase and butyrylcholinesterase using modified oxime nucleophiles. At the same time, I am the main investigator of specific research from 2022 on the topic of Heteroaromatic molecules affecting human enzymes. At the university, I teach laboratory exercises in organic chemistry. Last year I moved to a village in Arnultovice (near the Krkonose) and fell in love with life in the countryside. I grow my own vegetables and fruit, but my cat Merlin brings me the greatest joy. This year he will spend his first summer with me in the village, so I wonder how many mice he will catch.



Investigator:

Mgr. Markéta Miškeříková

Student's profile:

I am a Toxicology Ph.D. student at the Department of Chemistry, Faculty of Science, UHK. The aim of my research is to synthesize and evaluate in vitro novel 17β -HSD10 inhibitors, which could be used as potential drugs for the treatment of various pathologies, mainly Alzheimer's disease. I also contribute to the research of oxime reactivators of AChE and BChE. Specifically on their transport through the blood-brain barrier to the brain. I have been involved in several projects, either as a part of a research team or as a project manager. I also attended two international conferences, where I presented my results in the form of a poster, namely EFMC-ISMC 2022 and Liblice 2022. In my spare time, I enjoy the most reading a book, doing a creative activity (e.g., learning languages, journaling), traveling and exploring new places and countries, or spending time with family, friends, and my beloved cat.



In vitro study of 17 β -HSD10 activity

Annotation:

A multifunctional mitochondrial enzyme 17 β -HSD10 is a potential drug target for the treatment of different pathological conditions (Alzheimer's and Parkinson's disease, certain forms of cancer). Modulation of its expression, activity, and/or its interaction with other molecules is an attractive and promising target for future research.

This project is aimed at the design, synthesis, and in vitro evaluation of new small-molecule 17 β -HSD10 inhibitors. Novel compounds are structurally derived from previously identified hits.

Mentor:

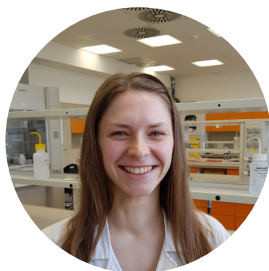
PharmDr. Ondřej Benek, Ph.D.

Principal investigator:

Mgr. Michaela Vašková

Student's profile:

I am a huge fan of science and knowledge. I have been involved in research for seven years, mainly in the field of biochemistry and molecular biology. During my Applied Biology & Ecology Ph.D. program at UHK, I have been focusing on Alzheimer's disease research. I have always been fascinated by the opportunity to discover something new and to be of benefit to others, to be able to help them. I like the study of living systems, the discovery of their fascinating nature, and new contexts. I see the research as an amazing mosaic to which every scientist contributes with their efforts. When I started working in the research lab, I was fascinated by science and felt that I belonged there. Outside of research, I enjoy writing and reading poetry, playing guitar and singing, keeping houseplants, and volunteering at church.



Investigator:

Mgr. Annamária Halečková

Student's profile:

Science is my life. Since my first encounter with chemistry at elementary school, my interest and involvement in research have become an indispensable part of my life. As an enthusiastic Ph.D. student of toxicology at UHK, I have become a hybrid working in organic chemistry as well as biochemistry laboratory. Being engaged in resolving the Alzheimer's disease topic along with a team of professionals fulfills my life. I believe that the contribution that we make to this research will make a change. Outside of research, I like to get inspired by morning horse rides in the forest, playing the piano, and reading romantic literature.



Investigator:

Mgr. Aneta Rotterová

Student's profile:

I am a Ph.D. student in Toxicology at the University of Hradec Kralove. I have always been fascinated by natural sciences, especially biology and chemistry. Therefore, since the beginning of my university studies, I have been interested in molecular biology, biochemistry, and cell biology. Thanks to these studies, I can constantly acquire new knowledge, learn new methods and discover new findings. Here at the University of Hradec Kralove, I am focused on the topic of Alzheimer's disease and working mainly with cell cultures. Outside of my studies, I am a keen sportswoman. My favorite sport is cycling, in which I competed for several years. But I also enjoy all other sports, such as running, hiking, and CrossFit.



Investigator:

Mgr. Katarína Jurková

Student's profile:

I am a PhD student at the University of Hradec Kralove. During my undergraduate studies, I worked in an organic synthesis lab where we were interested in Alzheimer's disease research. Now, my research focuses on the development of new small molecules as potential drugs for the treatment of several diseases where cell death occurs. I enjoy attending international conferences where you can meet other scientists and always learn something new, even from a different field. It is very mind-opening and motivating. I find it very fulfilling to be part of the research that could one day lead to drug candidates and help others. Apart from working in a lab, I really enjoy traveling, exploring new places, cooking, and doing sports.

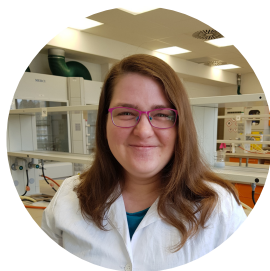


Investigator:

Mgr. Marie Hamšíková

Student's profile:

I have been involved in research, academia, and the private sector, for over ten years. After studying molecular biology and genetics and several years of work experience in an antibody development company, I decided to return to academia and focus on the study of protein interactions while studying in the Toxicology Ph.D. program. Ever since I was young, I have been fascinated by nature and interested in looking inside at how things and systems work. I enjoy discovering what is hidden beneath the surface and finding solutions to different problems, which science itself allows. In my spare time, I am drawn to the mountains to hike, enjoy spending time with friends also outside of choir, painting and organizing events, and volunteering at church.



Regional security implications of the Sino-US strategic competition in Latin America and the Horn of Africa

Annotation:

The current relationship between the United States and China is a major research topic in international relations today. This is due to the fact that the US has been a superpower since World War II and has been the sole superpower since the end of the Cold War. This position is being challenged by a number of countries, most notably China, owing to its growing economic power and influence globally. The Sino-US strategic competition has worldwide ramifications; this research aims to give insight on the repercussions of this competition in the selected cases in Latin America and the Horn of Africa, as well as whether it leads to an increase in local instability. The study period is 2016-June 2022; four case studies will be thoroughly evaluated and compared in terms of security issues data. The four cases chosen are Nicaragua and Venezuela from Latin America, as well as Ethiopia and Somalia from the Horn of Africa, where China and the US competed during the study period.

Mentor:

Mgr. et Mgr. Pavlína Springerová, Ph.D.

Principal investigator:

Nikola Jokanović, M.A.

Student's profile:

Currently, I am a PhD student at the Department of Political Science, Philosophical Faculty UHK, in the study programme Latin American Studies. My topics of research activity include energy transition and environmental protection in China and Brazil, as well as China's contemporary foreign policy. I am originally from Belgrade, Serbia, where I have concluded my bachelor's and master's studies; for my LL.M. studies, I have traveled to Beijing, the People's Republic of China, and have lived there for a year. I enjoy swimming, cycling, playing guitar, and singing, discovering different cultures and traditions (cuisine, music, dance, etc.), and practicing foreign languages.



Investigator:

Asnake Anteneh Chanie, M.A.

Student's profile:

My primary research interests are mostly on modern politics, particularly issues related to ethnicity, nationalism, globalization, democracy, aid, and conflict at regional and global levels. Besides my study and research commitments, I often engage in social media conversations, such as Twitter, on topics related to global affairs. In terms of social activities, I enjoy traveling to new places, joining indoor parties, cooking with friends, and volunteering for charities that have a religious foundation.



Investigator:

Elvin Francisco Rodríguez Fabilena

Student's profile:

I am a Ph.D. student of Latin American Studies at the University of Hradec Králové. I am researching autocratization processes. I like to write love poems in English, Czech, and Spanish. In this regard, I even had the chance to appear on a local Czech TV channel reciting the very first poem I wrote in the Czech language. Additionally, I like to cook beef meat, chicken breast, pork, or salmon in my grill pan. Furthermore, whenever I have time, I work out at the gym.

Moreover, I like listening to different genres of music, from pop, rock, and rap to heavy and death metal. In addition, I like football. My favorite teams are Barcelona and Argentina, and my favorite football player is Lionel Messi. Finally, I enjoy watching The Simpsons, but only from seasons 1 to 8, and my favorite series are Breaking Bad, Game of Thrones, and Dr. House.



Islamic insurgency in Northern Mozambique: Its causes, consequences and possible solutions

Annotation:

The research focuses on the security situation in Mozambique following the outbreak of conflict provoked by Islamist extremists in the northern part of the country since 2017. It compares the security situation of the state and the activities of Islamic terrorists in Mozambique with the cases of other countries where Islamist radicals are also active. The first part of the research focuses on the comparison of the goals, methods and tools used by Ansar al-Sunna (Muslim radicals in the northern part of the Mozambican region of Cabo Delgado) with the activities of the terrorist group Boko Haram in Nigeria and the surrounding countries of the Sahel and its cooperation with transnational jihadist terrorist organizations. The second part analyses the strategies adopted by the Mozambican government to quell the insurgency and compares them with those of the Nigerian state fighting Islamists extremists.

Mentor:

Mgr. Jan Prouza, Ph.D.

Principal investigator:

Mgr. Tadeáš Vala

Student's profile:

I am a double PhD student in Political Science – African Studies and Religious Studies with a focus on Islamic Studies. My main research focus is on the interreligious relations between Muslims and "people of the Western civilization sphere" from Prophet Muhammad to the Islamic State. Within Political Science at the UHK, I focus on the manifestations of jihadism in Africa and the (potential) interactions between terrorist organizations of global jihadism and local Islamist insurgencies in sub-Saharan Africa. Secondly, I also focus on Islamophobic and anti-Muslim manifestations in Europe and the US. I have conducted a number of research fellowships at, for example, the University of Pennsylvania, the University of Cambridge, and the University of Barcelona. My main passions and hobbies are traveling and getting to know the local people, cultures, cuisines, and time spent actively on sandy beaches.



Investigator:

Mgr. et Mgr. Jakub Zbýtovský

Student's profile:

I am a student at the Department of Political Science, with my main research topics being strategy, decision-making, security, and conflicts in Africa. As a part of my research, I spent some time in The Hague and Leiden in The Netherlands, conducting an interview, but unfortunately did not get an opportunity to meet any of the African leaders who are being held at the International Criminal Court there. Outside of my study and research activity, I am a big sports fan, following all the major sports to some extent and occasionally playing mostly racket sports. Also, I am into video games and board games, especially those that have some extent of tactical and strategic gameplay and not only a factor of random as a main mechanic.



Detection and identification of potential human pathogens in ectoparasitic arthropods with a focus on *Borrelia miyamotoi*

Annotation:

Ticks can transmit more than one pathogen, which can significantly impact human health because multiple diseases can be transmitted simultaneously.

The aim of this study was to determine the prevalence of *Borrelia miyamotoi*, *Borrelia burgdorferi* sensu lato, and *Anaplasmataceae* in the collected ticks at 26 selected sites in 14 regions of the Czech Republic.

In our study, 2930 ticks were collected, of which 2882 individuals of *Ixodes ricinus* (2143 nymphs, 460 females, 279 males), while *Dermacentor reticulatus* was present only in the South Moravia region in a total of 48 individuals (5 nymphs, 9 females, 34 males). The presence of three pathogens was determined by polymerase chain reaction (PCR). The prevalence of infection was found in 37 % of the ticks, with co-infection detected in 8.76 % of the ticks. The most common pathogen was *B. burgdorferi* s. l. These data show us the extent of tick-borne pathogens in suburban and urban areas and may provide new insights into the prevalence of infections at the regional level. Within regions, differences were found to depend on climatic factors and biocenosis characteristics. Transmission of several pathogens was detected, indicating the risk of further infections from the tick bite.

Mentor:

RNDr. Alena Myslivcová Fučíková, Ph.D.

Principal investigator:

Mgr. Lenka Michalčíková

Student's profile:

I am a PhD student at the University of Sciences UHK studying the occurrence and spread of pathogenic fungi near human dwellings worldwide. At the Institute of Microbiology of the Academy of Sciences of the Czech Republic, I have been studying the ecology of microorganisms and soils for over seven years. As part of my research, I collect samples worldwide. During my studies, I had the opportunity to visit Papua N. Guinea (1 year) and Svalbard (4 months), and other countries. I am an active person and don't like to be bored. My hobbies are ornithology, entomology, scuba diving, mountain climbing, programming, and bioinformatics. I have two dogs, chickens, and hydroponics. I love active vacations with the dogs, which usually involve water, climbing, scuba diving, and nature watching.



Investigator:

Ing. Karolína Bjelková

Student's profile:

In 2019, I started my doctoral studies at the Faculty of Science in Hradec Králové, focusing on applied biology and ecology, and I am currently working on pathogenicity in ectoparasites, primarily in the Hippoboscidae family. The main interest is finding out the possibility of transmission of risky pathogens to humans, possibly domestic animals.

My private hobby is the connection between animal ethology and the effect of vectors on populations because my love of nature is also associated with the behavior and training of my dogs, which I train to search for injured wild animals.

At work, I very much like to use the opportunity to spend time in the laboratory and learn new knowledge related to the identification. I like learning about new methods and comparing the gradual shift in science from the point of view of a budding scientist.



Investigation of limits of unobtrusive sensors developed at the Faculty of Science for vital functions monitoring

Annotation:

During the last years, a team of researchers at the Faculty of Science of the University of Hradec Králové has developed various sensing devices to evaluate the vital functions of humans. Some of them are based on sensing microvibrations of the human body, which occur due to the activity of the individual's cardiovascular, respiratory or digestive system, to make conclusions about the state of the human body. The less challenging parameters to describe by this method are the heart and respiratory rate. In this project we aim to prove that we are able to classify these and other biological parameters using existing technology developed by the Faculty of Science. Moreover this project also aims on investigation of ballistocardiographic signal of dying people.

Mentor:

RNDr. Filip Studnička, Ph.D.

Principal investigator:

Mgr. Damián Bušovský

Student's profile:

Currently, I am studying PhD study program Didactics of Physics at the Faculty of Science of UHK. In general, my field of interest is processing and analyzing biomechanical signals (mostly from a ballistocardiographic (BCG) point of view) using differential invariants, i.e., geometrical properties of signals that are preserved with respect to specific transformations. If not working, I like doing individual sports like jogging, cycling, hiking, and working out. The only sport I used to do that is not an individual sport is ballroom dancing, which I was doing competitively for more than five years. If I want to do some more psycho-hygiene, I play video games like League of Legends and World of Warcraft. I also play the ukulele and love everything related to fantasy worlds – books, TV shows, and desk games.



Investigator:

Mgr. et Bc. Kateřina Voglová

Student's profile:

I have been studying PhD program Didactics of Physics at the Faculty of Science of UHK for two years. I am focused on mechanical waves and biophysics topics in high school education. I am interested most in how to integrate biologic topics (connected with the human body) into lessons in physics at high school. I am a fan of physics, but I have other interests too. I like sports like running, swimming, and climbing. I like music as well. I play piano and guitar, but I trying play every possible musical instrument I meet :)

I appreciate the opportunity to cooperate in project Igráček due to the new skills gained. I enjoyed seeing theory from biophysics in practice. I was excited about how much we could find out from the data.



UHK Decision Support System

Annotation:

The aim of our project is to build a university decision support system, which is developed in the form of a data warehouse. Its goal is the provision of university data for the university management or, in general, for authorized persons. It is a modern Enterprise BI that will allow the user to understand trends in data analysis, report creation, statistics, and visualizations. The application mainly contains student data and subject data, which would be expanded. The design is meant to serve the existing data and security needs of the university.

Mentor:

doc. Ing. Filip Malý, Ph.D.

Principal investigator:

Ing. Sudha Prathyusha Jakkaladiki MSc.

Student's profile:

I am a Ph.D. student in the stream of applied informatics and research inclined to the "Prediction of breast cancerous cell through machine learning methodologies" and I have a great affinity towards mathematics and computer science! I am a Research and teaching assistant in the field of Applied informatics and teach Databases systems (as a front runner and also for Lab) and programming (as a lab assistant). I prepared content for the Subject Database systems for Bachelor Erasmus students. Before my Ph.D. student Journey I worked at Accenture and Infosys as an experienced Software Professional with Experience in Application Development in Big Data analytics SQL. CRIBL log stream and looking forward to creating positive change within and would like to code UI development through Modern React Libraries, working on the creation of responsive UI for one of the projects. A trained kathak Classical dance practitioner during weekends or whenever it is possible. A common mind teaches mathematics to 7 to 15 years children on Sunday.



Investigator:

Ing. Jan Krunčík

Student's profile:

I am a PhD student at the University of Hradec Králové, Faculty of Informatics. Currently, in my second year of studies. In the current research project, I contributed to the development of the user interface, and creation of the database, and the deployment of the reports on the web server. I have interesting areas of research, such as Software development-centric Systems. Along with university studies, I teach No SQL database systems to the students of UHK.

Investigator:

Ing. Martina Janečková

Student's profile:

I am a Ph.D. student at the University of Hradec Králové, Faculty of Informatics and Management. Currently, in my second year of studies. My research focuses on knowledge management and motivation. The subject of my dissertation thesis is "Potential Role of Knowledge Management in Strategic Human Resource Management". Thanks to this project, I got introduced to some other interesting areas of research, such as database systems or even sustainable development.

Along with university studies, I like learning about the human body, have been studying yoga for a few years, and I also like philosophy. In my free time, I like to spend time outside in nature, and I enjoy climbing.

