

# POROČILO O DOSEŽKIH PROGRESS REPORT 2021

# KAZALO / CONTENT

<b>1. Predstavitev Fakultete za farmacijo</b> Presentation of the Faculty of Pharmacy	<b>9</b>
Organiziranost Organization	10
Zaposleni Employees	20
<b>Predstavitev organizacijskih enot</b> Presentation of departments	22
Študentski svet Fakultete za farmacijo (ŠS FFA), Študentska organizacija Fakultete za farmacijo (ŠOFFA) in Društvo študentov farmacije Slovenije (DŠFS)	55
Student council of the Faculty of Pharmacy (ŠS FFA), Student organization of the Faculty of Pharmacy (ŠOFFA) and Slovenian pharmacy students' society (DŠFS)	
 <b>2. Poročilo o delu</b> Activity report	 <b>57</b>
Pregled poslovanja Business overview	58
Študijsko področje Field of study	60
Znanstvena, raziskovalna in strokovna dejavnost Research and profesional activities	63
Projekti in programi Projects and programs	66
Prenos znanja in sodelovanje z okoljem Knowledge transfer and cooperation with the environment	82
Izumi in inovacije Innovations and inventions	87
Informiranje strokovne in splošne javnosti Informing the professional and general public	88

<b>Mednarodna dejavnost</b>	90
International activity	
<b>Obštudijska dejavnost</b>	93
Extracurricular activities	
<b>Šport</b>	96
Sport	
 <b>3. Ponosni smo – priznanja in nagrade</b>	 101
We are proud of – awards and prizes	
 <b>Slavimo znanost - Raziskovalni dan UL FFA</b>	 107
We celebrate science – Faculty of Pharmacy research day	
<b>Novoizvoljeni redni profesorji</b>	114
Newly appointed full professors	
<b>Prejemniki dekanovih nagrad</b>	118
Recipients of Dean's awards	
<b>Prejemniki Prešernovih nagrad</b>	119
Recipients of Prešeren awards	
<b>Priznanja fakultete</b>	120
Faculty of Pharmacy recognitions	
<b>Pohvale fakultete</b>	121
Faculty of Pharmacy commendations	
 <b>4. Seznam diplomantov</b>	 127
List of graduates	
 <b>5. Znanstvene in strokovne publikacije</b>	 137
Scientific and professional publications	

# UVODNI POZDRAV



Spoštovani,

Fakulteta za farmacijo Univerze v Ljubljani (UL FFA) je zaključila uspešno leto, ki je prineslo številna priznanja strokovne javnosti in družbe. UL FFA sledi poslanstvu vzgoje, usposabljanja in izobraževanja strokovnjakov in vodij v farmaciji, laboratorijski medicini in kozmetologiji. S kombinacijo znanstvenih pristopov in inovativnih orodij v ustvarjanju in razširjanju znanja pripravljamo študente na delo v globalnem tekmovalnem okolju in razvijamo potenciale, ki bodo zagotavljalni nadaljnji razcvet farmacevtske stroke.

Fakulteta se zaveda pomena sodobne infrastrukture, zato vlagajo v nepremičnine in v raziskovalno opremo, odločno tudi napreduje pri projektiranju novogradnje in podpira ostale ključne projekte. Prav tako skrbimo za razvoj karier pedagogov in raziskovalcev, saj se zavedamo, da so za preboje vedno potrebni ljudje. Najboljši ljudje. Odgovornost fakultete je torej, da prepoznavajo izjemne posameznike in prav je, da jim kot skupnost damo priznanja. Stremena fakultete so se v preteklem letu odrazila v globokem poklonu družbe, ko so bila sodelavcem podeljena najvišjih državna priznanja na

področju znanosti in raziskovanja. Odbor Republike Slovenije za podelitev nagrad in priznanj je podelil Zoisovo nagrado za živiljenjsko delo **prof. dr. Julijani Kristl**. Prof. dr. Stanislav Gobec je prejemnik Zoisove nagrade, **prof. dr. Marko Anderluh** je prejemnik Zoisovega priznanja.

Kljud omejitvam pandemije smo leto 2021 obeležili s številnimi drugimi dosežki. Slovesnost v čast 60. obletnice Fakultete za farmacijo smo izvedli na daljavo. Načrtovano slavnostno akademijo pa smo preoblikovali in zapis prenesli v filmski medij. Oblikovali smo zrcalo časa in se spošljivo ozrli na pot, ki so jo prehodili snovalci fakultete, da lahko mi danes ustvarjamo svoje kariere ter odgovorno opravljamo poslanstvo kakovostnega izobraževanje, raziskovalne odličnosti in vpetosti v stroko. Fakulteta za farmacijo goji in prenaša navdušenje generacijam strokovnjakov, ki predano in vztrajno razvijajo stroko, s katero ohranjamo in izboljšujemo pomembno vrednoto – zdravje ljudi.

Širšo javnost smo nagovorili z razstavo »Doma na Fakulteti za farmacijo« in se predstavili sprehajalcem ob nabrežju Ljubljanice, nagovarjali smo mlade za študij na Fakulteti za farmacijo.

Fakulteta za farmacijo Univerze v Ljubljani je institucija, ki z odličnostjo v izobraževanju ter na znanstvenoraziskovalnem področju zagotavlja dragoceno podporo slovenski družbi tako na področju farmacije kakor tudi laboratorijske biomedicine in biomedicini sorodnih področij. V kriznih korona časih smo to samo še potrdili. Z odgovornim delovanjem smo vzpostavili pogoje za pedagoško in raziskovalno delo. Izkazali smo veliko mero solidarnosti in kolegialne pomoči, da smo v čim večjem obsegu opravili obveznosti in napredovali s študijskim procesom. Sodelavci UL FFA pa so prav tako aktivni v vseh segmentih življenja, kjer širijo razumevanje na znanosti temelječih spoznanj, vedno na človeku prijazen način.

Fakulteta za farmacijo deluje na zelo konkurenčnem področju, zato morajo biti načrti za razvoj in napredok ambiciozni. Fakulteta je bila in želi ostati vodilna na področju raziskav in razvoja zdravil, nosilka razvoja diagnostičnih pristopov in interpretacij ter translacije biomedicinskih raziskav v klinično prakso. Da bi vodilno vlogo ohranili in v prihodnje omogočili njen rast, so potrebne reforme in povečane investicije, ki bodo zagotovile usmeritev sredstev v zagotavljanje boljših pogojev dela. Zato zasluži še posebno pozornost napredek na projektu novogradnja Brdo. Gradbeni odbor intenzivno sodeluje z ATELIERarhitekti d. o. o. v skupnem nastopu z ARHEMA d. o. o., ter projektanti družbe ELEAiC. Ožja delovna skupina hkrati vodi številne postopke, vezane na urejanja prostora in projektiranje novogradnje. Konec leta smo zaključili

fazo izdelave idejnega projekta. Izjemnega pomena je tudi zagotavljanje finančnih virov. V sodelovanju s partnerskimi inštitucijami je Fakulteta za farmacijo dosegla umestitev projekta novogradnje v zakon o zagotavljanju finančnih sredstev za investicije v slovensko zdravstvo v letih od 2021 do 2031.

Številnim dosežkom so kljubovali izzivi, vključno z uvedbo novega informacijskega sistema na univerzitetni in fakultetni ravni, čemur je sledil odhod strokovnega kadra, da ne omenjamo nenehno spremenljajočih se okoliščin, povezanih s pandemijo.

Spoštovani bralec, ponosni smo na še mnoge druge dosežke, ki jih predstavljamo v nadaljevanju.

Pogumno oblikujemo prihodnost.



Prof. dr. Irena Mlinarič-Raščan  
dekanja

## GREETINGS BY THE DEAN



Dear reader,

The Faculty of Pharmacy of the University of Ljubljana (UL FFA) has completed a successful year and gained numerous awards of professional public and society at large. The FFA follows the mission of educating and training students to become professionals and leaders for a global competitive environment in pharmacy, laboratory medicine and cosmetology. The process of combining scientific approaches and innovative tools supports the advancement of students and subsequent graduates in a globally competitive environment, along with developing potentials, ensuring that the pharmaceutical profession will continue to bloom.

The Faculty recognizes the importance of outstanding individuals and cherishes the career development of its employees, both the educators and researchers. It is therefore the responsibility of the Faculty to identify and acknowledge outstanding individuals. In the past year the Faculty's outlooks were reflected in the tribute of scientific society, when colleagues were awarded the highest national awards in

the field of science and research. The Award Committee of the Republic of Slovenia gave the Zois Lifetime Achievement Award to **Prof. Dr. Julijana Kristl**. **Prof. Dr. Stanislav Gobec** is the recipient of the Zois Prize and **Prof. Dr. Marko Anderluh** is the recipient of the Zois Award.

Despite the limitations posed by the pandemic, 2021 has been marked by a number of other achievements. The ceremony in honor of the 60th anniversary of the Faculty of Pharmacy was held remotely. The planned academy was redesigned and transformed to the film, which was meant to portray the reflection of time and respectfully reflect on the paths that the founders of the Faculty had taken, so that nowadays we can develop our careers and responsibly carry out the mission of high-quality education, research excellence and commitment to the profession.

Complementary to film making, we have organized the exhibition along Ljubljanica river banks, entitled "At home, at the Faculty of Pharmacy". The key message is to point out that the Faculty of Pharmacy cultivates and passes on the enthusiasm of generations of professionals, who devoutly and persistently develop the profession through which we maintain and improve an important value – human health. In this way we reached out to the society and addressed young people, encouraging them to study at the Faculty of Pharmacy.

The Faculty of Pharmacy is an institution which provides valuable support to Slovenian society in pharmaceutical, laboratory biomedicine and biomedicine-related fields through excellence in education and scientific research.

This was confirmed in coronavirus pandemic. We have redesigned the environment, which establishes the conditions for pedagogical and research work. The coworkers have shown a great deal of solidarity – collegial assistance with the aim of completing the tasks we were committed to complete and continue to make progress with the study process. In addition to work-related duties, the FFA employees have also been active at various levels of COVID-related issues and societal events, during which they promoted evidence- and science-based understanding of the pandemic.

The Faculty of Pharmacy acts in a very competitive field; the plans for the development and progress must therefore be ambitious. The Faculty has been and wants to remain a leader in the field of research and development of medicines, and the leader in the development of diagnostics as well as interpretations and the translation of biomedical research into

clinical practice. In order to maintain the leading role and enable its growth in the future, reforms are required, as well as increased investments that will ensure that funds are directed towards providing better working conditions.

Special attention is therefore devoted to the progress of the new Brdo project. The construction committee closely cooperates with the architects of ATELIERarhitekti d.o.o. in a joint performance with ARHEMA d.o.o. and the engineering company ELEAiC. The core working group is simultaneously conducting a number of procedures related to spatial planning and the design of new premises. The end of 2021 was marked with the completion of the conceptual design phase of the project. In parallel cooperation with partner institutions, the Faculty achieved the placement of the new construction project in The Law on the Provision of Financial Resources for Investments in Slovenian Health Care in the years from 2021 to 2031.

Numerous advances in the past year have also brought challenges, involving the implementation of new information system at the university and faculty level, followed by consequent personnel withdrawal, not to mention the everchanging corona-related circumstances.

Dear reader, we are proud of many other achievements of the Faculty, presented herein. Enjoy reading!

It is the brave who shape the future.

A handwritten signature in black ink, appearing to read "Irena Mlinarič-Raščan".

Prof. Dr. Irena Mlinarič-Raščan  
Dean

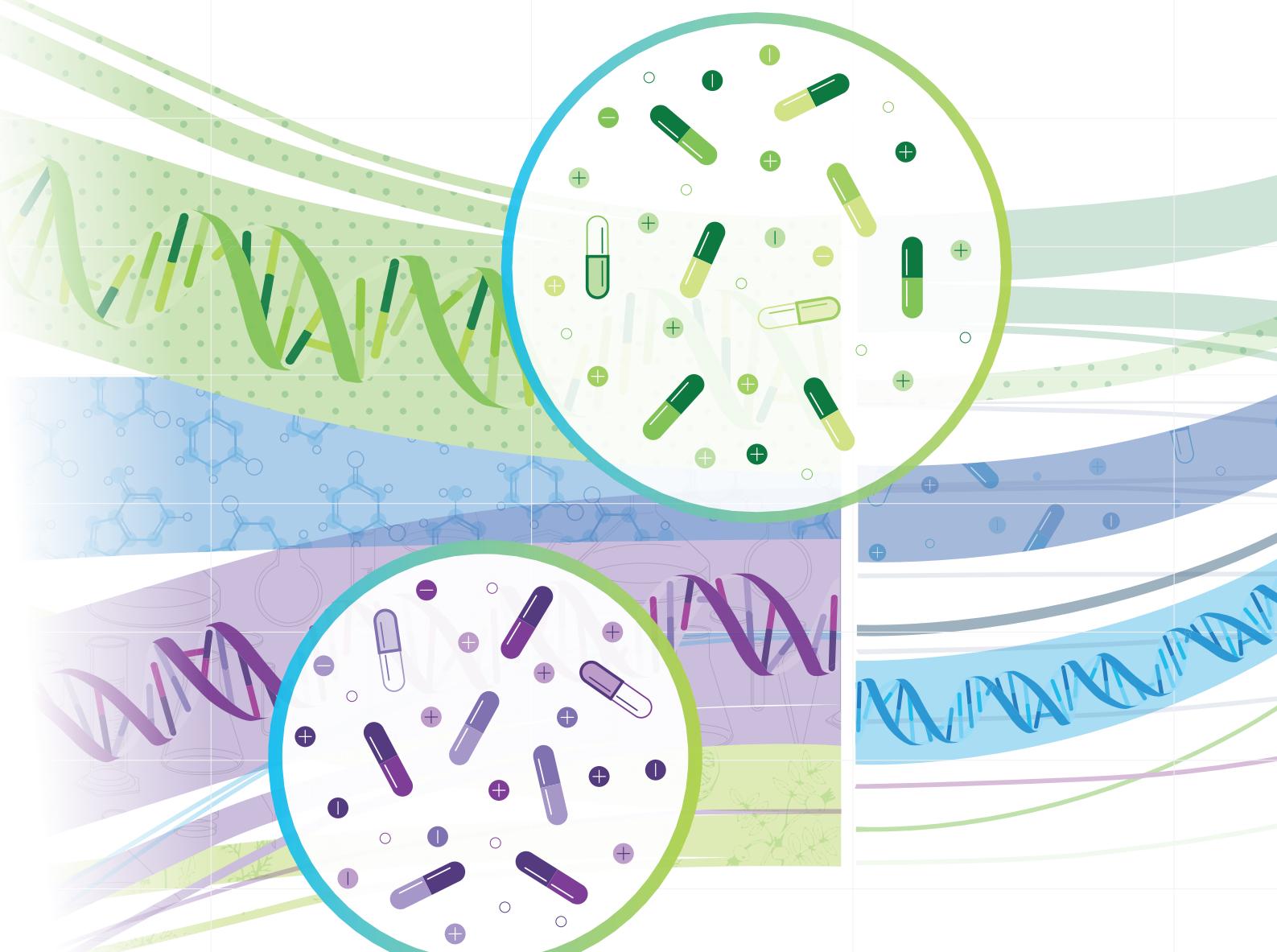
## Proučujemo vpliv genov na zdravljenje

Naše raziskave pomagajo zdravnikom najti pravi odmerek zdravila za bolnika. Pri tem je molekularna diagnostika eden ključnih postopkov za opredelitev poteka zdravljenja. Z genetskimi preiskavami določamo različice genov, ki vplivajo na izid terapije z zdravilnimi učinkovinami.

## Investigating the influence of genes on medical treatment

Our research helps doctors to find the right dose of medication for a specific patient. Molecular diagnostics is one of the key procedures for determining the course of the treatment. Genetic tests determine gene variants that influence the outcome of the drug therapy.

Farmakogenomika je proučevanje vloge genov pri odzivu na zdravila.  
Pharmacogenomics examines the role of genes in the drug response.



# 1

## Predstavitev Fakultete za farmacijo Presentation of the Faculty of Pharmacy

## ORGANIZIRANOST

UL FFA je raziskovalno usmerjena pedagoška ustanova, kar izkazuje tako z objavami raziskovalnih dosežkov svojih zaposlenih v uglednih mednarodnih revijah kot tudi s prenosom teh znanj v pedagoški proces na vseh študijskih programih.

Osnovne naloge so ustvarjanje, prenašanje in ohranjanje znanja, kar ob inovativnosti in raziskavah pomeni tudi učinkovito poučevanje in ohranjanje zgodovinskega spomina, vezanega na stroko. S številom objav v znanstvenih revijah ter s številom citatov in projektov z gospodarstvom se UL FFA uvršča v sam vrh Univerze v Ljubljani. Tovrstni način dela in razmišljanja je vpet tudi v študijske programe.

UL FFA kot del Univerze v Ljubljani gradi svoj ugled, integriteto in razvoj na odličnosti, učinkovitosti ter etični drži učiteljev in študentov. Farmacevtske izkušnje se gradijo na dolgoletni tradiciji tako v slovenskem kot širšem prostoru z vizijo usmerjenosti v prihodnost.

Po evropskih merilih je UL FFA srednje velika farmacevtska fakulteta, matična za širše področje farmacije, klinične biokemije in kozmetologije, ki letno sprejme 165 študentov na študijskem programu Farmacija, 90 študentov na programu Laboratorijska biomedicina (50 na 1. stopnji, 40 na 2. stopnji), 40 študentov na programu Kozmetologija, 40 študentov na programu Industrijska farmacija in od 20 do 30 študentov doktorskega študija. V zadnjih letih je na UL FFA skupno s specializanti vpisanih okrog 1550 študentov.

UL FFA ima šest kateder, ki predstavljajo osnovne organizacijske enote pedagoškega in znanstvenoraziskovalnega dela ter Inštitut za farmacijo, ki izvaja temeljne in razvojne projekte za tekoče potrebe farmacevtske stroke. Ima naslednje organizacijske enote: vodstvo fakultete, tajništvo fakultete, katedre in Inštitut za farmacijo.

## ORGANIZATION

The Faculty of Pharmacy is a research-oriented teaching institution, evidenced from the publications of research achievements in highly esteemed international journals, as well as in the transfer of knowledge in all programmes.

The faculty's basic tasks are creating, transmitting and retaining knowledge. Therefore, its priority, alongside innovation and research, is effective teaching and maintaining the profession-related historical memory. Its members' number of journal publications, number of citations and number of projects rank the faculty at the very top of the University of Ljubljana's member institutions. This way of working and thinking is also entwined in the study programmes.

As part of the University of Ljubljana, the Faculty of Pharmacy builds its reputation, integrity and development on excellence, effectiveness and the ethical stance of its students and teachers. We are building on the long-term tradition of pharmaceutical experience in Slovenia and beyond, while always looking toward the future.

According to European criteria, the faculty is a medium-sized educational institution of the pharmacy that is central to the wider field of pharmacy, clinical biochemistry and cosmetology. Each year the faculty admits 165 students in the Pharmacy programme, 90 students to the Laboratory Biomedicine programme (50 undergraduate and 40 graduate students), 40 students to the Cosmetology program, 40 students to the Industrial Pharmacy programme and 20 to 30 to doctoral studies. In the past years there have been about 1550 students together with specialist trainees enrolled at the Faculty of Pharmacy.

The Faculty of Pharmacy has six departments, which represent the basic organizational units of teaching and scientific research, and the Institute of Pharmacy, which implements basic and development projects for the current needs of the pharmaceutical profession. In other words, the faculty has the

Učitelji in sodelavci so večinoma registrirani kot raziskovalci pri Javni agenciji za raziskovalno dejavnost (ARRS) in imajo nedvomno velik raziskovalno-razvojni potencial.

Družbena odgovornost UL FFA se kaže v sodelovanju z uporabniki znanja na kulturnih, gospodarskih in socialnih področjih. Tako vlogo želi ohraniti in utrditi tudi v prihodnje in stremeti k povečevanju uveljavljenosti in ugledu v mednarodnem prostoru. S tem namenom se vključuje v mednarodna združenja in sklepa mednarodna partnerstva.

Vizija UL FFA je prispevati k sooblikovanju prihodnosti ter ostati v svet odprta, odzivna in odgovorna akademska izobraževalna in raziskovalna ustanova. Obenem stremi k ustvarjanju in širjenju znanstvenih spoznanj in delovanju v dobrobit slovenskih državljanov, s čimer prispeva k povečevanju splošnega razvoja in utrjevanju nacionalne samobitnosti.

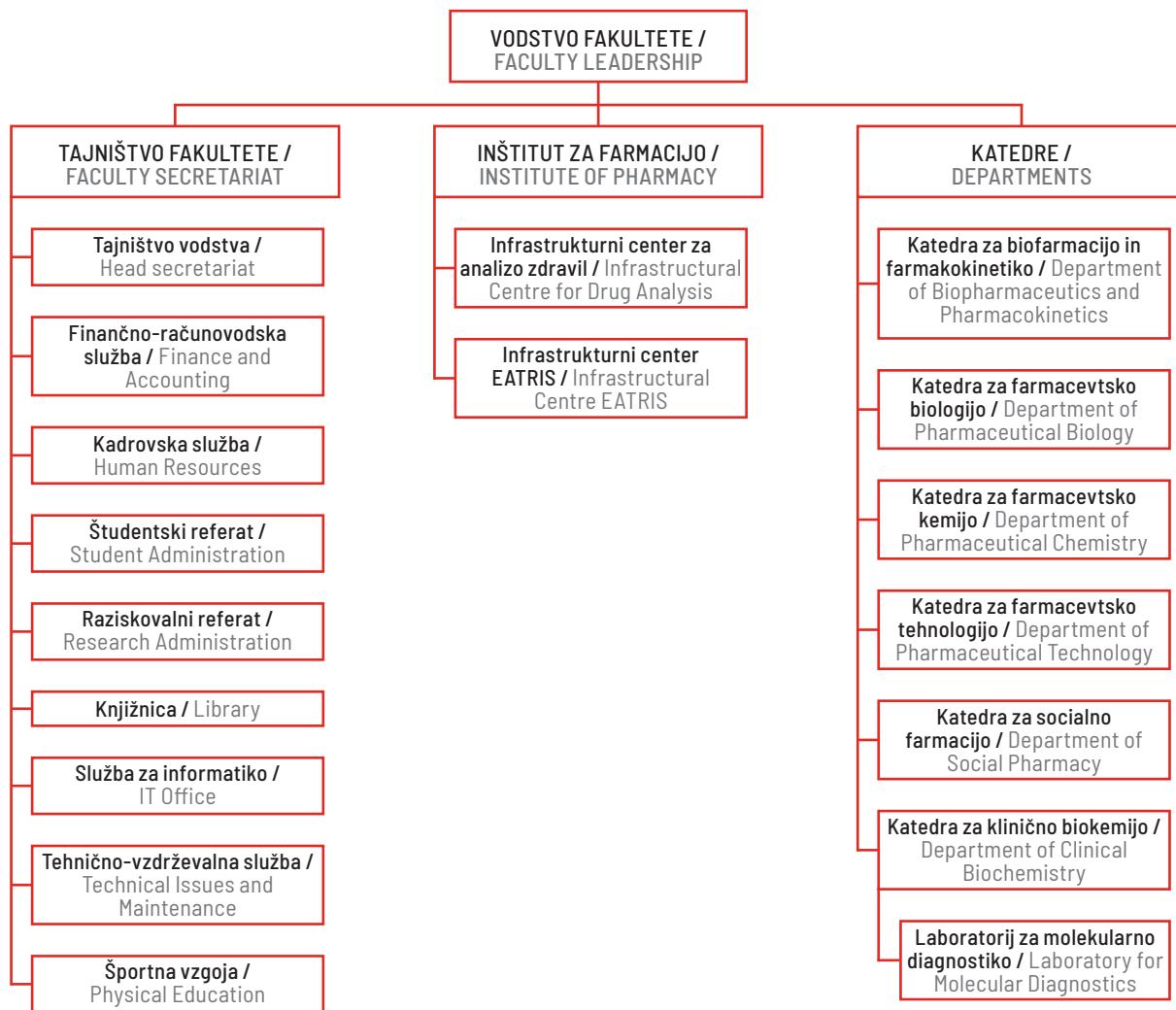
following organizational units: faculty management, faculty secretariat, departments and the Institute of Pharmacy.

Teachers and associates are mostly registered as researchers with the Slovenian Research Agency (ARRS) and undoubtedly have great research and development potential.

The social responsibility of the Faculty of Pharmacy is reflected in the cooperation with users of knowledge in the cultural, economic and social fields. The faculty wants to maintain and consolidate that role in the future and strive to increase its high standing and reputation in the international arena. To this end the faculty joins international associations and makes international partnerships.

The vision of the Faculty of Pharmacy is to contribute to creating the future and to remain an accessible, responsive and responsible academic educational and research institution. At the same time, it strives to create and disseminate scientific knowledge and work for the benefit of the Slovenian citizens, thus contributing to general development and strengthening national identity.

## ORGANIZACIJSKE ENOTE UL FFA / FACULTY OF PHARMACY ORGANISATIONAL UNITS



## **VODSTVO FAKULTETE (mandat od 1. 10. 2019 do 30. 9. 2023)**

**FACULTY'S GOVERNANCE (mandate: 1 October 2019 to 30 September 2023)**



**prof. dr. Irena Mlinarič-Raščan, dekanja / Dean**

**izr. prof. dr. Mojca Lunder, prodekanja za mednarodno sodelovanje / Vice-Dean for International Relations**

**izr. prof. dr. Rok Dreu, prodekan za znanstvenoraziskovalno področje / Vice-Dean for Scientific Research Matters**

**prof. dr. Marko Anderluh, prodekan za študijsko področje / Vice-Dean for Education**

**Katja Višnjevec Vahčič, tajnica fakultete / Faculty Secretary**

## KATEDRE FAKULTETE ZA FARMACIJO

**Katedra za biofarmacijo in farmakokinetiko**  
predstojnik: prof. dr. Albin Kristl, mag. farm.

**Katedra za farmacevtsko biologijo**  
predstojnik: izr. prof. dr. Tomaž Bratkovič, mag. farm.

**Katedra za farmacevtsko kemijo**  
predstojnik: prof. dr. Stanislav Gobec, mag. farm.

**Katedra za farmacevtsko tehnologijo**  
predstojnica: prof. dr. Mirjana Gašperlin, mag. farm.

**Katedra za socialno farmacijo**  
predstojnik: prof. dr. Mitja Kos, mag. farm.

**Katedra za klinično biokemijo**  
predstojnica do 30. 6. 2021:  
izr. prof. dr. Nataša Karas Kuželički, mag. farm.  
predstojnik od 1. 7. 2021:  
prof. dr. Borut Božič, mag. farm., spec. med. biokem

**Laboratorij za molekularno diagnostiko**  
vodja: prof. dr. Joško Osredkar, mag. farm.,  
spec. med. biokem.

## DEPARTMENTS IN THE FACULTY OF PHARMACY

**Department of Biopharmaceutics and Pharmacokinetics**  
Head: Prof. Dr. Albin Kristl, M. Pharm.

**Department of Pharmaceutical Biology**  
Head: Assoc. Prof. Dr. Tomaž Bratkovič, M. Pharm.

**Department of Pharmaceutical Chemistry**  
Head: Prof. Dr. Stanislav Gobec, M. Pharm.

**Department of Pharmaceutical Technology**  
Head: Prof. Dr. Mirjana Gašperlin, M. Pharm

**Department of Social Pharmacy**  
Head: Prof. Dr. Mitja Kos, M. Pharm.

**Department of Clinical Biochemistry**  
Head until 30 June 2021:  
Assoc. Prof. Dr. Nataša Karas Kuželički, M. Pharm.  
Head from 1 July 2021:  
Prof. Dr. Borut Božič, M. Pharm., EuSpLM

**Laboratory for Molecular Diagnostics**  
Head: Prof. Dr. Joško Osredkar, M. Pharm., EuSPLM

## INŠITUT ZA FARMACIJO

**predstojnik:** izr. prof. dr. Rok Dreu, mag. farm.

**Infrastrukturni center: EATRIS**

**vodja:** prof. dr. Irena Mlinarič-Raščan, mag. farm.

**Infrastrukturni center za analizo zdravil**

**vodja:** prof. dr. Anamarija Zega, mag. farm.

## INSTITUTE OF PHARMACY

**Head:** Assoc. Prof. Dr. Rok Dreu, M. Pharm.

**Infrastructural centre: EATRIS**

**Head:** Prof. Dr. Irena Mlinarič-Raščan, M. Pharm.

**Infrastructure Centre for Analysis of Medicinal Products**

**Head:** Prof. Dr. Anamarija Zega, M. Pharm.

## ORGANI FAKULTETE

**Senat**

**predsednica:** prof. dr. Irena Mlinarič-Raščan, mag. farm.

**Akademski zbor**

**predsednica:** prof. dr. Marija Sollner Dolenc, mag. farm.

**Upravni odbor**

**predsednik:** prof. dr. Matjaž Jeras, mag. farm.

**Študentski svet**

**predsednica:** Damijana Roškarič

## THE FACULTY'S GOVERNING BODIES

**Senate**

**Chair:** Prof. Dr. Irena Mlinarič-Raščan, M. Pharm.

**Academic Assembly**

**Chair:** Prof. Dr. Marija Sollner Dolenc, M. Pharm.

**Managing Board**

**Chair:** Prof. Dr. Matjaž Jeras, M. Pharm.

**Student Council**

**Chair:** Damijana Roškarič

## TAJNIŠTVO

### Tajnica fakultete

Katja Višnjevec Vahčič, univ. dipl. prav.

### Tajnica vodstva

Lidija Matajia, dipl. ekon.

### Finančno-računovodska služba

Marko Ocvirk, univ. dipl. ekon., vodja službe

### Kadrovska služba

Zdenka Gantar, viš. upr. del., vodja službe

### Študentski referat

Tanja Kadunc, dipl. org. tur., vodja referata

### Raziskovalni referat

Mateja Terčič, univ. dipl. soc., vodja referata

### Knjižnica

Borut Toth, prof. fil. in sociol., vodja knjižnice

### Služba za informatiko

Tanja Gregorič, univ. dipl. org. inf., vodja službe

### Športna vzgoja

pred. Dušan Videmšek, prof. športne vzgoje

## FACULTY SECRETARIAT

### Faculty Secretary

Katja Višnjevec Vahčič, LLB

### Head Secretary

Lidija Matajia, BS Econ.

### Office for Finance and Accounting

Head: Marko Ocvirk, BS Econ.

### Human Resources

Head: Zdenka Gantar, Snr. Admin. Work.

### Student Administration

Head: Tanja Kadunc, BSc (Tourism)

### Research Administration

Head: Mateja Terčič

### Library

Head: Borut Toth, Prof. Phil. and Soc.

### IT Office

Head: Tanja Gregorič, BSc (Organisational Informatics)

### Physical Education

Dušan Videmšek, Sport Education Professor

## KOMISIJE SENATA UL FFA

### Komisija za študijsko področje

*predsednik: prof. dr. Marko Anderluh, mag. farm.*

### Komisija za doktorski študij

*predsednik do 30. 9. 2021:*

*izr. prof. dr. Rok Dreu, mag. farm.*

*predsednica od 1. 10. 2021:*

*prof. dr. Lucija Peterlin Mašič, mag. farm.*

### Komisija za raziskovalno in razvojno delo

*predsednik: izr. prof. dr. Rok Dreu, mag. farm.*

### Habilitacijska komisija

*predsednica: prof. dr. Marija Bogataj, mag. farm.*

### Komisija za priznanja in nagrade

*predsednik do 30. 9. 2021:*

*prof. dr. Odon Planinšek, mag. farm.*

*predsednica od 1. 10. 2021:*

*prof. dr. Marija Sollner Dolenc, mag. farm.*

### Komisija za priznavanje tujih izobrazb

*predsednik: prof. dr. Marko Anderluh, mag. farm.*

### Komisija za kakovost in akreditacijo

*predsednik do 30. 9. 2021:*

*izr. prof. dr. Bojan Doljak, mag. farm.*

*predsednik od 1. 10. 2021:*

*izr. prof. dr. Janez Mravljak, mag. farm.*

### Komisija za strokovna vprašanja

*predsednica do 30. 9. 2021:*

*prof. dr. Mirjana Gašperlin, mag. farm.*

*predsednica od 1. 10. 2021:*

*izr. prof. dr. Mojca Kerec Kos, mag. farm.*

### Komisija za internacionalizacijo

*predsednica: izr. prof. dr. Mojca Lunder, mag. farm.*

### Komisija fakultete za etična vprašanja

*predsednica do 30. 9. 2021:*

*doc. dr. Alenka Šmid, mag. farm.*

*predsednik od 1. 10. 2021:*

*izr. prof. dr. Simon Žakelj, mag. farm.*

## SENATE COMMITTEES

### Study Affairs Committee

*Chair: Prof. Dr. Marko Anderluh, M. Pharm.*

### Doctoral Study Committee

*Chair until 30 September 2021:*

*Assoc. Prof. Dr. Rok Dreu, M. Pharm.*

*Chair from 1 October 2021:*

*Prof. Dr. Lucija Peterlin Mašič, M. Pharm.*

### Research and Development Committee

*Chair: Assoc. Prof. Dr. Rok Dreu, M. Pharm.*

### Habilitation Committee

*Chair: Prof. Dr. Marija Bogataj, M. Pharm.*

### Awards and Decorations Committee

*Chair until 30 September 2021:*

*Prof. Dr. Odon Planinšek, M. Pharm.*

*Chair from 1 October 2021:*

*Prof. Dr. Marija Sollner Dolenc, M. Pharm.*

### Recognition of Foreign Education Committee

*Chair: Prof. Dr. Marko Anderluh, M. Pharm.*

### Assurance and Accreditation Committee

*Chair until 30 September 2021:*

*Assoc. Prof. Dr. Bojan Doljak, M. Pharm.*

*Chair from 1 October 2021:*

*Assoc. Prof. Dr. Janez Mravljak, M. Pharm.*

### Professional Issues Committee

*Chair until 30 September 2021:*

*Prof. Dr. Mirjana Gašperlin, M. Pharm.*

*Chair from 1 October 2021:*

*Assoc. Prof. Dr. Mojca Kerec Kos, M. Pharm.*

### Internationalization Committee

*Chair: Assoc. Prof. Dr. Mojca Lunder, M. Pharm.*

### Ethical Issues Committee

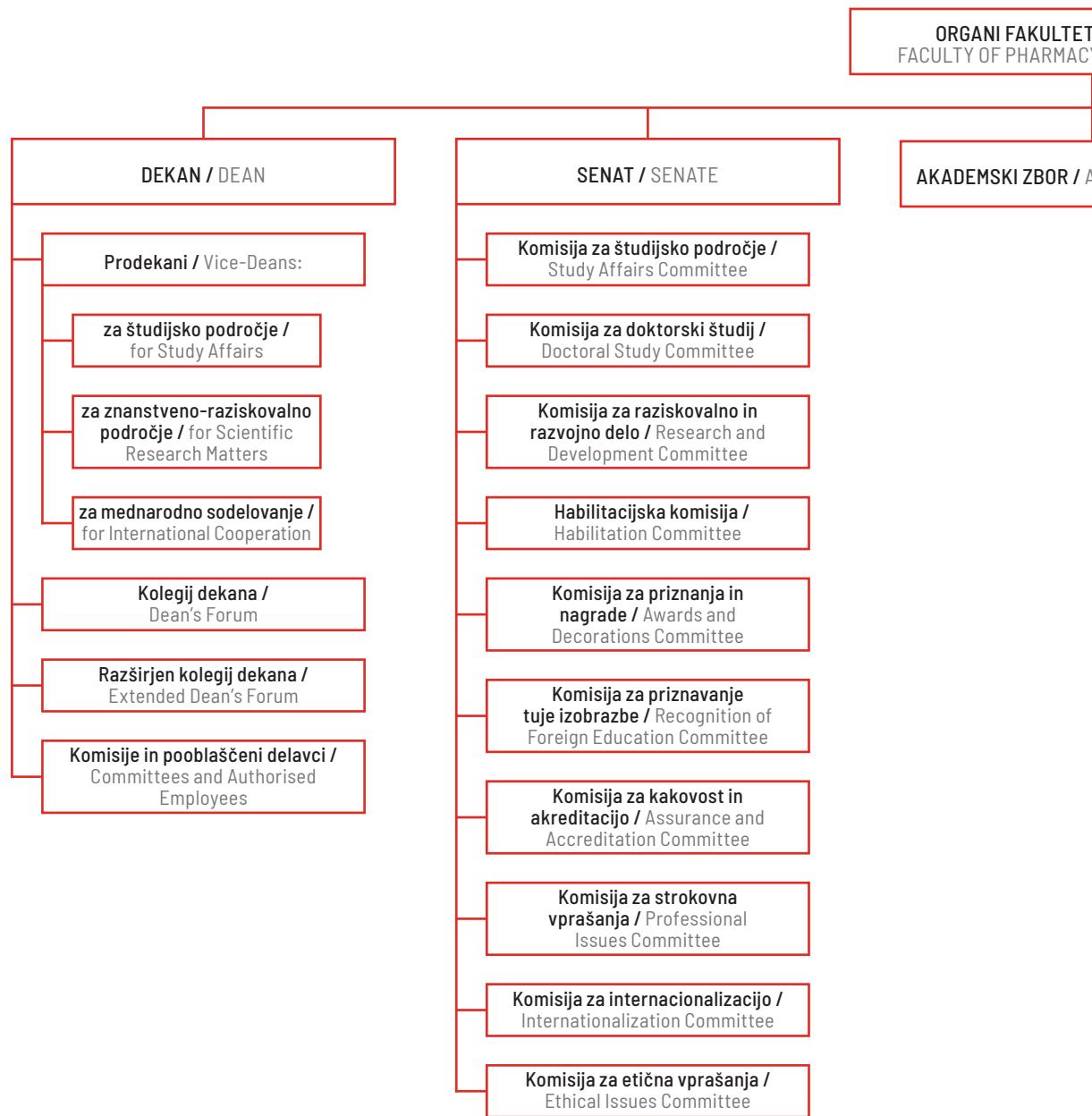
*Chair until 30 September 2021:*

*Assist. Prof. Dr. Alenka Šmid, M. Pharm.*

*Chair from 1 October 2021:*

*Assoc. Prof. Dr. Simon Žakelj, M. Pharm.*

## ORGANI UL FFA / GOVERNING BODIES OF THE FACULTY OF PHARMACY



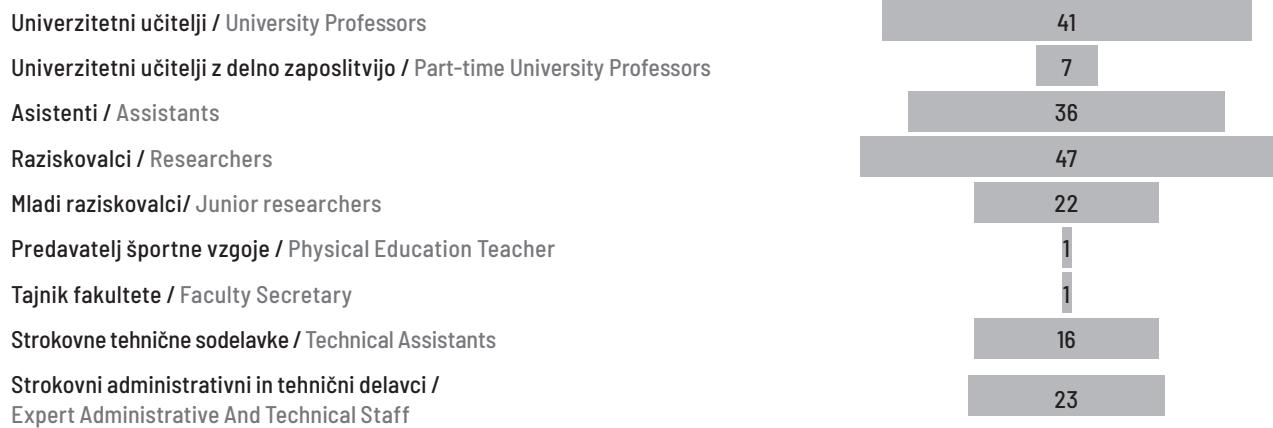
E ZA FARMACIJO /  
Y'S GOVERNING BODIES

ACADEMIC ASSEMBLY

UPRAVNI ODBOR / MANAGING BOARD

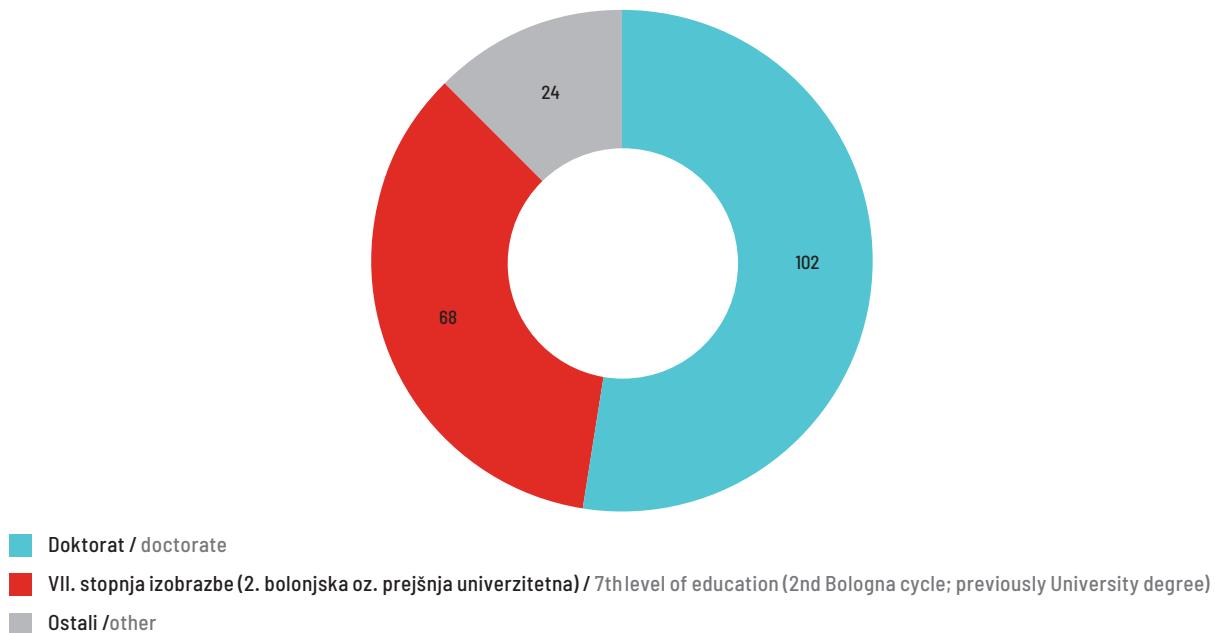
ŠTUDENTSKI SVET / STUDENT COUNCIL

## ZAPOSLENI NA FAKULTETI ZA FARMACIJO / FACULTY OF PHARMACY'S EMPLOYEES



Gradimo pripadnost / Team building event

**IZOBRAZBENA STRUKTURA ZAPOSLENIH NA UL FFA /  
EDUCATION STRUCTURE OF THE EMPLOYEES AT THE FACULTY OF PHARMACY**



## KATEDRA ZA KLINIČNO BIOKEMIJO DEPARTMENT OF CLINICAL BIOCHEMISTRY

### Člani katedre v letu 2021 / Members of the Department in 2021

#### Predstojnika katedre / Heads of the Department:

izr. prof. dr. Nataša Karas Kuželički (januar-junij / January-June)

prof. dr. Borut Božič (julij-december / July-December)

- prof. dr. Darko Černe, prof. dr. Matjaž Jeras, prof. dr. Janja Marc, prof. dr. Irena Mlinarič-Raščan, prof. dr. Joško Osredkar
- izr. prof. dr. Barbara Ostanek
- doc. dr. Mojca Božič Mijovski, doc. dr. Martina Gobec, doc. dr. Marija Nika Lovšin, doc. dr. Helena Podgornik, doc. dr. Alenka Šmid, doc. dr. Janja Zupan
- asist. dr. Klemen Čamernik, asist. – raz. dr. Nina Franko, zn. sod. dr. Jasna Lojk, asist. dr. Tijana Markovič, asist. dr. Jasna Omersel, asist. dr. Irena Prodan Žitnik, asist. dr. Dunja Urbančič, asist. Damjan Avsec, Manja Cedilnik, Petra Ferkov, asist. Sanja Nabergoj, Majda Sirnik, Lara Smrdel, asist. Lucija Ana Vrščaj, asist. Taja Zore

Sodelavci Katedre za klinično biokemijo (KKB) smo pedagoško, raziskovalno in strokovno aktivni na področju laboratorijske medicine. Vede, ki se ukvarja s preiskavami bioloških vzorcev za ugotavljanje zdravstvenega stanja preiskovancev in obsega tudi raziskave nastanka bolezni, njenega poteka z odzivom na terapijo ter svetovanje o naboru preiskav in oblikovanje diagnostičnih algoritmov. Zato je pomembna povezanost s stroko, kar izkazujemo npr. z delom v Razširjenem strokovnem kolegiju za laboratorijsko diagnostiko – medicinsko biokemijo, Zbornici laboratorijske medicine Slovenije in Slovenskem združenju za klinično kemijo in laboratorijsko medicino. Dobra prenosljivost raziskovalnih rezultatov v prakso se kaže skozi Laboratorij za molekularno diagnostiko (več v nadaljevanju) in s sodelovanjem z zdravstvenimi zavodi in drugimi inštitucijami po Sloveniji. Smo skrbniki in izvajalci prvo- in drugostopenjskih programov Laboratorijska biomedicina ter znanstvenega področja Klinična biokemija in laboratorijska biomedicina na doktorskem študiju Biomedicine, sodelujemo tudi pri izvedbi študijskih programov Farmacija in Kozmetologija. V raziskovalnem delu iščemo diagnostične kazalce kompleksnih bolezni (osteoporoze, osteoartrose, sarkopenije, metabolnega sindroma, kronične limfocitne levkemije, prijene srčne napake, orofacialne shize, ateroskleroze, avtoimunskih bolezni). Pri tem razvijamo pristope bolniku prilagojene laboratorijske medicine, osnovane na farmakogenomiki, nutrigenomiki, spremljanju ravni zdravil, celičnem zdravljenju in bioetiki. KKB je začetnica farmakogenomike na UL FFA ter raziskav z matičnimi celicami za namene regenerativne medicine zdravljenja sklepov.

Laboratorij za molekularno diagnostiko (LMD-KKB) je medicinski laboratorij z dovoljenjem Ministrstva za zdravje. V njem opravljamo preiskave, namenjene diferencialni laboratorijski diagnostiki kot podpora personalizirani medicini na področju nekaterih kroničnih in vrojenih metabolnih motenj.

At the Department of Clinical Biochemistry, we are pedagogical, research-oriented and professionally active in the field of laboratory medicine – the science that deals with the examination of biological samples to determine the health status of a person. It also includes research of pathogenesis, disease course, response to therapy and consulting about sets of tests or design of diagnostic algorithms. This is why it is important for us to be connected with the profession, as demonstrated namely by our work in Extended Expert College for Laboratory Diagnostics–Clinical Biochemistry, the Slovenian Chamber of Laboratory Medicine and the Slovenian Association for Clinical Chemistry and Laboratory Medicine. Good transferability of research results into practice is demonstrated through the Laboratory for Molecular Diagnostics (more below) and through collaboration with health care institutions and other institutions across Slovenia. We are coordinators and pedagogues of the first- and second cycle programmes in Laboratory Biomedicine and the scientific field of Clinical Biochemistry and Laboratory Medicine in the PhD Biomedicine programme, and we are also involved in the Pharmacy and Cosmetology study programmes. In our research we are looking for diagnostic indicators of complex disease (osteoporosis, osteoarthritis, sarcopenia, metabolic syndrome, chronic lymphocytic leukemia, congenital heart disease, orofacial clefts, atherosclerosis, autoimmune diseases). We are developing patient-centred/personalized laboratory medicine, based on pharmacogenomics, nutrigenomics, therapeutic drug monitoring, cell therapy and bioethics. KKB pioneered pharmacogenomics at UL FFA and stem cell research for regenerative medicine in joint healing.

The Laboratory for Molecular Diagnostic (LMD-KKB) is medical laboratory, licensed by Ministry of Health. In the laboratory we perform tests for differential diagnosis and personalized medicine in selected chronic and inborn metabolic diseases.

## KLJUČNI DOSEŽKI V LETU 2021

### Najodličnejsi raziskovalni dosežek Univerze v Ljubljani

Raziskovalno delo »Novo napredno celično zdravilo za imunsko terapijo raka prostate« je bilo izbrano za enega od najodličnejših raziskovalnih dosežkov Univerze v Ljubljani v letu 2021. Prestižno priznanje je prejel prof. dr. Matjaž Jeras s soavtorji.

### Najboljša inovacija Univerze v Ljubljani

Nagrado za najboljšo inovacijo v kategoriji študentke in študenti ter alumne in alumni je prejel projekt »Pufer za izvedbo PCR testov SARS-CoV-2 na vzorcu sline« raziskovalcev skupine prof. dr. Irene Mlinarič-Raščan (doc. dr. Alenka Šmid, asist. dr. Dunja Urbančič) v sodelovanju z raziskovalci Kemijskega inštituta in Nacionalnega inštituta za biologijo. K izvedbi projekta je pripomoglo več ustanov, vključno z NMP ZD Jesenice in NLZOJ Ljubljana. Inovacija omogoča učinkovito orodje za neinvazivno detekcijo virusov pri morebitnih epidemijah v prihodnosti.

### Priznanje jabolko navdiha

Predsednik Republike Slovenije Borut Pahor je podelil priznanje jabolko navdiha skupini znanstvenic, ki so pod imenom Science Mamas' Vaccine Forum na družbenih omrežjih ozaveščale javnost o pomenu cepljenja in moči znanosti: izr. prof. dr. Nataša Karas Kuželički, asist. dr. Tijana Markovič, asist. dr. Jasna Omersel, doc. dr. Martina Gobec, asist. Lucija Ana Vrščaj (vse s KKB) in dr. Simona Jurkovič Mlakar (nekdanja članica KKB).

### Objava v reviji z visokim faktorjem vpliva

Prof. dr. Matjaž Jeras je dopisni avtor za imunološki del študije, objavljene v Clinical Translational Medicine 2021 Aug; 11(8): e505 (IF = 11,492), katere avtorji so še raziskovalci K0 za urologijo in Oddelka za nuklearno medicino UKC Ljubljana, družbe Celica, Biomedicinski center, d. o. o., štirih inštitutov UL Medicinske fakultete in Zavoda Republike Slovenije za Transfuzijsko medicino. Izsledki randomizirane, dvojno slepe, s placebom nadzorovane navzkrižne klinične študije faze I/II kažejo podaljšano preživetje bolnikov z na kastracijo odpornim rakom prostate, ki so prejemali cepivo v obliki imunohibridomov, izdelanih iz avtolognih dendritičnih in tumorskih celic.

## KEY ACHIEVEMENTS IN 2021

### Most outstanding research achievement of the UL

The research work "New advanced cellular drug for immune therapy of prostate cancer" has been selected as one of the most outstanding research achievements of the UL in 2021. The prestigious award went to Prof. Dr. Matjaž Jeras and co-authors.

### Best innovation of the UL

The award for the best innovation in the category of students and alumni was given to the project "Buffer for performing PCR tests for SARS-CoV-2 on saliva samples" by the research group of Prof. Dr Irena Mlinarič-Raščan (Assoc. Prof. Dr. Alenka Šmid, Assist. Dr. Dunja Urbančič) in collaboration with researchers from the Institute of Chemistry and the National institute for Biology. Several institutions contributed to the implementation of the project, including the NMP Jesenice and NLZOJ Ljubljana.

### Apple of Inspiration Award

President of the Republic of Slovenia, Mr. Borut Pahor, awarded the "Apple of Inspiration" prize to a group of women scientists who, under the name Science Mamas' Vaccine Forum, have raised public awareness of the importance of vaccination and the power of science through social media: Assistant Prof. Dr. Nataša Karas Kuželički, Assistant Dr. Tijana Markovič, Assistant Dr. Jasna Omersel, Associate Professor Martina Gobec, Lucija Ana Vrščaj (all with KKB) and Simona Jurkovič Mlakar (former KKB member).

### Publication in a journal with a high impact factor.

Prof. Dr. Matjaž Jeras is a corresponding author for the immunological part of the study published in Clinical Translational Medicine 2021 Aug;11(8):e505)(IF=11,492), which was co-authored by researchers from the Department of Urology and the Department of Nuclear Medicine, UKC Ljubljana, Celica, Biomedical Centre, d. o. o. , four institutes of the UL Faculty of Medicine, and the Institute of Transfusion Medicine of the Republic of Slovenia. Results from a randomized, double-blind, placebo-controlled, phase I/II crossover clinical study show prolonged survival in patients with castration-resistant prostate cancer who received a vaccine in the form of immune-hybrids made from autologous dendritic and tumor cells.

## KATEDRA ZA FARMACEVTSKO BIOLOGIJO DEPARTMENT OF PHARMACEUTICAL BIOLOGY

Predstojnik katedre / Head of the Department:  
izr. prof. dr. Tomaž Bratkovič

### Člani katedre v letu 2021 / Members of the Department in 2021

- prof. dr. Janko Kos, prof. dr. Samo Kreft, prof. dr. Borut Štrukelj
- izr. prof. dr. Bojan Doljak, izr. prof. dr. Nina Kočevar Glavač, izr. prof. dr. Mojca Lunder
- doc. dr. Eva Tavčar Benković, doc. dr. Urša Pečar Fonović, doc. dr. Anja Pišlar
- Lara Bolčina, dr. Krištof Bozovičar, dr. Meta Kokalj Ladan, Irena Klančnik Mavec, Mateja Matjaž, Selena Pavšič, dr. Tina Vida Plavec, Nina Poljšak , dr. Matjaž Ravnikar, Katja Schoss

Na Katedri za Farmacevtsko biologijo se v okviru pedagoškega in raziskovalnega dela ukvarjamo z aktualnimi in sodobnimi temami, kot so protitumorni imunski odziv, nastanek in razvoj nevrodegenerativnih bolezni, imunoterapija s peptidnimi mimetiki alergenov, kanabinoidi, spojine rastlinskega izvora z antiholinergičnim učinkom, vloga maščobnih olj pri celjenju ran idr. V letu 2021 je bila raziskovalno aktualna tudi tematika COVID-19.

Pedagoški proces izvajamo na vseh študijskih programih UL FFA, tematike pa vključujejo celično biologijo, genetiko in genska zdravila, biotehnologijo v farmaciji in kozmetologiji, biokemijo in bolj podrobno biokemijo nastanka in napredovanja raka, proteomiko, zdravila iz zdravilnih rastlin, prehranska dopolnila, zdravila v alternativni medicini, kozmetične sestavine naravnega izvora, razvoj in vpeljava diagnostičnih metod ter načrtovanje in zagotavljanje kakovosti v medicinskih laboratorijih.

Sodelavci Katedre za farmacevtsko biologijo smo sodelovali v številnih intervjujih in oddajah, kjer smo podajali strokovne in znanstvene odgovore na temo COVID-19. Sodelovali smo v Skupini za obveščanje strokovne in laične javnosti o cepivih in zdravilih v pandemiji COVID-19 v sklopu UL FFA in Delovni skupini za pripravo predloga o preskrbi s cepivi za preprečevanje širjenja okužb z virusom SARS-CoV-2 ter zdravljenja COVID-19 pri Ministrstvu za zdravje.

As part of our teaching and research work at the Department of Pharmaceutical Biology, we deal with up-to-date and contemporary topics such as the antitumor immune response, the origin and development of neurodegenerative diseases, immunotherapy with peptide mimetics of allergens, cannabinoids, plant derived compounds with anticholinergic effect, the role of vegetable oils in wound healing, etc. The research on COVID-19, that started the previous year was continued in 2021 as well.

The teaching process is carried out throughout all existing UL FFA study programs. More general subjects include cell biology, genetics and gene therapy, pharmaceutical biotechnology, biotechnology in cosmetology and biochemistry. The more particular subjects include biochemistry of cancer, proteomics, herbal medicines, dietary supplements, drugs in alternative medicine, cosmetic ingredients of natural origin, development and implementation of diagnostic methods and design and quality assurance in medical laboratories.

Employees of the Department of Pharmaceutical Biology participated in numerous interviews and broadcasts, where we provided professional and scientific answers on the topic of COVID-19. We participated in the Group for informing the professional and lay public about vaccines and medicines in the COVID-19 pandemic within the UL FFA and the Working Group for the preparation of the proposal on the supply of vaccines for prevention of SARS-CoV-2 spread and COVID-19 treatment within the Ministry of Health.

## KLJUČNI DOSEŽKI V LETU 2021

V bazi podatkov COBISS je za leto 2021 vnesenih 152 bibliografskih enot, katerih avtorjev je 15 sodelavcev katedre. Od tega je 19 izvirnih znanstvenih člankov, 15 preglednih znanstvenih člankov in 3 patentne prijave na Ameriški in Evropski patentni urad.

Slovensko biokemijsko društvo, katerega predsednik je bil v letu 2021 prof. dr. Janko Kos, je organiziralo 45. kongres Evropske zveze biokemijskih društev (FEBS) v sodelovanju s Hrvaškim biokemijskim društvom. Kongresa se je udeležilo preko 1700 udeležencev z vsega sveta, med katerimi je bilo več kot 160 predavateljev s področij biokemije in molekulske biologije ter sorodnih ved. Med predavatelji sta bila tudi Nobelova nagrajenca prof. dr. Richard Roberts, pionir tehnologije rekombinantne DNK, in dr. Emmanuelle Charpentier, odkriteljica tehnologije CRISPR-Cas.

Prof. dr. Borut Štrukelj je prejel priznanje »Prometec znanosti za odličnost v komuniciranju«, ki ga podeljuje Slovenska znanstvena fundacija. Prof. Štrukelj je izjemno predan obveščanju strokovne javnosti (farmacevtov v lekarnah, bolnišnicah in drugje) ter osveščanju laične javnosti (po različnih medijih) o stanju v razvoju cepiv in zdravil, o rezultatih testiranj zdravil ter o sredstvih za preventivo pri okužbi. Medijska analiza pojavnosti UL in njenih članic za prvo polletje 2021 je po medijski pozornosti v referenčnem seznamu tiskanih, spletnih in elektronskih medijev postavila UL FFA na četrto mesto, po številu naklonjenih objav pa na drugo mesto. Najpomembnejši dejavnik, ki je k temu prispeval, so bili intervjuji o cepivih in delta različici novega koronavirusa, ki jih je med drugimi imel prav prof. Štrukelj.

V Tednu Univerze v Ljubljani je za spremljanje in obveščanje o novostih na področju terapije COVID-19 ter razvoja protivirusnih zdravil SARS-CoV-2 prejela zlato plaketo UL skupina, katere člani so tudi sodelavci Katedre za farmacevtsko biologijo: prof. dr. Borut Štrukelj, izr. prof. dr. Tomaž Bratkovič in izr. prof. dr. Mojca Lunder.

Krištof Bozovičar je zagovarjal doktorsko disertacijo z naslovom Načrtovanje in karakterizacija peptidnih ligandov za vezavo regije Fc imunoglobulinov (mentor: izr. prof. dr. Tomaž Bratkovič).

Karsten Fatur je zagovarjal doktorsko disertacijo z naslovom Ethnobotanical investigations on anticholinergic Solanaceae plants in Europe (mentor prof. dr. Samo Kreft).

## KEY ACHIEVEMENTS IN 2021

In the COBISS database for 2021 there are 152 bibliographical units from 15 employees of the Department. Out of these, 19 are original scientific articles, 15 are scientific review articles and three are US and European patent applications.

The Slovenian Biochemical Society, whose president in 2021 was Prof. Dr. Janko Kos, organized the 45th Congress of the European Federation of Biochemical Societies (FEBS) in cooperation with the Croatian Biochemical Society. The congress was attended by over 1,700 participants from around the world, including more than 160 lecturers in the fields of biochemistry and molecular biology and related sciences. Among the lecturers there were also Nobel laureates Prof. Dr. Richard Roberts, a pioneer of recombinant DNA technology, and Dr. Emmanuelle Charpentier, who discovered the CRISPR-Cas technology.

Prof. Dr. Borut Štrukelj received the "Prometheus of Science for Excellence in Communication" award from the Slovenian Science Foundation. Prof. Štrukelj is extremely committed to informing the professional public (pharmacists in pharmacies, hospitals and elsewhere) and raising awareness among the general public (through various media) about the state of development of vaccines and medicines, the results of drug testing and means to prevent infection. The media analysis of the incidence of UL and its members for the first half of 2021 positioned the UL FFA as fourth in the reference list of print, online and electronic media, and second in the number of favoured publications.

During the Week of the University of Ljubljana, the group, whose members were also employees of the Department of Pharmaceutical Biology Dr. Borut Štrukelj, Assoc. Prof. Dr. Tomaž Bratkovič and Assoc. Prof. Dr. Mojca Lunder received The Golden Plaque of University of Ljubljana for monitoring and informing about novelties in the field of COVID-19 therapy and development of SARS-CoV-2 antiviral drugs.

Krištof Bozovičar, defended his doctoral dissertation entitled Design and characterization of peptide ligands for binding of the Fc region of immunoglobulins (mentor: Assoc. Prof. Dr. Tomaž Bratkovič)

Karsten Fatur defended his doctoral dissertation entitled Ethnobotanical investigations on anticholinergic Solanaceae plants in Europe (mentor Prof. Dr. Samo Kreft).

## KATEDRA ZA FARMACEVTSKO KEMIJO DEPARTMENT OF PHARMACEUTICAL CHEMISTRY

**Predstojnik katedre / Head of the Department:**  
**prof. dr. Stanislav Gobec**

### Člani katedre v letu 2021 / Members of the Department in 2021

- prof. dr. Marko Anderluh, prof. dr. Zdenko Časar, prof. dr. Janez Ilaš, prof. dr. Danijel Kikelj, prof. dr. Aleš Obreza, prof. dr. Lucija Peterlin Mašič, prof. dr. Marija Sollner Dolenc, prof. dr. Uroš Urleb, prof. dr. Anamarija Zega
- izr. prof. dr. Ziga Jakopin, izr. prof. dr. Janez Mravljak, izr. prof. dr. Matej Sova, izr. prof. dr. Tihomir Tomašič, izr. prof. dr. Nace Zidar
- asist. – raz. dr. Aljoša Bolje, asist. Aleša Bricelj, Sandra Cetin, doc. dr. Andrej Emanuel Cotman, asist. Jaka Dernovšek, asist. dr. Ana Dolšak, asist. Martina Durcik, Svit Ferjančič Benetik, doc. dr. Rok Frilan, asist. Katarina Grabrijan, Špela Gubič, asist. Samo Guzelj, doc. dr. Martina Hrast, asist. dr. Maša Kenda, Veronika Klančič, doc. dr. Damijan Knez, Anja Kodila, asist. dr. Urban Košak, asist. – raz. dr. Alen Krajnc, asist. – raz. dr. Eva Krajnc, Maria Elena Loi, asist. Anže Meden, asist. – raz. dr. Štefan Možina, dr. Doroteja Novak, doc. dr. Stane Pajk, Katja Perc, Martina Piga, asist. Matic Proj, Edvin Purić, doc. dr. Izidor Sosič, asist. Maša Sterle, asist. Nika Strašek, asist. Andrej Šterman, Martina Tekavec, asist. dr. Žan Toplak, Sjors Van Klaveren, asist. Matjaž Weiss, Živa Zajec, Damijana Zalar, Maša Zorman

Na Katedri za farmacevtsko kemijo organiziramo in opravljamo pedagoško, znanstvenoraziskovalno in strokovno delo na širšem področju farmacevtske kemije, farmacevtske analize, toksikologije in zgodovine farmacije. Izvajamo raziskave načrtovanja, sinteze in biološkega vrednotenja spojin in razvoj novih molekulskeih orodij za proučevanje interakcij z biološkimi makromolekulami. Glavni raziskovalni poudarki so na razvoju novih učinkovin za naslednje tarče: encimi, ki so udeleženi v sintezi bakterijske stene, encimi, udeleženi v biosintezi mikolnih kislin mikobakterij, encimi, ki so pomembni pri nastanku nevrodgenerativnih obolenj, encimi, ki so pomembni pri razmnoževalnem ciklu SARS-CoV-2 virusa, natrijevi in kalijevi kanali, proteini toplotnega šoka (Hsp90), Toll-u podobni receptorji (TLR), NOD receptorji, lektini (galektini, Siglec, DC-SIGN in FimH), encimi, vpleteni v posttranslacijske modifikacije (OGT: O-beta-N-acetylglukozaminil transferaza), imunoproteasom in tarče v procesu koagulacije krvi. Razvijamo nove sintezne poti, nove separacijske in analizne metode za karakterizacijo spojin, nove metode za biološko karakterizacijo sintetiziranih spojin, nove antioksidante, nove radiofarmake, nove stabilne nitroksidne ter fluorescenčne označevalce. Glavnina raziskav na katedri poteka v okviru programske skupine Farmacevtskakemija: načrtovanje, sintezainvrednotenje učinkovin (2015–2021), del pa v povezavi UL FKKT, UL MF, UL VF, Kemijskim inštitutom in Institutom Jožef Stefan ter v okviru domačih in mednarodnih projektov. Nezanemarljiv del raziskovalne dejavnosti Katedre za farmacevtsko kemijo poteka tudi v sodelovanju s farmacevtsko industrijo, predvsem Lekom in Krko.

At the Department of Pharmaceutical Chemistry, we organise and perform pedagogical, research-oriented and professional work in the fields of pharmaceutical chemistry, pharmaceutical analysis, toxicology and the history of pharmacy. We conduct research on the design, synthesis and biological evaluation of compounds and the development of new molecular tools to study interactions with biological macromolecules. The main research focus is on the development of new active ingredients for the following targets: enzymes involved in bacterial wall synthesis, enzymes involved in mycobacterial mycolic acid biosynthesis, enzymes important in the development of neurodegenerative diseases, enzymes important in the reproduction cycle of SARS-CoV-2 virus, sodium and potassium channels, heat shock proteins (Hsp90), Toll-like receptors (TLRs), NOD receptors, lectins (galectins, Siglec, DC-SIGN and FimH), enzymes involved in posttranslational modifications (OGT: O-beta-N-Acetylglucosaminyl Transferase), immunoproteasome and targets involved in blood coagulation process. We are developing new synthetic routes, new separation and analytical methods for the characterization of compounds, new methods for the biological characterization of synthesized compounds, new antioxidants, new radiopharmaceuticals, new stable nitroxide and fluorescent markers. The majority of research at the department takes place within the programme group Pharmaceutical chemistry: design, synthesis and evaluation of active ingredients (2015–2020), and part in collaboration with the UL FKKT, UL MF, UL VF, Institute of Chemistry and Jožef Stefan Institute and within national and international projects. Significant part of the research at the Department of Pharmaceutical Chemistry is done in collaboration with pharmaceutical companies, especially with Lek and Krka.

## KLJUČNI DOSEŽKI V LETU 2021

V letu 2021 smo objavili več kot 100 izvirnih in preglednih znanstvenoraziskovalnih člankov, med katerimi jih je 40 % v revijah prvega kvartila, nekateri tudi v skupini zgornjih 5 % revij na različnih področjih. Posebno izstopa objava v prestižni reviji *Nature Communications* o novih zaviralcih DNA giraze, pri čemer so hkrati prvič dokazali simetrične halogenske vezi v biološkem sistemu. Iztopata še objava longitudinalne študije novega BChE PET sledilca kot zgodnjega in vivo biološkega označevalca v mišjem modelu Alzheimerjeve bolezni v reviji *Theranostics* in objava o zaviralcih ionskega kanala hEAG1 s protitumornim delovanjem v reviji *Cancers*. Na področju toksikologije omenjamo odlično objavo o in silico evaluaciji endokrone aktivnosti biocidnih spojin v reviji *Chemosphere*. Poleg tega smo predstavili številne novoodkrite bioaktivne molekule, ki zavirajo bakterijske encime, npr. topozomeraze protimikrobne učinkovine z delovanjem na dve tarči, zaviralce O-GlcNAc transferaze, monoamin oksidaz in številnih drugih tarč.

Na katedri smo v letu 2021 uspešno prijavljali projekte, člani katedre so pridobili tri nove projekte. Dva sta iz naslova načrtovanja in sinteze novih učinkovin, natančneje novih protibakterijskih učinkovin za zdravljenje smrtonosnih okužb, ki jih povzročajo večkrat odporni bakterijski sevi. Tretji projekt pa s področja odstranjevanja trdovratnih bakterijskih biofilmov z baktericidnimi nanorezili. Poleg tega sta bila na razpisu Inovacijskega sklada UL za dodelitev sredstev izbrana dva predloga s Katedre za farmacevtsko kemijo. Prvi za razvoj nove širokospektralne protibakterijske učinkovine in drugi za razvoj zdravil za zdravljenje kognitivnih motenj pri psih.

Med odmevnnejšimi nagradami je prof. dr. Stanislav Gobec prejel Zoisovo nagrado za izjemne dosežke na področju osnovnih in uporabnih raziskav v farmaciji, prof. dr. Marko Anderluh pa Zoisovo priznanje. Prof. dr. Marko Anderluh in doc. dr. Martina Hrast sta del skupine, ki je prejela priznanje za najodličnejši raziskovalni dosežek Univerze v Ljubljani v letu 2021 za nove molekule z zavirальнim delovanjem na superodporne bakterije, ki predstavljajo veliko grožnjo javnemu zdravju. V medijih smo pomembno prispevali k promociji UL FFA, zlasti z aktivnim sodelovanjem pri Evropski federaciji za farmacevtsko kemijo in kemijsko biologijo EFMC, sodelovanju pri SFD, intervjuji in nastopi v dokumentarnih oddajah.

## KEY ACHIEVEMENTS IN 2021

In 2021 we published more than 100 original and review scientific articles, of which about 40 % were in first-quarter journals, some also in the group of the top 5 % of journals in various fields. Of particular note is the publication in the prestigious journal *Nature Communications* of new DNA gyrase inhibitors, that for the first-time also provides proof of symmetrical halogen bonds in the biological system. The publication of a longitudinal study of a new BChE PET tracker is also notable as an early *in vivo* biological marker in a mouse model of Alzheimer's disease in journal *Theranostics*, including the publication of hEAG1 ion channel blockers with antitumor activity in journal *Cancers*. In the field of toxicology, there was an excellent publication on the *in silico* evaluation of the endocrine activity of biocidal compounds in the journal *Chemosphere*. Additionally, the members of Department of pharmaceutical chemistry published papers on a number of newly discovered bioactive molecules that inhibit bacterial enzymes, e.g. topoisomerases, dual antimicrobial agents, O-GlcNAc transferase inhibitors, monoamine oxidase inhibitors etc.

In 2021 we successfully applied for new projects with a total of three projects approved, two for the design and synthesis of new active ingredients, specifically new antibacterial agents for the treatment of deadly infections caused by multidrug-resistant bacterial strains. The third project was approved for bactericidal nanoblades for bimodal chemo-mechanical eradication of persistent biofilms. In addition, two proposals from the Department of Pharmaceutical Chemistry were approved by UL Innovation Fund. The first for the development of a new broad-spectrum antibacterial agent and the second for the development of drugs for the treatment of cognitive impairment in dogs.

Among the notable awards Prof. Dr. Stanislav Gobec received the Zois award for outstanding achievements in the field of basic and applied research in pharmacy and Prof. Dr. Marko Anderluh was awarded the Zois recognition award. Prof. Dr. Marko Anderluh and Assist. Dr. Martina Hrast were part of the group that received the award for the best research achievement of the UL in 2021, for new molecules with inhibitory action on super-resistant bacteria that pose a major threat to public health. In the media we have made an important contribution to the promotion of UL FFA, especially through active participation in the European Federation for Pharmaceutical Chemistry and Chemical Biology EFMC, participation in SFD, interviews and appearances in documentaries.

## KATEDRA ZA FARMACEVTSKO TEHNOLOGIJO DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY

**Predstojnica katedre / Head of the Department:**  
**prof. dr. Mirjana Gašperlin**

### Člani katedre v letu 2021 / Members of the Department in 2021

- prof. dr. Janez Kerč, prof. dr. Julijana Kristl, prof. dr. Odon Planinšek, prof. dr. Stanko Srčič, prof. dr. Franc Vrečer
- izr. prof. dr. Pegi Ahlin Grabnar, izr. prof. dr. Rok Dreu, izr. prof. dr. Ilija German Ilić, izr. prof. dr. Petra Kocbek, izr. prof. dr. Alenka Zvonar Pobirk
- doc. dr. Mirjam Gosenca Matjaž, doc. dr. Biljana Janković, doc. dr. Špela Zupančič
- Ana Baumgartner, dr. Maja Bjelošević, dr. Katarina Bolko Seljak, Črt Dragar, Valerija Garb, Blaž Grilc, Nina Katarina Grilc, Tatjana Hrovatič, Mojca Keržan, dr. Zoran Lavrič, asist. dr. Mitja Pohlen, Tanja Potrč, Mercedes Vitek, Anže Zidar, dr. Barbara Sterle Zorec

Na Katedri za farmacevtsko tehnologijo organiziramo in izvajamo pedagoški proces na vseh stopnjah študija ter koordiniramo tri študijske programe. Pedagoško, znanstvenoraziskovalno in strokovno pokrivamo področja farmacevtske tehnologije, nanotehnologije, industrijske farmacije, farmacevtskega inženirstva, fizikalne farmacije, farmacevtsko tehnološke analitike in kozmetologije.

Naš skupni raziskovalni cilj je razvoj in vrednotenje pacientom prijaznih zdravil. Usmerjeni smo tako v izdelavo klasičnih farmacevtskih oblik kot inovativnih dostavnih sistemov, uporabljamo moderne tehnologije, ki podpirajo izdelavo zdravil z vgrajeno kakovostjo. Uspešno sledimo sodobnim trendom tako z razvojem inovativnih nanodostavnih sistemov in formulacij za biofarmacevtike ter (nano)teranostikov kot z raziskavami že uveljavljenih farmacevtskih oblik s prirejenim sproščanjem tekoče kristalnih struktur, orodisperzibilnih in večenotnih farmacevtskih oblik ter z različnimi pristopoma izboljšanje topnosti učinkovin. Člani katedre smo eksperti na področju predformulacijskih študij in vrednotenja končnih formulacij ter naprednih (nano)dostavnih sistemov z najsodobnejšimi tehnološko analiznimi tehnikami, vključno z numeričnimi modeli za napovedovanje procesov in formulacij. Z našo ekspertizo uspešno iščemo rešitve in rešujemo pereče izzive farmacevtske industrije.

Katedra je vključena v programsko skupino *Farmacevtska tehnologija: od dostavnih sistemov učinkovin do terapijskih izidov zdravil pri otrocih in starostnikih* in različne mednarodne mreže (npr. CEEPUS, PSSRC, ORBIS, RISE). Ponosni smo na naše dolgoletno sodelovanje s farmacevtsko industrijo ter močno vpetost posameznih članov v aktivnosti stroke v domačem in mednarodnem okolju, kjer sodelujemo pri organizaciji simpozijev, smo člani številnih komisij in uredniških odborov, ocenjevalci doktorskih nalog na tujih univerzah, cenjeni recenzenti in drugo.

At the Department of Pharmaceutical Technology, we organize and perform study activities at all three levels and coordinate three study programmes. Our pedagogical, research-oriented, and professional work covers the fields of pharmaceutical technology, nanotechnology, industrial pharmacy, pharmaceutical engineering, physical pharmacy, pharmaceutical technological analytics, and cosmetology.

Our main research focus is development and evaluation of patient friendly medicines, based on both classical dosage forms and innovative delivery systems combined with implementation of modern technologies in manufacturing medicines with integrated quality. We successfully follow the contemporary trends in development of innovative nanodelivery systems, biopharmaceuticals and (nano)theranostics, as well as in liquid-crystalline systems, controlled release and solubility enhancing formulations, orally disintegrating and multiunit dosage forms. We are experts in preformulation and characterization of final dosage forms and novel delivery systems with the state-of-the-art analytical techniques, including reliable numerical models for the simulation of processes and formulations. We provide comprehensive and expertise-based solutions for the challenges encountered by industrial partners.

The Department is involved in research programme Pharmaceutical Technology: from delivery systems of ingredients to therapy outcomes of medicines in children and the elderly, and many international networks (e.g. CEEPUS, PSSRC, ORBIS, and RISE). We are proud of our long cooperation with pharmaceutical industry and strong professional activities on national and international level. As members we are included in many (inter)national committees and editorial boards, evaluators of doctoral dissertations at foreign universities, recognised reviewers and other.

## KLJUČNI DOSEŽKI V LETU 2021

Leto 2021 je bilo najuspešnejše leto v zgodovini katedre na področju nagrad, kar priča vrsta priznanj, ki so jih prejeli njeni člani za svoje delo.

Prof. dr. Julijana Kristl je dobitnica najvišjega državnega priznanja za dosežke na področju znanstvenoraziskovalnega dela, in sicer Zoisove nagrade za življensko delo. Nagrado je prejela za znanstvene dosežke na področju razvoja visokotehnološko zahtevnih nanodostavnih sistemov, ki omogočajo učinkovito zdravljenje različnih bolezni na popolnoma nov način. Doc. dr. Špeli Zupančič je bil podeljen zlati znak Jožefa Stefana za odmevnost doktorskega dela z naslovom *Razvoj dvoslojnih nanovlaken za inovativno zdravljenje parodontalne bolezni*, ki ga je izdelala pod mentorstvom prof. dr. Julijane Kristl. V Tednu univerze je svečano listino za mlade visokošolske učiteljice in učitelje za izjemne pedagoške in raziskovalne dosežke prejela doc. dr. Špela Zupančič, svečano listino za študentke in študente za najboljše študijske dosežke pa mlada raziskovalka Ana Baumgartner, ki je študij farmacije zaključila z izjemno visoko povprečno oceno izpitov in vaj 9,9. Prof. dr. Mirjana Gašperlin je prejela priznanje UL FFA za izjemne rezultate pri delu. Skupina članov katedre (izr. prof. dr. Rok Dreu, prof. dr. Mirjana Gašperlin, asist. dr. Zoran Lavrič in prof. dr. Stanko Srčič) pa je prejela priznanje Zvezde, ki ga farmacevtska družba Novartis vsako leto podeljuje izjemnim posameznikom in timom, ki so se s svojimi vrednotami in dosežki vpisali med najboljše.

Katedra je v letu 2021 aktivno pristopila k evropskemu projektu ORBIS (Open Research Biopharmaceutical Internships Support), katerega cilj je vzpostaviti mednarodno mrežo med akademskimi inštitucijami in industrijo ter tako izboljšati predklinični razvoj zdravil s poudarkom na tehnologijah in procesih. Projekt povezuje akademske ustanove in industrijo iz EU (Poljska, Irska, Finska, Nemčija, Češka in Slovenija), Ukrajine in ZDA.

Zelo pomemben je bil v letu 2021 tudi prispevek članov katedre pri organizaciji in izvedbi letnega simpozija SFD z naslovom *Zdravljenje bolezni kože*. Sodelovali smo v vlogi predavateljic (izr. prof. dr. Petr Kocbek, izr. prof. dr. Alenka Zvonar Pobirk, doc. dr. Mirjam Gosenca Matjaž), recenzentov strokovnih prispevkov in gostujoče urednice posebne številke Farmacevtskega vestnika (prof. dr. Mirjana Gašperlin).

## KEY ACHIEVEMENTS IN 2021

The year 2021 has been the most fruitful so far in terms of the awards received, as the members of the Department were granted with numerous awards and recognitions for their work.

Prof. Dr. Julijana Kristl was honoured with the most prestigious award of the Republic of Slovenia, the Zois Award for her work in scientific-research field, i.e. the Lifetime Achievement Award for the development of highly innovative and effective nanodelivery systems that support treatment in a completely new way. Assist. Prof. Dr. Špela Zupančič received the Jožef Stefan Golden Emblem Award for outstanding contributions made to science in doctoral dissertation entitled "The development of core-shell nanofibers for innovative periodontal disease treatment" performed under the supervision of Prof. Dr. Julijana Kristl. During the University of Ljubljana Week, a special Commendation for Young Higher Education Teachers and Staff was awarded to Assist. Prof. Dr. Špela Zupančič and a special Commendation for Students with the Best Academic Achievements was awarded to young researcher Ana Baumgartner, who completed her studies with an exceptionally high average grade of 9.9. Prof. Dr. Mirjana Gašperlin received a Faculty of Pharmacy Award for her outstanding achievements. The group from the department (Assoc. Prof. Dr. Rok Dreu, Prof. Dr. Mirjana Gašperlin, Assist. Dr. Zoran Lavrič and Prof. Dr. Stanko Srčič) were the recipients of the Star Award, which is awarded annually by the pharmaceutical company Novartis to outstanding individuals and teams.

In 2021 the Department joined the EU H2020 project ORBIS (Open Research Biopharmaceutical Internships Support), which aims to establish an international network of academic and industrial partners and thus accelerates the preclinical stage of medicines development with a special focus on processes and technologies. The project integrates multidisciplinary academic institutions and industry from the EU (Poland, Ireland, Finland, Germany, Czech Republic and Slovenia), EU associated country (Ukraine) and USA.

Important article of our Department in 2021 referred to the organization and realisation of the Slovenian Pharmaceutical Society symposium entitled Treatment of skin diseases. We were involved as conference speakers (Assoc. Prof. Dr. Petra Kocbek, Assoc. Prof. Dr. Alenka Zvonar Pobirk, Assist. Prof. Dr. Mirjam Gosenca Matjaž), as reviewers and as guest editor of the special issue of the gazette Farmacevtski vestnik (Prof. Dr. Mirjana Gašperlin).

## KATEDRA ZA BIOFARMACIJO IN FARMAKOKINETIKO DEPARTMENT OF BIOPHARMACEUTICS AND PHARMACOKINETICS

**Predstojnik katedre/ Head of the Department:**  
**prof. dr. Albin Kristl**

### Člani katedre v letu 2021 / Members of the Department in 2021

- prof. dr. Marija Bogataj, prof. dr. Iztok Grabnar, prof. dr. Robert Roškar
- izr. prof. dr. Mojca Kerec Kos, izr. prof. Tomaž Vovk, izr. prof. dr. Simon Žakej
- doc. dr. Tina Trdan Lušin, doc. dr. Jurij Trontelj, asist. dr. Žane Temova Rakuša
- Margareta Cof, Tjaša Felicijan, Andrej Grobin, Mihaela Kolarev, Nevenka Lilik, Nika Osel, Timeja Planinšek Parfant, Katarina Rede, Armando Tratenšek, Jurij Aguiar Zdovc

Na Katedri za biofarmacijo in farmakokinetiko raziskujemo procese, ki potekajo v človeškem telesu po aplikaciji zdravila. Te procese lahko razdelimo na sproščanje zdravilne učinkovine iz farmacevtske oblike, njeno absorpcijo, porazdelitev, metabolism in izločanje (sistem LADME).

Za vrednotenje farmakokinetike spojin razvijamo različne kromatografske metode z UV/VIS, EC, fluorescenčno in MS-MS detekcijo. V okviru predformulacijskih raziskav proučujemo njihove fizikalno-kemijske lastnosti, kot so topnost, hitrost raztapljanja, stabilnost, ionizacija, permeabilnost ter metabolične pretvorbe. Na osnovi teh parametrov in profilov sproščanja *in vitro* napovedujemo lastnosti farmacevtske oblike *in vivo*.

S tako pridobljenim znanjem razvijamo tudi farmakokinetično-farmakodinamične modele, ki omogočajo napovedovanje kliničnih učinkov zdravil ter iskanje vzrokov za njihovo variabilnost. Ti modeli omogočajo uvedbo individualnega odmerjanja zdravil glede na posameznikove genotipske in fenotipske značilnosti. Raziskave, ki so podprte z vsemi najsodobnejšimi tehnologijami, pripomorejo k učinkovitejšemu in varnejšemu zdravljenju z zdravili. Ker nas zanima tudi nadaljnja usoda zdravilnih učinkov in njihovih metabolitov, raziskujemo njihovo pojavnost v okoljskih vzorcih odpadnih, površinskih in pitnih vod s pomočjo zelo občutljivih in selektivnih LC-MS/MS metod.

At the Department of Biopharmaceutics and Pharmacokinetics we study the processes taking place in the human body after the drug application. These processes comprise the liberation of the active substance from the pharmaceutical formulation, drug absorption, distribution, metabolism, and excretion (the LADME system).

To evaluate the pharmacokinetics of substances, we develop various chromatographic methods using UV/VIS, EC, fluorescent and MS-MS detection. As part of preformulation studies we assess physico-chemical properties such as solubility, dissolution rate, stability, ionization, permeability, and metabolic conversion. Based on these parameters and *in vitro* release profiles we predict the *in vivo* properties of a pharmaceutical form.

Such knowledge allows us to develop pharmacokinetic and pharmacodynamic models, which can be used to predict the clinical effects of drugs and to explain the underlying variability in response to treatment. By studying and accounting for the effects of an individual patient's characteristics (e.g. genotype, phenotype), these models enable more personalized dosing. Studies supported by these kinds of modern technologies contribute to more effective and safer drug treatment. In addition, we further study the fate of active pharmaceutical ingredients and their metabolites by investigating their occurrence in environmental samples of waste, surface and drinking water using highly sensitive and selective LC-MS/MS methods.

## KLJUČNI DOSEŽKI V LETU 2021

Znanstvenoraziskovalno odličnost katedre v letu 2021 kažejo številne objave, med drugim tudi v uglednih revijah z visokim faktorjem vpliva (IF). Tako smo na katedri objavili 6 člankov v znanstvenih revijah s faktorjem vpliva (IF) preko 6. Izstopata predvsem 2 članka:

A comprehensive approach for the simultaneous analysis of all main water-soluble vitamins in multivitamin preparations by a stability-indicating HPLC-DAD method, objavljen v *Food chemistry*, 2021, 337, 1-11 (IF = 7,514). Na področju analitike smo za sočasno vrednotenje vseh najpogosteje uporabljenih vodotopnih vitaminov v izdelkih razvili inovativno stabilnostno-indikativno HPLC-DAD analizno metodo. Avtorji raziskave so asist. dr. Žane Temova Rakuša, asist. Andrej Grobin in prof. dr. Robert Roškar.

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Peak concentrations of ustekinumab after intravenous induction therapy identify patients with Crohn's disease likely to achieve endoscopic and biochemical remission, objavljen v *Clinical gastroenterology and hepatology*, 2021, 19, 111-118 (IF = 11,328). Na področju farmakokinetike-farmakodinamike smo v sodelovanju z UKC Ljubljana in Univerzo v Leuvnu poročali o razmerju med serumskimi koncentracijami ustekinumaba in endoskopsko ter biokemično remisijo pri pacientih s Crohnovo bolezni. Pri raziskavi so sodelovali asist. Jurij Zdovc, izr. prof. dr. Tomaž Vovk in prof. dr. Iztok Grabnar.

Dr. Žane Temova Rakuša je za svojo nalogu Razvoj stabilnostno indikativnih analiznih metod za vrednotenje stabilnosti hidrofilnih in lipofilnih vitaminov ter načrtovanje njihove stabilizacije, ki jo je izdelala pod mentorstvom prof. dr. Roberta Roškarja in prof. dr. Albina Kristla, dobila veliko Krkino nagrado. V svojem delu je kandidatka najprej razvila dve ločeni analizni metodi za vrednotenje lipofilnih in hidrofilnih vitaminov (zaradi njihovih zelo različnih fizikalno-kemijskih lastnosti), nato pa še stabilnostno indikativne metode za vitamin D3, obe oblike CoQ10 (ubikinon in ubikinol) in retinoide. Z razvitimi analitskimi metodami je potem vrednotila stabilnost in kakovost vitaminskih izdelkov na trgu ter preučevala različne pristope za njihovo stabilizacijo.

V letu 2021 smo tudi uspešno zaključili projekt Laktika; Frakcioniranje in implementiranje sirotkinih proteinov ter izraba preostanka za oblikovanje novih funkcionalnih živil in prehranskih dopolnil v okviru Operativnega programa za izvajanje evropske kohezijske politike v obdobju 2014-2020, ki smo ga izvajali v sodelovanju z Arhelom, Projektiranje in inženiring d. o. o., Ljubljana Šentvid, in drugimi.

## KEY ACHIEVEMENTS IN 2021

Scientific excellence of the Department in 2021 is reflected in many scientific articles, including publications in high impact factor (IF) journals. Six papers were published in journals with the IF exceeding 6. Two articles have the highest IF value:

1. A comprehensive approach for the simultaneous analysis of all main water-soluble vitamins in multivitamin preparations by a stability-indicating HPLC-DAD method published in *Food chemistry*, 2021, 337, 1- 11 (IF = 7,514). In the field of analytics, we have developed an innovative stability-indicative HPLC-DAD analytical method for the simultaneous analysis of all most used water-soluble vitamins in the preparations. The authors of the study are Assist. Dr. Žane Temova Rakuša, Assist. Andrej Grobin and Prof. Dr. Robert Roškar.
2. Peak concentrations of ustekinumab after intravenous induction therapy identify patients with Crohn's disease likely to achieve endoscopic and biochemical remission, published in *Clinical gastroenterology and hepatology*, 2021, 19, 111-118 (IF = 11,328). In the field of pharmacokinetics-pharmacodynamics we have reported about the relationship between serum concentrations of ustekinumab during the first two weeks of treatment and endoscopic and biochemical remission in patients with Crohn's disease. The research was done in collaboration with the UMC Ljubljana, and KU Leuven. The co-authors of the study are Assist. Jurij Zdovc, Assoc. Prof. Dr. Tomaž Vovk and Prof. Dr. Iztok Grabnar.

Dr. Žane Temova Rakuša was awarded a big prize (Velika Krkina nagrada) for her research-oriented work for her thesis The development of stability-indicating methods for stability evaluation of hydrophilic and lipophilic vitamins and design of their stabilization, with mentors Prof. Dr. Robert Roškar and Prof. Dr. Albin Kristl. In her work the candidate first developed two separate analytical methods for the evaluation of lipophilic and hydrophilic vitamins (because of their very different physicochemical properties) and later stability-indicative methods for vitamin D<sub>3</sub>, both forms of CoQ10 (ubiquinone and ubiquinol) and retinoids. This analytical methodology was further applied to different vitamin products on the market to evaluate their stability and quality with the aim to investigate various approaches towards their stabilization.

The project Lactica was completed. Together with Arhel, Projektiranje in inženiring d.o.o., Ljubljana Šentvid, and participating organizations within the call for proposals "to support research and development projects (TRL 3-6)" we finished the project 'Fractionation and Processing of Whey Proteins and Exploitation of the Residue for the Formation of New Functional Foods and Food Supplements' (LAKTIKA).

## KATEDRA ZA SOCIALNO FARMACIJO DEPARTMENT OF SOCIAL PHARMACY

Predstojnik katedre / Head of the Department:  
prof. dr. Mitja Kos

### Člani katedre v letu 2021 / Members of the Department in 2021

- izr. prof. dr. Igor Locatelli
- doc. dr. Nejc Horvat, doc. dr. Lea Knez
- Marija Babnik Gatej, asist. dr. Nanča Čebron Lipovec, asist. dr. Andreja Čufar, asist. Nuša Japelj, asist. dr. Janja Jazbar, asist. dr. Ana Kodrič, asist. dr. Urška Nabergoj Makovec, asist. Sara Prelesnik, asist. dr. Špela Žerovnik

Na Katedri za socialno farmacijo proučujemo vpliv zdravil na sodobnega človeka in družbo v mednarodnem in domačem okolju. Osredotočamo se na zdravila po njihovem prihodu na trg oziroma v roke bolnika. Pri svojem delu prepletamo naravoslovne in družboslovne metode raziskovanja. V okviru farmakoepidemiologije spremjam varnost in učinkovitost zdravil na ravni populacije, s farmakoekonomiko pa osvetlimo stroškovne vidike uporabe zdravil v relaciji do njihovih koristi. Zanima nas vrednotenje storitev farmacevta v lekarni, pri čemer posvečamo posebno pozornost raziskovanju vidika pacienta. S pomočjo rezultatov raziskav prispevamo h gradnji farmacevtskih storitev. Raziskujemo tudi delovanje zdravstvenega sistema in vlogo pacienta v njem. V tem okviru gradimo in proučujemo storitve, ki jih prinaša sodoben način pristopa k pacientu v obliki eZdravlja in mZdravlja. Raziskujemo tudi značilnosti domače in mednarodne regulative, ki ureja področje zdravil in farmacevtske stroke. Pri tem prispevamo k nastajanju nove zakonodaje in uvajanju najvišjih standardov v vsakodnevno prakso.

The Department of Social Pharmacy studies the effects of medicines on a modern individual and society in the international and domestic setting. We mainly explore medicines after their arrival on the market - in other words into the hands of the patients. We combine natural and social sciences research methods. With pharmacoepidemiology approaches we monitor the medicines' safety and effectiveness at the population level, while in pharmacoeconomics we address the cost aspect of the medicines' use in relation to their benefits. We are interested in the evaluation of pharmacy services with special attention to the patient's perspective. We also explore the operation of healthcare system and the patient's role in it. In this context we build and study the services provided by modern approach to the patient in the form of eHealth and mHealth. We also explore the properties of domestic and foreign regulations that cover the area of medicines and pharmaceutical profession. By doing so, we actively contribute to creating new legislation and implementation of the highest standards into everyday practice.

## KLJUČNI DOSEŽKI V LETU 2021

### Digitalna preobrazba v farmaciji

Epidemija SARS-CoV-2 je močno posegla v delovanje zdravstvenega sistema in povzročila velike premike na področju digitalizacije v zdravstvu. Tej pomembni tematiki smo v letu 2021 posvetili posebno pozornost in v sodelovanju s Slovenskim farmacevtskim društvom organizirali simpozijski dan v okviru Simpozija ob 46. skupščini SFD in posebno številko Farmacevtskega vestnika na temo digitalne preobrazbe v farmaciji ter oblikovali interesno skupino SFD za digitalno preobrazbo v farmaciji, v okviru katere so potekali strokovni večeri na to temo – »Digitalne srede«.

Luka Hiti in sodelavci, pod mentorstvom prof. dr. Mitja Kosa in izr. prof. dr. Igorja Locatellija, so s skupino Outfit7 delili prvo mesto na poletni šoli EIT Digital Summer School 2021 za razvit koncept digitalne rešitve za izmenjave informacij med zdravstvenimi delavci na primarnem in sekundarnem nivoju ter bolniki oz. njihovimi skrbniki.

### Projekti pod okriljem Evropske agencije za zdravila (EMA)

Zaključili smo mednarodni raziskavi na temo varnosti uporabe peroralnih zdravil z retinoidi in valproatom v času nosečnosti.

Vključili smo se v projekt RiskAwareTTS, v sklopu katerega proučujemo vpliv regulatornih odločitev in priporočil, povezanih s tveganjem za sindrom tromboze s trombocitopenijo ob cepljenju s SARS-CoV-2 adenovirusnimi vektorskimi cepivi.

### Raziskave na temo diabetesa

Asist. dr. Špela Žerovnik je v svojem doktorskem delu pod mentorstvom izr. prof. dr. Igorja Locatellija in somentorstvom prof. dr. Mitja Kosa pokazala, da so zaviralci SGLT2 in analogi GLP-1, kot dodatek k obstoječi terapiji, učinkovitejši pri preprečevanju srčno-žilne obolenosti in umrljivosti kot zaviralci DPP-4. Raziskava je pokazala primerljivo tveganje za amputacije spodnjih okončin ob uporabi zaviralcev SGLT2 in DPP-4, a hkrati nakazuje na povečano tveganje za amputacije ob dolgotrajni uporabi zaviralcev SGLT2.

S kvalitativno raziskavo o dostopu do antidiabetičnih zdravil v Sloveniji smo pokazali, da bi lahko le-tega bistveno izboljšali s spremembami omejitve predpisovanja, vzpostavitev nacionalnih registrov bolnikov in z vključitvijo multidisciplinarnih timov v oskrbo diabetesa. Z raziskavo o značilnostih umeščanja novih antidiabetičnih zdravil v 11 evropskih državah pa smo pokazali pomembne razlike pri hitrosti in obsegu umeščanja teh zdravil.

### Raziskave na temo krhkosti

Asist. dr. Janja Jazbar je v svojem doktorskem delu pod mentorstvom prof. dr. Mitja Kosa in somentorstvom izr. prof. dr. Igorja Locatellija pokazala, da starostno standardizirana razširjenost krhkosti v Sloveniji znaša 15 %, v raziskavi na osnovi podatkov mednarodne longitudinalne raziskave SHARE pa smo pokazali, da določene vrste zdravil povečajo, netvegana raba alkohola pa zniža tveganje za sindrom krhkosti.

### Raziskave na temo sodelovanja pacientov pri zdravljenju z zdravili

V letu 2021 smo objavili rezultate randomizirane kontrolirane raziskave iz slovenskega okolja, ki kažejo na učinkovitost storitve Pregled uporabe zdravil na izboljšanje sodelovanja pri zdravljenju pri kroničnih bolnikih.

Z raziskovalnimi skupinami iz 39 držav smo se povezali v okviru mednarodnega projekta COST Action ENABLE. Asist. dr. Urška Nabergoj Makovec je namestnica vodje Working Group 2 – Adherence Technology.

## KEY ACHIEVEMENTS IN 2021

### Digital transformation in pharmacy

The SARS-CoV-2 epidemic has severely affected the functioning of the health care system and caused major shifts in the field of digitalization in health care. In 2021 we paid special attention to this important topic and in cooperation with the Slovenian Pharmaceutical Society (SFD) organized a symposium day within the Symposium at the 46th SFD Assembly and a special issue of a gazette Farmacevtski vestnik on the topic of digital transformation in pharmacy. We also founded a special interest group within SFD, which held professional events on this topic called "Digital Wednesdays".

Luka Hiti and colleagues under the mentorship of Prof. Dr. Mitja Kos and Assoc. Prof. Dr. Igor Locatelli shared the first place at the EIT Digital Summer School 2021 for the developed digital solution, which supports the exchange of information between healthcare professionals and patients or their caregivers.

### Projects on behalf of the European Medicines Agency (EMA)

We have completed an international study on the safety of oral medicines with retinoids and valproate during pregnancy.

We have joined the RiskAwareTTS project, within which we explore the impact of regulatory decisions and recommendations related to the risk of thrombosis syndrome with thrombocytopenia after vaccination with SARS-CoV-2 adenoviral vector vaccines.

### Diabetes studies

In her doctoral dissertation under mentorship of Assoc. Prof. Dr. Igor Locatelli and co-mentorship of Prof. Dr. Mitja Kos, Assist. Dr. Špela Žerovnik showed that SGLT2 inhibitors and GLP-1 analogues as add-on therapy are more effective in preventing cardiovascular morbidity and mortality than DPP-4 inhibitors. The study showed a comparable risk of lower limb amputations using SGLT2 and DPP-4 inhibitors, however, it suggests an increased risk of amputations with long-term use of SGLT2 inhibitors.

A qualitative study about access to antidiabetic medicines in Slovenia showed that it could be significantly improved by changing prescribing restrictions, establishing national patient registries and involving multidisciplinary teams in diabetes care. A study on the uptake of new antidiabetic medicines in eleven European countries showed significant differences in the rate and extent of the uptake of these medicines.

### Frailty studies

In her doctoral dissertation under the mentorship of Prof. Dr. Mitja Kosa and co-mentorship of Assoc. Prof. Dr. Igor Locatelli, Assist. Dr. Janja Jazbar showed that the age-standardized prevalence of frailty in Slovenia is 15 %, and in a study based on data from the international longitudinal survey SHARE we showed that certain types of drugs increase the risk of frailty syndrome, while low risk alcohol use decreases it.

### Medication adherence studies

In 2021 we published the results of a randomized controlled trial from the Slovenian environment, which show that Medication Use Review improves medication adherence in chronic patients.

We connected with research groups from 39 countries within the international project COST Action ENABLE. Assist. Dr. Urška Nabergoj Makovec also holds the position of Vice President of Working Group 2 - Adherence Technology.

## TAJNIŠTVO UL FFA FACULTY SECRETARIAT UNIT

Tajnica fakultete / Faculty Secretary:  
Katja Višnjevec Vahčič, univ. dipl. prav.

### Člani Tajništva v letu 2021 / Members of the Faculty Secretariat unit in 2021

Strokovni sodelavci / Professional collaborators:

- Zdenka Gantar, Tanja Gregorič, Urban Jernejčič, Nataša Juvan, Tanja Kadunc, Marjetka Kirin, Aleš Kolenko, Tomaž Kuštrin, Tinka Leskovec, Lidija Matajija, Judita Merjasec, Sebina Mujagić, Marko Ocvirk, Teja Pečnik, mag. Nina Pesko, Marta Pogačar, Milenka Sojer, Darko Šaša, Marija Šebjan Pušenjak, Polonca Škulj, Darja Šviga, Mateja Terčič, Boris Terobšič, Borut Toth, Dušan Videmšek, Bernarda Žagar

Tajništvo UL FFA je samostojna organizacijska enota, ki skrbi za administrativno in upravno delovanje fakultete ter nudi podporo pri izvajanju pedagoške in znanstvenoraziskovalne dejavnosti. Poleg tega delavci v službi za tehnično vzdrževanje in recepcijo zagotavljajo varno, čisto in zdravo delovno okolje.

Tajništvo fakultete opravlja upravno administrativne in finančno gospodarske naloge v zvezi z izvajanjem tržne dejavnosti fakultete.

Del tajništva je tudi učitelj športne vzgoje, ki s svojim delom spodbuja študente - in nemalokrat tudi zaposlene - k zdravemu življenjskemu slogu.

Tajništvo sestavlja podenote: tajništvo vodstva, kadrovska služba, raziskovalni referat, študentski referat, finančno-računovodska služba, služba za informatiko, tehnično-vzdrževalna služba, knjižnica.

The Faculty Secretariat Unit is an independent organizational unit that provides effective administrative support for performing professional and scientific research activities. Employees in the technical maintenance and reception service, on the other hand, ensure a safe, clean and healthy working environment.

The Secretariat Unit also performs administrative and financial-economic tasks related to carrying out the faculty's marketing activities.

The Physical Education Teacher is also a member of this organisational unit, as he/she encourages students - and often employees - to follow a healthy lifestyle.

The subunits of the Secretariat Unit: Governance Secretariat, Human Resources, Research Department, Student Department, Financial Accounting Services, IT Department, Technical-Maintenance Services, Library.

## KLJUČNI DOSEŽKI V LETU 2021

Ga. Tanja Kadunc je v okviru Tedna Univerze prejela priznanje UL za izjemne rezultate pri delu. Ga. Kadunc je vodja študentskega referata in je na UL FFA zaposlena že več kot 30 let. V vseh teh letih je s svojim delom nedvomno prispevala k rasti in razvoju fakultete.

Leto 2021 je bilo še naprej zaznamovano s koronavirusno bolezenijo (COVID-19), kar je terjalo prilagoditve dela. V okviru tega je UL FFA v okviru projekta APIS pristopila k uvedbi novega poslovno-informacijskega sistema SAP. Vloga strokovnih služb fakultete, predvsem finančno-računovodske službe in kadrovske službe, je bila nepogrešljiva. Z vztrajnim in požrtvovalnim delom je kljub velikim naporom uvedba SAP na UL FFA dobro začrtana.

## KEY ACHIEVEMENTS IN 2021

Mrs. Tanja Kadunc received the UL Award for outstanding work results as part of the University Week. Mrs. Kadunc is the Head of the Student Department and has been employed at UL FFA for more than 30 years. She has undoubtedly contributed to the growth and development of the Faculty.

The year 2021 continued to be known for COVID-19 (coronavirus disease 2019), which required adjustments in the work process. In this context, the UL FFA, within the APIS project, started the introduction of a new SAP business information system. The role of the Faculty Secretariat Unit departments, especially the Financial Accounting Department and the Human Resources Department, was indispensable. With persistent and dedicated work the introduction of SAP at UL FFA is set well, despite the difficulties and facing challenges along the way.

## **INŠITUT ZA FARMACIJO** **INSTITUTE OF PHARMACY**

**Predstojnik inštituta / Head of the Institute:**  
**izr. prof. dr. Rok Dreu**

### **Člani Inštituta v letu 2021 / Members of Institute in 2021**

- prof. dr. Irena Mlinarič-Raščan, prof. dr. Anamarija Zega
- asist. dr. Tanja Gmeiner, asist. – raz. dr. Maruša Bizjak, znan. sod. dr. Maša Kandušer, asist. dr. Dunja Urbančič, Ema Valentina Brovč, Maja Frelih, asist. Katja Glinšek, Luka Hiti, asist. Tilen Huzjak, Jasna Kalan, asist. Lina Keršmanc, asist. Jaka Kranjc, asist. Klemen Kreft, asist. Blaž Lebar, Anja Mihelčič, asist. dr. Žane Temova Rakuša, asist. Ernest Šprager, asist. Helena Vrbanac

Osnovno poslanstvo Inštituta je spremljanje trendov raziskav na širšem farmacevtskem in biomedicinskem področju in podajanje pobud glede raziskovalnih usmeritev UL FFA. V okviru Inštituta izvajamo znanstvenoraziskovalne, razvojno-aplikativne in strokovne projekte ter mednarodne aktivnosti, ki presegajo aktivnosti posamezne katedre. Povezujemo infrastrukturne in kadrovske potenciale različnih kateder in skupaj s svojim multidisciplinarnim timom sodelavcev omogočamo podporo različnim raziskovalnim in gospodarskim subjektom. V okviru Inštituta deluje dva infrastrukturna centra: Infrastrukturni center za analizo zdravil kot del Mreže raziskovalnih infrastrukturnih centrov Univerze v Ljubljani (MRIC UL) in Infrastrukturni center za translacijske raziskave EATRIS (European Advanced Translation Research InfraStructure in medicine), član mednarodnega konzorcija EATRIS ERIC.

Leta 2021 smo v okviru projekta RI-SI-EATRIS razširili raziskovalno infrastrukturo, realizirali nakup nove opreme in opremili tri nove laboratorije. Opremili smo tudi nov celični laboratorij, kateremu so zagotovljeni pogoji za delo z gensko spremenjenimi organizmi 2. varnostnega razreda (GSO VR2).

Na področju mednarodne dejavnosti smo letos organizirali 1. modul evropskega podiplomskega izobraževanja (Postgraduate European Radiopharmacy Course – PERC 2021), ki ga kot del evropske sheme za pridobitev evropske specializacije s področja radiofarmacije izvajamo vsako drugo leto.

The Institute's primary mission is to follow the research trends in the broader fields of pharmacy and biomedicine and to provide directions for UL FFA's research activities. Within the Institute, we conduct scientific research, development-application and professional projects, as well as international activities that extend beyond the operations of particular departments. We connect the infrastructural and human resource assets of different faculty departments and we provide support to other research institutions and companies with our diverse team of associates. Two infrastructural centres are operating within the framework of the Institute: The Infrastructural Centre for Drug Analysis, as part of the Network of Research and Infrastructural Centres of the University of Ljubljana (MRIC UL), and Infrastructural Centre for Advanced Translation Researches EATRIS (European Advanced Translation Research Infrastructure in medicine), member of the international consortium EATRIS ERIC.

In 2021 we enhanced our research infrastructure by purchasing new equipment and establishing three new laboratories as part of the RI-SI-EATRIS project. We also set up a new cell laboratory that allows us to work with genetically modified organisms (GMOs) of the second safety class (GMO SC2).

In terms of international activities, we hosted the first module of the Postgraduate European Radiopharmacy Course (PERC 2021) this year, which is held every other year as part of the European programme for acquiring a European radiopharmacy specialization.

## KLJUČNI DOSEŽKI V LETU 2021

### Sodelovanje z industrijo in usposabljanje kadrov

Tudi v letu 2021 smo sodelovali z gospodarskimi subjekti in mladim strokovnjakom omogočili, da se v okviru podiplomskega študija vključijo v naše aplikativne projekte na področju razvoja novih farmacevtskih izdelkov, analitskih metod vrednotenja (geno)toksičnosti učinkovin, registracije novih zdravil in regulative. S tovrstnim sodelovanjem farmacevtski industriji in ostalim zainteresiranim strankam omogočamo dostop do naše infrastrukture in specifičnih znanj, s katerimi razpolagamo ter prispevamo k ustvarjanju kadrov, ki po zaključku doktorskega oz. specialističnega študija nadaljujejo svojo karierno pot v njihovem delovnem okolju.

## KEY ACHIEVEMENTS IN 2021

### Cooperation with the industry and staff development

In 2021 we collaborated with various business partners and engaged young professionals in our projects covering the development of new pharmaceutical products, analytical methods for evaluating (geno)toxicity of active ingredients, registration of new drugs and regulation. We therefore managed to enable the pharmaceutical industry and other interested parties to have access our infrastructure and specific knowledge; moreover, we further contribute to the training of professionals who, after completing their doctoral or specialist studies, become experienced to proceed with their career in the business working environment.

## Širitev raziskovalne infrastrukture

Ekipalnštitutaje v okviru IC EATRIS 29.9.2021 organizirala dogodek na UL FFA, na katerem je predstavila novo raziskovalno opremo. V letu 2021 smo nabavili še:

- UHPLC Agilent 1290 Infinity z masnim detektorjem na čas preleta (Agilent 6545XT AdvanceBio Q-TOF),
- HPLC Agilent 1260 Infinity z DAD in FSD detektorjem.

## Expanding research infrastructure

On 29 September 2021 the team of the Institute working on IC EATRIS organized an event at UL FFA, where new research equipment was presented. In 2021 we purchased:

- UHPLC Agilent 1290 Infinity with Quadrupole Time of Flight mass detector (Agilent 6545XT AdvanceBio Q-TOF)
- HPLC Agilent 1260 Infinity with DAD and FSD detector.



Nov laboratorij IC-EATRIS in nova oprema UHPLC Agilent 1290 -Q-TOF /  
New IC-EATRIS laboratory and new UHPLC Agilent 1290 -Q-TOF equipment

V letu 2021 smo opremili nov celični laboratorij za delo z GSO VR2 z:

- dvema zaščitnima mikrobiološkima komorama Guardian,
- dvema CO<sub>2</sub> inkubatorjem Binder CB-S 170,
- invertnim mikroskopom ZEISS Primovert,
- hlajeno laboratorijsko centrifugo MPW 352R,
- avtoklavom Certoclav VAC PRO.

In 2021 we also refurbished a new cell laboratory for work with GMO SC2 with:

- Two Guardian microbiological safety cabinets
- Two CO<sub>2</sub> Binder incubators CB-S 170
- ZEISS Primovert Invert microscope
- MPW 352R refrigerated laboratory centrifuge MPW 352R
- VAC PRO Autoclave Certoclav



Nov laboratorij za delo z GSO VR2 / New laboratory for working with GMO VR2

## Izobraževalne aktivnosti

V letu 2021 smo realizirali več izobraževalnih aktivnostih v okviru mednarodnih projektov EATRIS-Plus in Erasmus+ ADVANCE.

- ADVANCE ATMP (Advanced Therapy Medicinal Products), 5-dnevna delavnica (od 3. 5. do 7. 5. 2021),
- EATRIS-Plus, 2-dnevna delavnica: Teorija in praksa sodelovanja med industrijo in akademijo (od 27. 9. do 28. 9. 2021),
- EATRIS-Plus, 5-dnevna poletna šola personalizirane medicine, INFARMED – EATRIS Portugalska (od 14. 6. do 18. 6. 2021),
- BioCamp 2021 »Vpliv podatkov in umetne inteligece na farmacevtsko industrijo«, Novartisov dogodek (od 27. 9. do 1. 10. 2021),
- Izvedba 1. modula na evropskem podiplomskem izobraževanju iz radiofarmacije – PERC 2021 (od 30. 8. do 10. 9. 2021).

## Nagrade

- Luka Hiti in sodelavci, pod mentorstvom prof. dr. Mitja Kosa in izr. prof. dr. Igorja Locatellija, so s skupino Outfit7 delili prvo mesto na poletni šoli EIT Digital Summer School 2021.
- Rektorjevo nagrado za najboljšo inovacijo v kategoriji študentke in študenti ter alumne in alumni je prejel projekt z naslovom »Pufer za izvedbo PCR testov SARS-CoV-2 na vzorcu sline« raziskovalne skupine prof. dr. Irene Mlinarič-Raščan v sodelovanju z raziskovalci Kemijskega inštituta in Nacionalnega inštituta za biologijo.

## Educational activities

In 2021 we organised and contributed to several educational activities within the international projects EATRIS plus and Erasmus + ADVANCE.

- ADVANCE ATMP (Advanced Therapy Medicinal Products), a 5-day workshop (from 3 to 7 May 2021)
- EATRIS-Plus, a 2-day workshop: Theory and Practice of Industry and Academia Collaboration (from 27 to 28 September 2021),
- EATRIS-Plus, a 5-day Summer School in Personalized Medicine, INFARMED – EATRIS Portugal (from 14 to 18 June 2021),
- BioCamp 2021 Impact of Data and Artificial Intelligence on the Pharmaceutical Industry, Novartis event (from 27 September to 1 October 2021),
- 1. module of Postgraduate European Radiopharmacy Course – PERC 2021 (from 30 August to 10 September 2021).

## Awards

- At the EIT Digital Summer School 2021 Luka Hiti and his team, mentored by Prof. Dr. Mitja Kos and Assoc. Prof. Dr. Igor Locatelli, shared first place with Outfit7.
- The Rector's Award for the best innovation in the category of students and alumni was awarded to the project entitled 'Buffer for performing PCR tests SARS-CoV-2 on a saliva sample' from the research group of Prof. Dr. Irena Mlinarič-Raščan in collaboration with researchers from the Institute of Chemistry and the National Institute of Biology.

## **ŠTUDENTSKI SVET FAKULTETE ZA FARMACIJO (ŠS FFA), ŠTUDENTSKA ORGANIZACIJA FAKULTETE ZA FARMACIJO (ŠOFFA) IN DRUŠTVO ŠTUDENTOV FARMACIJE SLOVENIJE (DŠFS)**

### **Študentski svet Fakultete za farmacijo (ŠS FFA)**

Študentski svet je organ fakultete, katerega člani so predstavniki letnikov, izvoljeni na letnih volitvah. ŠS FFA predstavlja študente UL FFA v organih fakultete (senat UL FFA, upravni odbor UL FFA in različne komisije) in pa v študentskem svetu Univerze v Ljubljani. ŠS FFA se ukvarja predvsem s študijem na UL FFA ter zagovarjanjem pravic študentov na vseh ravneh zastopanja.

### **Študentska organizacija Fakultete za farmacijo (ŠOFFA)**

ŠOFFA je ena izmed podružnic družine Študentske organizacije Univerze v Ljubljani (ŠOU), kakršno ima vsaka fakulteta Univerze v Ljubljani. ŠOFFA organizira različne dogodke izobraževalnega in družabnega značaja, kot so božična ekskurzija, farmacevtski piknik, farmacevtsko smučanje in druge aktivnosti. Aktivnosti družabnega programa so potrebne za povezovanje mlajših in starejših študentov, kar omogoča izmenjavo znanj in izkušenj.

### **Društvo študentov farmacije Slovenije (DŠFS)**

DŠFS in Študentska sekcija Slovenskega farmacevtskega društva (ŠSSFD) delujeta kot ena organizacija z isto ekipo, ki vodi projekte in zastopa naše društvo na nacionalnem in mednarodnem nivoju. S pomočjo članov pod vodstvom koordinatorjev izvajajo različne javne kampanje, humanitarne projekte, mednarodne izmenjave Twinnet in SEP, mednarodne poletne farmacevtske tabore (IPSC), strokovne večere, trikrat letno pa izide študentsko glasilo Spatula.

## **STUDENT COUNCIL OF THE FACULTY OF PHARMACY (ŠS FFA), STUDENT ORGANIZATION OF THE FACULTY OF PHARMACY (ŠOFFA) AND SLOVENIAN PHARMACY STUDENTS' SOCIETY (DŠFS)**

### **Student Council of the Faculty of Pharmacy (ŠS FFA)**

ŠS FFA is one of the governing bodies of the faculty. Its members, who are elected annually, are representatives of each year of their respective programmes. The ŠS FFA represents Faculty of Pharmacy students in other governing bodies of the faculty (the Senate, the Managing Board and various committees), as well as in the Student Council of the University of Ljubljana. The ŠS FFA mainly deals with the programme at the Faculty of Pharmacy and defending students' rights on all levels of representation.

### **Student Organization of the Faculty of Pharmacy (ŠOFFA)**

The ŠOFFA is one of the ŠOU's (the University of Ljubljana Student Organization) branches, which exists at each faculty at the University of Ljubljana. The ŠOFFA holds various educational and social events, such as the Christmas excursion, pharmaceutical picnic, pharmaceutical ski trip and other activities. Social activities are necessary to connect younger and older students, which in turn allows exchange of knowledge and experience.

### **Slovenian Pharmacy Students' Society (DŠFS)**

The DŠFS and the Students' section of the Slovenian Pharmaceutical Society (ŠSSFD) function as a single organization with the same team that leads projects and represents our society on national and international levels. With the help of our members and under the guidance of the coordinators the organization carries out various public campaigns, humanitarian projects, Twinnet and SEP international exchanges, the International Pharmaceutical Summer Camp (IPSC) and professional training evenings. The organization also publishes the student newsletter Spatula three times a year.

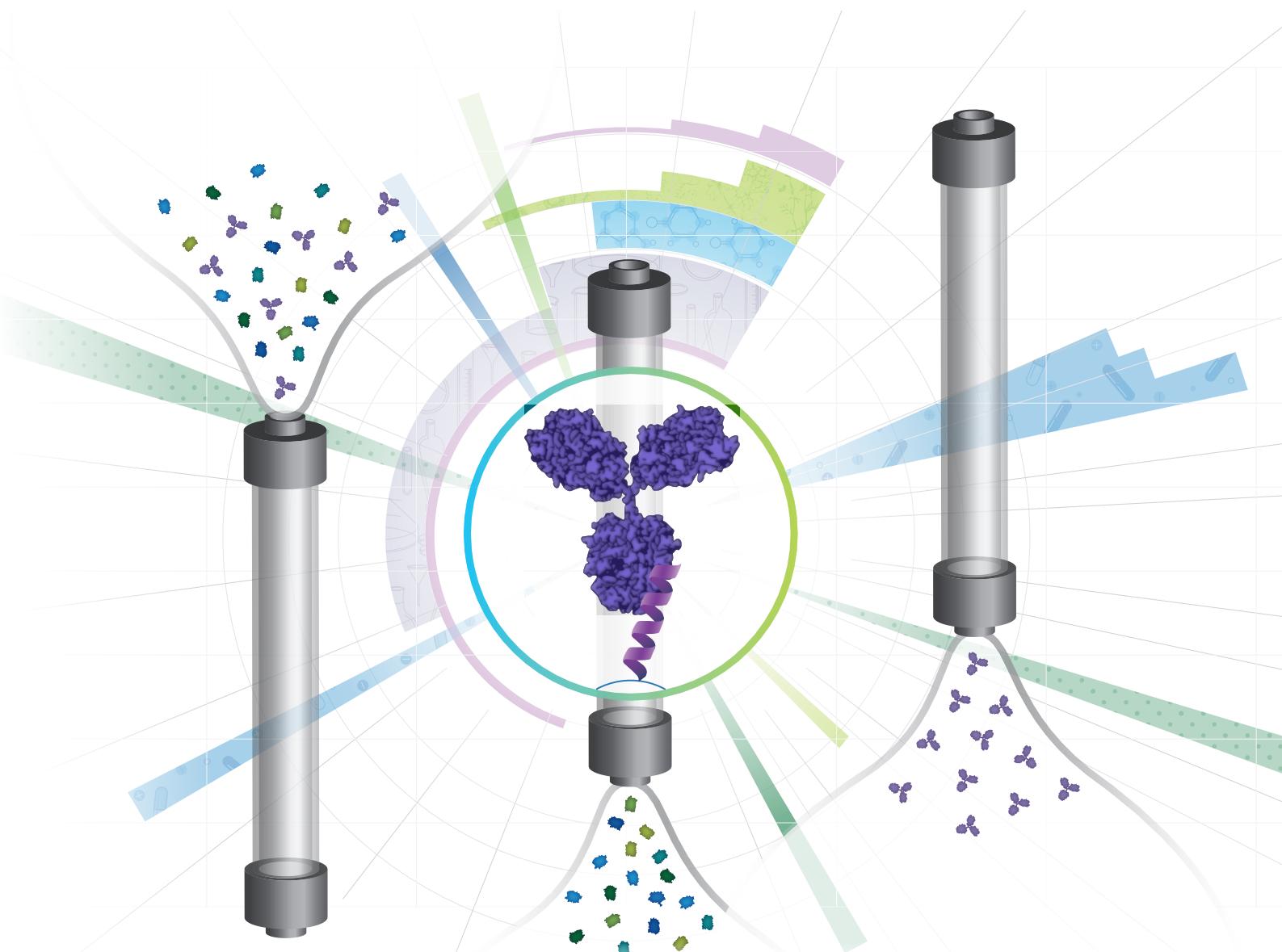
## Premagujemo nove izzive

V farmaciji se vsak dan srečujemo z novimi izzivi. Na področju bioloških zdravil smo razvili izboljšano metodo izolacije protiteles, s katero lahko proizvajalci zdravil ločijo učinkovine od nečistot. Z razvojem peptidnih vezalcev smo ustvarili dostopnejšo in cenejšo različico trenutno prevladajočega načina izolacije in čiščenja protiteles.

## Overcoming new challenges

We face new challenges every day. In the field of biologics, we have developed an improved method of antibody isolation which allows drug manufacturers to separate active ingredients from impurities. We have devised a more accessible and cost-effective version of the commonly used separation method that is based on peptide binders to isolate and purify antibody drugs.

## Afinitetno čiščenje protiteles s pomočjo inovativnih peptidnih vezalcev. Affinity purification of antibodies using innovative peptide binders.



# 2 Poročilo o delu Activity report

## PREGLED POSLOVANJA

UL FFA je v letu 2021 poslovala uspešno, saj kljub temu da se situacija z epidemijo COVID-19 v letu 2021 ni umirila, ampak se je še poslabšala, je FFA realizirala višje prihodke glede na leto 2020 in je dosegla 12.728.577 EUR prihodkov, kar glede na preteklo leto pomeni 14 % rast prihodkov. Odhodki so znašali 12.349.618 EUR in so bili glede na predhodno leto višji za 14,5 %. V okviru odhodkov so na njihovo povečanje najbolj vplivali višji stroški dela, ki so znašali 7.868.316 EUR in so se glede na preteklo leto povečali za kar 8,5 %. Na višje stroške dela so delno vplivali ukrepi na področju plač ter večje število zaposlenih, ki se je računalo iz delovnih ur in se je povečalo iz 176 zaposlenih v letu 2020 na 182 zaposlenih v letu 2021. Zaradi rasti prihodkov in delnih sprostitev ukrepov zaradi COVID-19 so stroški materiala in storitev narasli, saj je bilo manj študija na daljavo, zato so se povečali splošni stroški materiala in storitev ter neposredni stroški, vezani na izvajanje pedagoškega procesa in raziskovalnega dela. Stroški materiala so v letu 2021 znašali 1.330.170 EUR in so bili za 27 % višji glede na preteklo leto, prav tako so se povečali stroški storitev, ki so znašali 2.145.467 EUR, in so bili večji za 26 % glede na preteklo leto.

UL FFA je realizirala 378.959 EUR presežka prihodkov nad odhodki pred davki, kar pomeni 3 % zmanjšanje glede na preteklo leto.

Zaradi delno sproščenih ukrepov, vezanih na epidemijo COVID-19, in zaradi prenosa delno porabljenih raziskovalnih sredstev iz leta 2020 v leto 2021 je fakulteta dosegla boljše rezultate na raziskovalni in tržni dejavnosti, kjer so znašali realizirani prihodki 847.960 EUR, kar je približno 7 % delež celotne realizacije. Tržni prihodki so se zvišali za 47 %.

V letu 2021 je bila fakulteta zelo dejavna tudi pri investicijski dejavnosti. V osnovna sredstva je bilo investiranih več kot 1,1 mio EUR. Poleg lastnih sredstev fakultete, s katerimi je FFA financirala nakupe osnovnih sredstev, so bile večje investicije financirane tudi iz evropskih sredstev, kot na primer iz projekta EATRIS-TRI.si, ki je za nakup raziskovalne opreme prispeval 478.339 EUR. Z razpisi ARRS za raziskovalne projekte je bilo pridobljenih 239.650 EUR za investicije.

## BUSINESS OVERVIEW

In 2021 the UL FFA operated successfully and despite the fact the situation with COVID-19 epidemic in 2021 did not calm down, but worsened, the FFA accomplished higher revenues in comparison to 2020 and reached a revenue of 12.728.577 EUR, which represents a 14 % increase in revenue in comparison to the previous year. Expenditures amounted to 12.349.618 EUR and were 14,5 % higher than in the previous year. Regarding expenditures - their increase was mainly due to higher labour costs, which amounted to 7.868.316 EUR and increased by as much as 8,5 % compared to the previous year. Higher labour costs were partly due to wage measures and a higher number of employees, which increased from 176 employees in 2020 to 182 employees in 2021. Due to revenue growth and partial liberalization of measures due to COVID-19, costs of materials and services increased as there was less remote schooling, so the general costs of materials and services increased and direct costs related to the implementation of the pedagogical process and research work increased. The costs of materials therefore amounted to 1.330.170 EUR and were higher by 27 %, the costs of services in the amount of 2.145.467 EUR increased by 26 %.

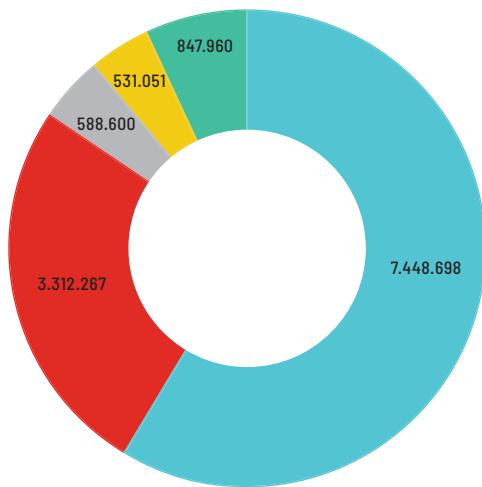
The UL FFA realized a slightly lower surplus of revenues over expenses than in 2020, which amounted to 378.959 EUR before the calculation of corporate income tax.

Due to partially released measures related to the COVID-19 epidemic and due to the transfer of partially spent research funds from 2020 to 2021, the faculty achieved better results in research and marketing activities, where realized revenues amounted to 847.960 EUR, which is about 7 % of total realization. Market revenues increased by 47 %.

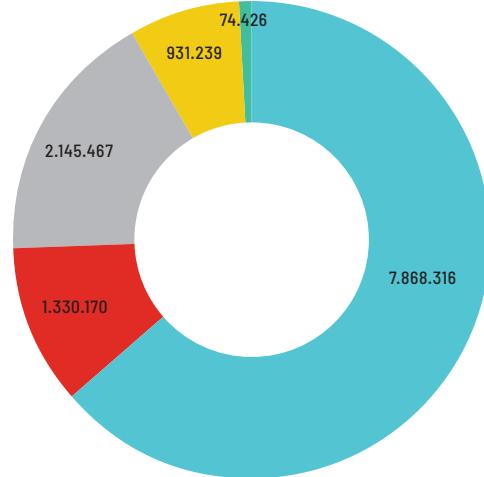
In 2021 the faculty also made considerable investments. More than 1.1 million EUR was invested in fixed assets. In addition to the faculty's own funds, with which the FFA financed the purchase of its fixed assets, major investments were also financed from EU funds, such as the EATRIS-TRI.si project, which contributed 478.339 EUR for the purchase of research equipment. Through ARRS tenders, for the purposes of research projects, 239.650 EUR was obtained for investments.

Prihodki v EUR/Revenues, EUR	2021	2020	Struktura 2021/ 2020 Structure	Indeks 21/20
Prihodki od MIZŠ / Ministry of Education, Science, and Sport	7.448.698	6.691.052	58,5 %	111,3
Prihodki od ARRS / Slovenian Research Agency	3.312.267	2.591.668	26,0 %	127,8
EU skladi in mednarodni projekti / EU funds and international projects	588.600	741.665	4,6 %	79,4
Druga javna služba / Other public services	531.051	569.828	4,2 %	93,2
Prodaja storitev na trgu / Market sales of services	847.960	578.955	6,7 %	146,5
<b>Skupaj prihodki / Total revenues</b>	<b>12.728.577</b>	<b>11.173.168</b>	<b>100,0 %</b>	<b>113,9</b>

**STRUKTURA PRIHODKOV V 2021, PO VIRU FINANCIRANJA V EUR**  
REVENUE STRUCTURE IN 2021, EUR



**STRUKTURA ODHODKOV V 2021, PO VRSTAH STROŠKOV V EUR**  
EXPENSE STRUCTURE IN 2021, EUR



- Prihodki od MIZŠ / Ministry of Education, Science and Sport
- Prihodki od ARRS / Slovenian Research Agency
- EU skladi in mednarodni projekti / EU funds and international projects
- Druga javna služba / Other public services
- Prodaja storitev na trgu / Market sales of services

- Delo / Labor
- Material / Goods
- Storitve / Services
- Amortizacija / Depreciation
- Drugi odhodki / Other Expenses

# ŠTUDIJSKO PODROČJE / FIELD OF STUDY

## PREDSTAVITEV ŠTUDIJSKIH PROGRAMOV / PRESENTATION OF ACADEMIC PROGRAMMES

### ENOVITI magistrski študijski program Farmacija

Študij farmacije izobražuje za reguliran poklic farmacevta skladno z evropsko direktivo 2005/36/ES in omogoča pridobitev naziva magister/magistrica farmacije, ki je priznan v vseh državah članicah EU.

Študij usposobi študenta za izvajanje strokovnih del in nalog na področju farmacije, vključujuč skrb in svetovanje pacientom, izdajo zdravil, proizvodnjo zdravil, razvoj in raziskave ter analizo in nadzor kakovosti zdravil. Obenem nudi osnovo za nadaljevanje študija na doktorski stopnji in je odprt za stalno vseživljenjsko strokovno usposabljanje. Študij traja 5 let in vključuje obvezno polletno praktično usposabljanje v učnih zavodih (lekarnah) in izdelavo magistrske naloge.

### Uniform master study programme in Pharmacy (Single-cycle master study programme in Pharmacy)

In accordance with the European Directive 2005/36/ES the pharmacy programme educates students for the regulated profession of pharmacist, through which they obtain their degrees as masters of pharmacy, which are recognized by all EU member states.

The programme gives the students the skills to carry out professional work and tasks in pharmacy, including counselling patients, dispensing medicines, development and research, analysis and controlling the quality of medicines. The programme provides students with a firm basis to continue their education at the doctoral level and it is open to ongoing lifelong professional training. The five-year programme includes six months of mandatory practical training in pharmacies with the master's thesis research and defence.

### The academic bachelor study programme in Laboratory Biomedicine and the master study programme in Laboratory Biomedicine

After the first cycle of study (three years) a student of Laboratory Biomedicine obtains bachelor's degree in Laboratory Biomedicine. After the second cycle (additional two years) a student receives master's degree in Laboratory Biomedicine. After each of the two cycles the students can seek employment in various medical laboratories or in the industry. After the end of the second cycle the students can also proceed with their education at the doctoral level or with a certificate in Medical Biochemistry.

### UNIVERZITETNI in MAGISTRSKI študijski program Laboratorijska biomedicina

Študent laboratorijske biomedicine pridobi po prvi stopnji študija, ki traja 3 leta, naziv diplomirani inženir/diplomirana inženirka laboratorijske biomedicine(UN), po drugi stopnji, ki traja 2 leti, pa magister/magistrica laboratorijske biomedicine. Po obeh stopnjah je možnost zaposlitve v različnih medicinskih laboratorijih in v industriji, po drugi stopnji pa tudi nadaljevanje študija na doktorski stopnji ali specializaciji iz medicinske biokemije.

## **UNIVERZITETNI študijski program Kozmetologija**

Univerzitetni študijski program traja 3 leta, študent pa po uspešno opravljenem študiju pridobi strokovni naziv diplomirani kozmetolog (UN)/diplomirana kozmetologinja (UN). Glavni namen študija je usposobiti strokovnjake na področju kozmetoloških znanosti. Poleg osnovnih znanj naravoslovne usmeritve nudi program poglobljena znanja iz strokovnih ved kozmetologije.

## **MAGISTRSKI študijski program Industrijska farmacija**

Magistrski študij traja 2 leti in omogoča pridobitev znanj in veščin za delo v farmacevtsko-industrijskem okolju, vendar ne v okviru reguliranega poklica farmacevta. Strokovni naziv, ki ga pridobi diplomant, je magister/magistrica industrijske farmacije.

## **DOKTORSKI študijski program Biomedicina**

Nadoktorskemu študiju UL FFA izvaja programe Farmacija, Klinična biokemijska in laboratorijska biomedicina ter Toksikologija, ki omogočajo pridobitev naziva doktor/doktorica znanosti. Osnovna ideja študija biomedicine in izvajanja na več članicah UL je v veliki izbirnosti, ki bodočim doktorjem znanosti omogoča študij po meri in pridobivanje specifičnih kompetenc, ki jih težko pokriva le ena članica UL.

Značilnosti študija na UL FFA so visoka motiviranost študentov, velika interdisciplinarnost programov, raznolikost študijskih pristopov in dobra povezanost s potencialnimi delodajalci tako v gospodarstvu (farmacevtska industrija, veledrogerije, predstavnštva) kot v javnem sektorju (lekarne, bolnišnice, medicinski laboratoriji).

## **The academic bachelor study programme in Cosmetology**

This university programme lasts for three years and gives its students bachelor's degree in Cosmetology. Its main purpose is to provide experts with skills in cosmetic sciences. Alongside basic knowledge of natural sciences the programme offers in-depth study of professional cosmetology sciences.

## **The master study programme in Industrial Pharmacy**

This master's programme (two years) provides students with knowledge and skills needed to work in a pharmaceutical industrial environment, but not in the regulated pharmacist profession. The student receives their professional master's degree in industrial pharmacy.

## **The interdisciplinary doctoral programme in Biomedicine**

The Faculty of Pharmacy is responsible for the programmes of Pharmacy, Clinical Biochemistry and Laboratory Biomedicine, and Toxicology. The basic idea for the interdisciplinary programme offered by multiple member institutions of the University of Ljubljana lies in the multiplicity of choices. This way future doctorate holders acquire specific skills that would be difficult to acquire at a single faculty.

The characteristics of studying at UL FFA are high student motivation, high interdisciplinarity of the programmes, diversity of study approaches and good connections with potential employers in the real sector (pharmaceutical industry, wholesalers, representative offices) and in the public sector (pharmacies, hospitals, medical laboratories).

# ŠTUDENTI IN DIPLOMANTI 2020/21

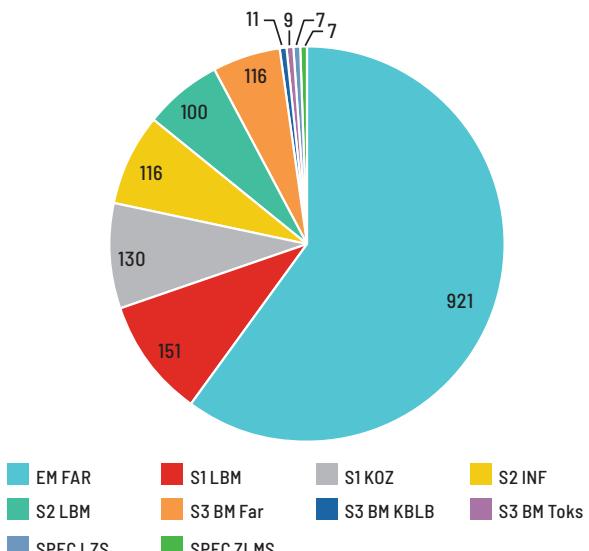
## ŠTEVilo študentov

V študijskem letu 2020/21 je bilo na vseh programih dodiplomskega in poddiplomskega študija UL FFA vpisanih 1520 študentov.

V študijskem letu 2020/21 je zaključilo študij:

- 235 na 1. in 2. stopnji (107 EM FAR, 31 S1 KOZ, 25 S1 LBM, 34 S2 INF, 38 S2 LBM),
- 23 doktorandov na 3. stopnji.

### ŠTUDENTI PO ŠTUDIJSKIH PROGRAMIH V 2020/21 STUDENTS BY PROGRAMME, 2020/21



# STUDENTS AND GRADUATES IN 2020/21

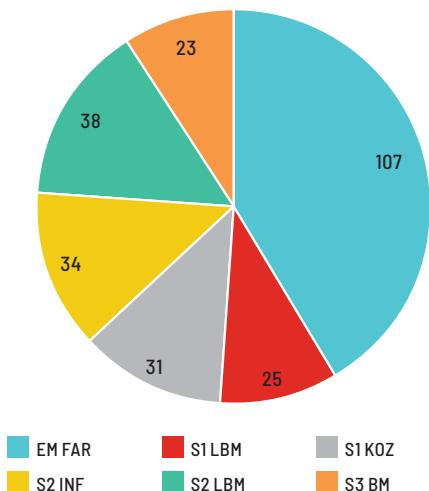
## NUMBER OF STUDENTS

In the academic year 2020/21 1520 students were enrolled in the undergraduate and postgraduate programmes at the University of Ljubljana's Faculty of Pharmacy.

In the academic year 2020/21 there were:

- 235 graduates in cycles 1 and 2 (107 EM FAR, 31 S1 KOZ, 25 S1 LBM, 34 S2 INF, 38 S2 LBM and
- 23 graduates in cycle 3.

### DIPLOMANTI PO ŠTUDIJSKIH PROGRAMIH V 2020/21 GRADUATES BY PROGRAMME, 2020/21



EM FAR – enoviti magistrski študijski program Farmacija / Pharmacy (single-cycle master study programme); S1 LBM – univerzitetni študijski program Laboratorijska biomedicina (1. stopnja) / Laboratory biomedicine (the academic bachelor study programme); S1 KOZ – Univerzitetni študijski program Kozmetologija (1. stopnja) / Cosmetology (the academic bachelor study programme); S2 INF – magistrski študijski program Industrijska farmacija (2. stopnja) / Industrial pharmacy (the master study programme); S2 LBM – magistrski študijski program Laboratorijska biomedicina (2. stopnja) / Laboratory biomedicine (the master study programme); S3 BM – Biomedicina (3. stopnja): področja Farmacija, Klinična biokemijska in laboratorijska biomedicina ter Toksikologija / Biomedicine (the interdisciplinary doctoral programme in Biomedicine – scientific fields: Pharmacy, Clinical Biochemistry and Laboratory Biomedicine, and Toxicology; SPEC – Specializacija v sodelovanju z Lekarniško zbornico Slovenije za področja: Klinična farmacija, Oblikovanje zdravil, Preizkušanje zdravil in Farmakognozija ter v sodelovanju z Zbornico laboratorijske medicine Slovenije za področje Medicinske biokemije / Certificate in collaboration with the Pharmacy Chamber of Slovenia in Clinical Pharmacy, Medical Design, Medicinal Testing and Pharmacognosy, and in collaboration with the Laboratory Chamber of Slovenia in Medical Biochemistry.

## ZNANSTVENA, RAZISKOVALNA IN STROKOVNA DEJAVNOST

Tako kot že leto prej se je UL FFA tudi v letu 2021 kot matična izobraževalna in raziskovalna ustanova na področjih farmacije, klinične kemije in laboratorijske biomedicine intenzivno odzivala na izziv pandemije COVID-19, s katero sta se soočala naša družba in svet. Pri tem je identificirala potencialno pomembna raziskovalna področja in preusmerila del lastnih bazičnih in aplikativnih raziskav. V ta namen smo tudi v tem letu s prijavami usmerjenih raziskav programskih skupin fakultete pri ARRS uspeli zagotoviti dodatno financiranje tovrstnih raziskav v obsegu 3,5 FTE. Nekateri predlogi projektov, usmerjenih v obvladovanje pandemije COVID-19, so bili že prijavljeni v letu 2021, nekatere pa bomo z ustreznimi komplementarnimi partnerji prijavljali na nacionalne in mednarodne raziskovalne razpise v letu 2022. Pričakujemo, da bomo s tem pristopom prispevali sorazmerno pomemben del v mozaiku znanja na področju okužb s SARS-CoV-2.

Na področju raziskav in razvoja je bilo leta 2021 za UL FFA leto presežkov, saj je dosegla več vidnih uspehov:

- Na podlagi kontinuiranih naporov v raziskovalnem delu zadnjih let in kulture prijavljanja raziskovalnih projektov je glede na preteklo leto v letu 2021 uspela povečati obseg tovrstnega financiranja raziskovalnega dela za 4 FTE.
- Sodelavci UL FFA Katedre za farmacevtsko kemijo so objavili članek o longitudinalni študiji novega BchE PET sledilca kot zgodnjega in vivo biološkega označevalca v mišjem modelu Alzheimerjeve bolezni v reviji Theranostics in članek o zaviralcih ionskega kanala hEAG1 s protitumornim delovanjem v reviji Cancers.
- Zaposleni UL FFA so v 2021 prejeli vidna priznanja:

## RESEARCH AND PROFESSIONAL ACTIVITIES

Like a year before in 2020 the UL FFA, being a central educational and research institution in the fields of pharmacy, clinical chemistry and laboratory biomedicine, intensively responded to the challenge of the COVID-19 pandemic, that was burdening our society and the world. Researchers of the faculty have identified potentially important research areas and redirected part of their basic and applied research. For this purpose we managed to secure additional funding for such research in the amount of 3.5 FTE this year as well. Some project proposals, aimed at managing the COVID-19 pandemic, were submitted in 2021, others will be - together with relevant complementary research partners - submitted to national and international research calls in 2022. It is expected that this approach will contribute a proportionally significant part to the emerging knowledge mosaic in the field of SARS-CoV-2 infections.

For the UL FFA the year 2021 was marked with several outstanding achievements in the field of research and development:

- on the basis of continuous efforts in the research work of recent years and the culture of applying for research projects, compared to the previous year, it managed to increase the volume of such research funding by 4 FTEs in 2021.
- The UL FFA Department of Pharmaceutical Chemistry published an article on a longitudinal study of a new BchE PET follower as an early in vivo biological marker in a mouse model of Alzheimer's disease in Theranostics and an article on hEAG1 ion channel blockers with cancer antitumor activity in Cancer.
- In 2021 the employees of the UL FFA received visible recognitions:

- Med Zoisovimi nagrajenci so bili kar trije profesorji Fakultete za farmacijo.
- Dodatno kakovost in aktualnost raziskovalnega dela fakultete potrjuje prijava in vzpostavitev nove programske skupine s področja cepiv, imunoloških zdravil in celične terapije.
- Raziskovalci UL FFA so prejeli kar dve priznanji za najodličnejsi raziskovalni dosežek Univerze v Ljubljani v letu 2021.

Sodelavci UL FFA so raziskovalne dosežke objavljali v prestižnih publikacijah s področja naravoslovja in medicine, s katerimi je fakulteta dosegala znatno družbeno odmevnost. Kljub oviram epidemije je UL FFA v 2021 ohranila sodelovanje s ključnimi gospodarskimi subjekti na področju farmacije doma in v tujini. Ključni kazalci uspešnosti raziskovalnega dela (število objav, število citatov in količina FTE) so pokazali, da je UL FFA tudi v letu 2021 glede na predhodno leto beležila pozitivno rast, kar potrjuje trend konstantne rasti raziskovalnih dosežkov UL FFA v zadnjem petletnem obdobju.

- among the Zois winners were as many as three professors from the Faculty of Pharmacy.
- the additional quality and relevance of the research work of the faculty is confirmed by the application and establishment of a new programme group in the field of vaccines, immunological drugs and cell therapy.
- the UL FFA researchers received two awards for the most outstanding research achievement of the University of Ljubljana in 2021.

Research achievements were published in prestigious publications with high impact factors in the field of natural sciences and medicine. Through citations publications have gained visible recognition of scientific community. Despite the obstacles of the epidemic the UL FFA maintained the cooperation with key economic entities in the field of pharmacy at home and abroad in 2021. Key indicators of research success (number of publications, number of citations and amount of FTE) showed that the UL FFA recorded positive growth in 2021, which confirms the trend of constant growth of the UL FFA research achievements in the last five years.

## OBJAVE IN CITIRANOST DEL V LETU 2021

Raziskovalci UL FFA so v letu 2021 objavili 179 znanstvenih člankov v revijah s faktorjem vpliva (SCI), kar je največ v obdobju po letu 2011. V revijah s SCI je bilo objavljenih 144 izvirnih in 33 preglednih znanstvenih člankov ter 2 kratka znanstvena prispevka.

V letu 2021 so objavljena dela UL FFA prejela 6737 čistih citatov, kar predstavlja konstantno rast (za 12,9 % več kot leto prej). Indeks števila čistih citatov/FTE je v letu 2021 v primerjavi z letom prej večji: iz 96,5 na 119,01.

Preglednica spodaj ponazarja vire financiranja raziskovalne dejavnosti in razmerje znanstvenih člankov glede na FTE, financiranih iz virov ARRS in EU. Kazalnik učinkovitosti števila znanstvenih objav s SCI glede na FTE (ARRS in EU) je v letu 2021 znašal 3,2 članka s SCI/FTE.

V letu 2021 je število FTE 56,61, kar je 3,9 % več v primerjavi z letom prej.

## PUBLICATIONS AND CITATION OF WORKS IN 2021

In 2021 the researchers at the Faculty of Pharmacy published 179 research articles in impact factor (SCI) journals, the highest in the period after 2011. 144 original and 33 review scientific articles and 2 short scientific papers were published in SCI journals.

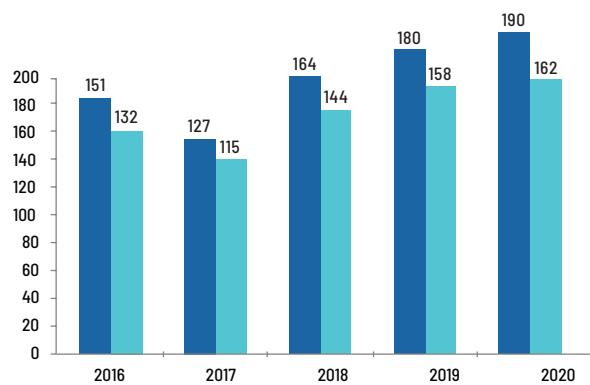
In 2021 published works of the Faculty of Pharmacy received 6.737 pure citations, which represents a constant growth over the years (e.g. 12.9 % more than the year before). The pure citations /FTE index is higher in 2021 compared to the previous year. From 96.5 to 119.01.

The table below illustrates the sources of research activities funding and the ratio of scientific articles in terms of FTE, funded by ARRS and EU sources. The efficiency indicator of the number of scientific publications with SCI compared to FTE (ARRS and EU) in 2021 amounted to 3.2 articles with SCI / FTE.

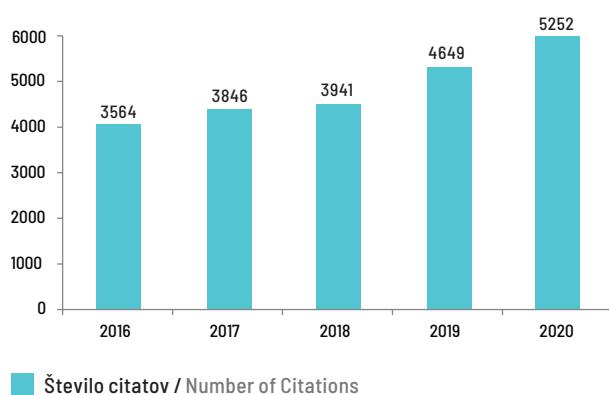
**Razmerje objavljenih znanstvenih člankov raziskovalcev in višina financiranja iz virov ARRS in EU**  
 Ratio between research articles and FTE researchers financed by EU/ARRS

leto/year	Sredstva za raziskovalce (FTE)/ Founds for researchers (FTE)				Število vseh znanstvenih člankov/FTE/ Number of all research publications/FTE	Število člankov v revijah s SCI/FTE/ Number of publications with SCI/FTE
	ARRS Projekti in programi/ Projects and programmes	MR	EU	Skupaj/Total		
2011	15.42	19.60	6.33	41.35	3.9	3.4
2012	17.55	20.30	4.95	42.80	4.0	3.0
2013	17.96	18.28	8.20	44.44	3.4	3.0
2014	19.80	16.80	8.20	44.8	3.2	2.7
2015	19.06	13.80	5.50	38.36	4.0	3.5
2016	23.22	16.83	2.24	42.29	3.6	2.9
2017	21.49	15.10	1.00	37.59	3.4	3.1
2018	24.31	16.6	2.3	43.21	3.8	3.3
2019	26.20	17.25	2.00	45.45	4.0	3.5
2020	32.31	19.65	2.50	54.46	3.5	3.0

**ŠTEVILLO ZNANSTVENIH OBJAV**  
 NUMBER OF SCIENTIFIC PUBLICATIONS



**ŠTEVILLO CITATOV**  
 NUMBER OF CITATIONS



■ Vsi članki / All publications

■ Članki z SCI / Publications with SCI

■ Število citatov / Number of Citations

## PROJEKTI IN PROGRAMI

Raziskovalno delo na UL FFA je potekalo pod okriljem štirih programske skupin ter v okviru številnih projektov. V letu 2021 so bili nacionalni raziskovalni programi ARRS financirani v obsegu 16,02 FTE. UL FFA je izvajala še 41 raziskovalnih projektov v obsegu 17,5 FTE, večje število razvojno-raziskovalnih projektov z gospodarstvom, druge nacionalne in evropske projekte (3 projekte Obzorje 2020) v obsegu 2,5 FTE, druge EU projekte: CELSA, COST, CEEPUS, INTERREG, IMI ENABLE, projekte ESS in ESRR: LAKTIKA, EATRIS-TRI.si, 2 podoktorska projekta Raziskovalci na začetku kariere v obsegu 2,00 FTE ter druge mednarodne in bilateralne projekte. Z uspešnimi prijavami projektov na razpisih ARRS smo v 2021 uspeli povečati obseg financiranja.

UL FFA je v letu 2021 pridobila šest (6) novih mladih raziskovalcev, kar je enako kot v letu 2020 in več kot preteklih sedem let (2019(5), 2018(5), 2017(4), 2016(5), 2015(4), 2014(3), 2013(4)).

## NACIONALNI PROGRAMI IN PROJEKTI

### RAZISKOVALNI PROGRAMI UL FFA

**Farmacevtska tehnologija: od dostavnih sistemov učinkovin do terapijskih izidov zdravil pri otrocih in starostnikih P1-0189 (obseg 3,93 FTE)**

Pod vodstvom prof. dr. Albina Kristla združuje raziskovalce Katedre za biofarmacijo in farmakokinetoiko, Katedre za farmacevtsko tehnologijo in Katedre za socialno farmacijo. Program zajema vse segmente od proučevanja osnovnih lastnosti učinkovin in pomožnih snovi do vrednotenja zdravil kot ekonomske in etične kategorije. Glavni cilj programa je razviti metodologije za prepoznavanje in zmanjšanje interindividualne variabilnosti učinkovin v klinično želenih in neželenih učinkih in tako povečati učinkovitost zdravljenja. Razvijajo postopke za načrtovanje delcev z želenimi lastnostmi, kar se izkorišča pri načrtovanju, izdelavi

## PROJECTS AND PROGRAMMES

The faculty's research work was carried out under the auspices of four programme groups and in the framework of multitude of projects. In 2021 the ARRS's national research programmes were financed to the extent of 16.02 FTE. The Faculty of Pharmacy also carried out 41 research projects, a large number of research development projects in cooperation with the industry, other national and European projects (3 projects within the Horizon 2020)- 2.5 FTE, and several other international projects: CELSA, COST, CEEPUS, INTERREG, IMI ENABLE, ESS and ESRR projects: LAKTIKA, EATRIS-TRI.si, 2 postdoctoral projects Early Career Researchers (2.00 FTE) and other international and bilateral projects. By successfully applying for projects in ARRS tenders, we managed to increase the amount of funding in 2021.

UL FFA acquired six (6) new young researchers in 2021, which is the same as in 2020 and more than in the previous seven years (2019 (5), 2018 (5), 2017 (4), 2016 (5), 2015 (4), 2014 (3), 2013 (4)).

## NATIONAL PROGRAMMES AND PROJECTS

### FACULTY OF PHARMACY RESEARCH-PROGRAMMES

**Pharmaceutical Technology: From delivery systems for active ingredients to drugs' therapeutic results in children and older people - P1-0189 (extent: 3.93 FTE)**

Under the leadership of Prof. Dr. Albin Kristl it brings together researchers from the Department of Biopharmacy and Pharmacokinetics, the Department of Pharmaceutical Technology and the Department of Social Pharmacy. The programme covers all segments from the study of the basic properties of active substances and excipients to the evaluation of medicines as economic and ethical categories. The main goal of the programme is to develop methodologies for identifying and reducing interindividual variability of active substances in clinically desirable and adverse effects and thus

in vrednotenju sodobnih (nano)dostavnih sistemov, ki omogočajo transport učinkovin na mesto delovanja in/ali znotrajcelični privzem ter zaščito pred proteolitičnimi encimi in nadzorovanim sproščanjem. Proučujejo biofarmacevtske in farmakokinetične procese po aplikaciji omenjenih dostavnih sistemov učinkovin ter stabilnost in bioanalitiko učinkovin s poudarkom na razvoju prijaznejših tehnologij. Razvijajo nove eksperimentalne modele za proučevanje sproščanja in za vrednotenje permeabilnosti učinkovin skozi sluznico prebavnega trakta in sečnega mehurja. V okviru programa so razvili tudi več vrst *in vitro* modelov za hkratno proučevanje transporta in metabolizma učinkovin, upoštevajoč tudi farmakogenetske vidike. Razviti farmakokinetični-farmakodinamski modeli omogočajo napovedovanje kliničnih izidov zdravil ter iskanje vzrokov za njihovo variabilnost.

increase the effectiveness of treatment. They develop procedures for the design of particles with the desired properties and this is used in the design, manufacture and evaluation of modern (nano) delivery systems that enable transport of active ingredients to the site of action and/or intracellular uptake and protection against proteolytic enzymes and controlled release. They study biopharmaceutical and pharmacokinetic processes after the application of the mentioned drug delivery systems, as well as the stability and bioanalytics of active substances, with an emphasis on the development of more friendly technologies. They are developing new experimental models to study the release and to evaluate the permeability of active substances through the mucosa of the gastrointestinal tract and bladder. The programme also developed several types of *in vitro* models for the simultaneous study of drug transport and metabolism, taking into account pharmacogenetic aspects. Developed pharmacokinetic-pharmacodynamic models allow the prediction of clinical outcomes of drugs and the search for causes of their variability.

#### **Farmacevtska kemija: načrtovanje, sinteza in vrednotenje učinkovin P1-0208 (obseg: 7,97 FTE)**

Pod vodstvom prof. dr. Stanislava Gobca združuje raziskovalce Katedre za farmacevtsko kemijo, Katedre za klinično biokemijo in Katedre za farmacevtsko biologijo. Cilj raziskovalnega programa je odkrivanje novih učinkovin in razjasnjevanje mehanizma njihovega delovanja na molekularnem nivoju. Program obsega racionalno načrtovanje učinkovin na osnovi znanih in novih validiranih tarč, sintezo in izolacijo učinkovin ter njihovo biološko in fizikalno kemijsko vrednotenje. Glavna področja raziskav obsegajo (i) odkrivanje protibakterijskih učinkovin, katerih tarče so bakterijski encimi in človeški lektini (optimizacija predhodno odkritih MurA-F inhibitorjev, inhibitorjev D-Ala-D-Ala ligaze B, inhibitorjev aspartatne ligaze, inhibitorjev transpeptidazne in transglukozilazne domene penicilinvezočih proteinov z vidika jakosti delovanja, fizikalno-kemijskih in ADMET lastnosti, odkrivanje inhibitorjev reduktaze enoil acil prenašalnega proteina

#### **Pharmaceutical Chemistry: Planning, synthesis and evaluation of active ingredients - P1-0208 (extent: 7.97 FTE)**

Under the leadership of Prof. Dr. Stanislav Gobec it brings together researchers from the Department of Pharmaceutical Chemistry, the Department of Clinical Biochemistry and the Department of Pharmaceutical Biology. The aim of the research programme is to discover new active ingredients and clarify the mechanism of their action at the molecular level. The programme includes rational design of active ingredients based on known and new validated targets, synthesis and isolation of active ingredients and their biological and physical chemical evaluation. The main areas of research include (i) the detection of antibacterial agents targeting bacterial enzymes and human lectins (optimization of previously detected MurA-F inhibitors, D-Ala-D-Ala ligase B inhibitors, aspartate ligase inhibitors, transpeptidase and transglycosylase protein transglycosylase inhibitors in terms of potency, physicochemical and ADMET properties, detection of

(InhA), DNA giraze B in topoizomeraze IV (ParE) in odkrivanje antagonistov lektinov DC-SIGN and FimH), (ii) odkrivanje imunomodulatorjev, katerih tarče so imunoproteasom, NOD1, NOD2 in Tollu-podobni receptorji (NOD1, NOD2, TLR4, TLR7 in TLR8 agonisti in antagonisti), (iii) odkrivanje antineurodegenerativnih spojin, ki se vežejo na napetostno odvisne natrijeve in kalijeve kanale in vplivajo na agregacijo beta amiloida, (iv) odkrivanje novih protirakovih spojin, katerih tarče so katepsin B, proteasom in pregnan-X-receptor, (v) toksikološki vidiki procesa odkrivanja učinkovin, ki vključujejo napovedovanje tvorbe reaktivnih metabolitov, njihovo določanje in identifikacijo endokrinih motilcev v različnih serijah spojin ter (vi) raziskave uporabe rastlinskih sekundarnih metabolitov pri odkrivanju novih učinkovin.

#### **Farmacevtska biotehnologija: znanost za zdravje P4-0127 (obseg na UL FFA: 1,93 FTE)**

Pod vodstvom prof. dr. Janka Kosazdružuje raziskovalce Katedre za farmacevtsko biologijo, Katedre za klinično biokemijo in Odseka za biotehnologijo Instituta Jožefa Stefana. Delo programske skupine se vključuje v sodobne znanstvene trende z namenom povečati vedenje o življenju, ohraniti zdravje ljudi in čisto okolje. Poleg poznavanja osnovnih mehanizmov delovanja celic so izpostavljene predvsem študije mehanizmov nastanka in napredovanja določenih bolezni, saj s poznanjem glavnih dejavnikov v bolezenskih procesih lahko identificirajo nove tarče za uspešnejšo diagnozo in terapijo. Dosedanji dosežki članov programske skupine na tem področju, ki se odražajo v 20 številnih publikacijah in citiranosti, kažejo, da je doprinos novih znanj k svetovni zakladnici znanja pomemben. Pomembno je tudi delo skupine pri iskanju novih možnih učinkovin in diagnostičnih pristopov ter pri razvoju analitskih in biotehnoloških metod. Skupina pri svojem raziskovalnem delu uporablja in uvaja najsodobnejše znanstvene tehnike in metodologije. Povezanost skupine z drugimi raziskovalci v Sloveniji in mednarodnem prostoru zagotavlja pretok znanja in dobre rezultate tudi v prihodnje.

enoyl acyl transfer protein reductase inhibitors (InhA), DNA gyrase B and topoisomerase IV(ParE), and detection of lectins antagonists DC-SIGN and FimH), (ii) detection of immunomodulators whose targets are immunoprotease, NOD1, NOD2 and Toll-like receptors (NOD1, NOD2, TLR4, TLR7 and TLR8 agonists and antagonists), (iii) detection of antineurodegenerative compounds that bind to voltage-gated sodium and potassium aggregates and affect the beta amyloid aggregation, (iv) detection of new anticancer compounds targeting cathepsin B, proteasomes and expelled - X - receptor, (v) toxicological aspects of the active substance detection process, including predicting the formation of reactive metabolites, their identification and identification of endocrine disruptors in different batches of compounds; and (vi) research into the use of plant secondary metabolites in the detection of new active substances.

#### **Pharmaceutical Biotechnology: Science for health - P4-0127 (extent at UL FFA: 1.93 FTE)**

Under the leadership of Prof. Dr. Janko Kos it brings together researchers from the Department of Pharmaceutical Biology, the Department of Clinical Biochemistry and the Department of Biotechnology of the Jožef Stefan Institute. The work of the programme group is included in modern scientific trends in order to increase knowledge about life, maintain human health and clean environment. In addition to knowledge of the basic mechanisms of cell function, studies of the mechanisms of origin and progression of certain diseases are highlighted, as knowledge of the main factors in disease processes can identify new targets for more successful diagnosis and therapy. The achievements of the members of the programme group in this field so far, which are reflected in 20 numerous publications and citations, have shown that the contribution of new knowledge to the global treasury of knowledge is important. The work of the group is also important in the search for new possible active ingredients and diagnostic approaches, as well as in the development of analytical and biotechnological methods. In its research work the group uses and introduces state-of-the-art scientific techniques and methodologies. The connection of the group with other researchers both in Slovenia and internationally ensures the flow of knowledge and good results in the future as well.

## Napredna imunološka zdravila in celični pristopi v farmaciji

Pod vodstvom prof. dr. Žige Jakopina združuje raziskovalce Katedre za farmacevtsko kemijo, Katedre za farmacevtsko biologijo, Katedre za klinično biokemijo in Katedre za farmacevtsko tehnologijo. Cilj programa je razvoj varnih in učinkovitih cepiv proti nalezljivim boleznim, razvoj zdravil za imunoterapijo in celično terapijo rakavih obolenj ter imunoterapijo alergij. Program temelji na treh osnovnih platformah: (i) Razvoj inovativnih cepiv; (ii) Imunoterapija in celična terapija kot napredna pristopa za zdravljenje raka in alergij ter (iii) Imunotoksikološko profiliranje. V platformi razvoja inovativnih cepiv (klasična cepiva, cepiva nove generacije, tumorska cepiva, cepiva za imunoterapijo alergij) so zajete vse faze razvoja cepiv: ekspresija proteinov, DNA ali RNA ter njihova izolacija in čiščenje, razvoj sintetičnih adjuvantov, razvoj formulacij oziroma naprednih dostavnih sistemov ter označevanje z ligandi za ciljano dostavo, imunofarmakološko vrednotenje *in vitro* ter vrednotenje učinkovitosti in varnosti cepiv in vivo. V drugi platformi, imunoterapija in celična terapija kot napredna pristopa za zdravljenje raka in alergij, so zajeta področja razvoja inovativnih agonistov prirojene imunosti za zdravljenje raka, uporaba mezenhimskih matičnih celic (MSC) kot dostavni sistem za ciljanje rakavih tkiv, proučevanje novih sinergističnih kombinacij ZU s protirakovim delovanjem in uporaba imunoterapije ter imunosupresivnega delovanja MSC pri zdravljenju alergij. V tretjem sklopu je program usmerjen v proučevanje imunotoksičnih učinkov *in vitro* ter vrednotenje imunogenosti.

## Advanced immunological drugs and cellular approaches in pharmacy

Under the leadership of Prof. Dr. Žiga Jakopin it brings together researchers from the Department of Pharmaceutical Chemistry, the Department of Pharmaceutical Biology, the Department of Clinical Biochemistry and the Department of Pharmaceutical Technology. The goal of the programme is the development of safe and effective vaccines against infectious diseases, the development of drugs for immunotherapy and cell therapy of cancer and immunotherapy of allergies. The programme is based on three basic platforms: (i) Development of innovative vaccines; (ii) Immunotherapy and cell therapy as advanced approaches for the treatment of cancer and allergies; and (iii) Immunotoxicological profiling. The platform for the development of innovative vaccines (classic vaccines, new generation vaccines, tumor vaccines, allergy immunotherapy vaccines) covers all stages of vaccine development: expression of proteins, DNA or RNA and their isolation and purification, development of synthetic adjuvants, development of formulations or advanced delivery systems and labeling with ligands for targeted delivery, *in vitro* immunopharmacological evaluation, and evaluation of the efficacy and safety of *in vivo* vaccines. The second platform, immunotherapy and cell therapy, as advanced approaches for cancer and allergy treatment, covers areas of development of innovative innate agonists for cancer treatment, use of mesenchymal stem cells (MSC) as a delivery system to target cancerous tissues, study of new synergistic combinations of ZU with anticancer action and the use of immunotherapy and immunosuppressive action of MSCs in the treatment of allergies. In the third part, the programme focuses on the study of immunotoxic effects *in vitro* and the evaluation of immunogenicity.

## **Klinična biokemija: geni, hormonske in osebnostne spremembe pri metabolnih motnjah P3-0298 (obseg na UL FFA: 2,19 FTE)**

Pod vodstvom prof. dr. Andreja Janeža deluje na UKC Ljubljana ter na UL FFA, Katedra za klinično biokemijo, koordinatorica je prof. dr. Janja Marc. Program je zasnovan na lastnih dolgoletnih izkušnjah in dosežkih na področju kliničnih in laboratorijskih raziskav, ki proučujejo kronične presnovne bolezni, osteoporozo, sladkorno bolezen in sindrom policističnih ovarijev. Osteoporozo proučujejo na ravni lokalnih regulatorjev kostne premene. Cilj raziskave je, da osvetlijo pomen lokalnih regulatorjev za etiopatogenezo osteoporoze. Predpostavlja, da bodo identificirali serumski označevalci, ki bo v korelaciji z dogajanjem v samem kostnem tkivu. Načrtujejo tudi raziskavo vpliva zarodnih mutacij nekaterih odgovornih genov na zdravljenje (farmakogenetika) in na zgodnje odkrivanje oseb s povečanim tveganjem za osteoporozo. Na področju sladkorne bolezni raziskujejo pojav rezistence celic v perifernih tkivih na insulin. Pri bolnicah s sindromom policističnih ovarijev jih zanimajo spremembe mehanizma prenosa glukoze v adipocite po zdravljenju z metforminom ali rosiglitazonom. Predpostavlja se, da bodo pripomogli k razumevanju etiopatogeneze sindroma policističnega ovarija, ki sloni na insulinski rezistenci.

## **Clinical Biochemistry: Genes, hormonal and personality changes in metabolic disorders - P3-0298 (extent at UL FFA: 2.19 FTE)**

Under the leadership of Prof. Dr. Andrej Janež it operates at the University Medical Centre Ljubljana and at the University of Ljubljana FFA, Department of Clinical Biochemistry, the coordinator is Prof. Dr. Janja Marc. The programme is based on our own experience gained throughout the years and all the achievements in clinical and laboratory research, examining chronic metabolic diseases, osteoporosis, diabetes and polycystic ovary syndrome. Osteoporosis is being studied at the level of local regulators of bone turnover. The aim of the study is to shed light on the importance of local regulators for the etiopathogenesis of osteoporosis. They assume that they will identify a serum marker that will correlate with the events in the bone tissue itself. They are also planning to study the impact of germline mutations in some of the responsible genes on treatment (pharmacogenetics) and on the early detection of people at increased risk for osteoporosis. In the field of diabetes, they are investigating the phenomenon of cell resistance in peripheral tissues to insulin. In patients with polycystic ovary syndrome they are interested in changes in the mechanism of glucose transfer to adipocytes after treatment with metformin or rosiglitazone. They are thought to be of help in understanding the etiopathogenesis of polycystic ovary syndrome based on insulin resistance.

## **Sodelovanje v drugih programih**

Raziskovalci fakultete sodelujejo tudi v raziskovalnih programih, ki se izvajajo na drugih inštitucijah, in sicer Eksperimentalna biofizika kompleksnih sistemov in slikanje v biomedicini, vodja je prof. dr. Janez Štrancar na Institutu Jožef Stefan, Sistemske avtoimunske bolezni, vodja je izr. prof. dr. Snežna Šemrl Sodin na UKC Ljubljana in Celična fiziologija 1 10-7, vodja je prof. dr. Robert Zorec na UKC Ljubljana.

## **Participation in other programmes**

Researchers of the faculty also participate in research programmes carried out at other institutions, namely Experimental Biophysics of Complex Systems and Imaging in Biomedicine, the leader is Prof. Dr. Janez Štrancar at the Jožef Stefan Institute, Systemic Autoimmune Diseases, where the Head is Assoc. Prof. Dr. Snežna Šemrl Sodin at the University Medical Centre Ljubljana, and Cellular Physiology1 10-7, where the leader is Prof. Dr. Robert Zorec at the University Medical centre Ljubljana.

## NACIONALNI RAZISKOVALNI PROJEKTI UL FFA

### Temeljni raziskovalni projekti ARRS

- J3-9256 - Razvoj agonistov receptorja NOD2 ter dualnih NOD2/TLR7 agonističnih konjugatov kot novih adjuvansov za cepiva(nosilec: izr. prof. dr. Žiga Jakopin)
- J1-9192 - Nove protitumorne učinkovine napetostno odvisnih kalijevih kanalov hEag1 in njihova validacija v limfomih (nosilka: prof. dr. Lucija Peterlin Mašič)
- J1-9194 - Nanozdravila z antibiotiki in probiotiki za lokalno zdravljenje parodontalne bolezni (nosilka: prof. dr. Julijana Kristl)
- J3-9267 - Zaviranje aktivnosti katepsina X kot nov pristop za zdravljenje Parkinsonove bolezni (nosilka: doc. dr. Anja Pišlar)
- J4-9327-Ciljanje, slikanje in zdravljenje kolorektalnega raka z varnimi teranostičnimi bakterijami (koordinator na UL FFA: prof. dr. Janko Kos, nosilec: prof. dr. Aleš Berlec, IJS)
- J3-1749 - Mezenhimske matične celice – nosilci endogene regenerativne sposobnosti tkiv v boju proti staranju mišično-skeletnega sistema (nosilka: doc. dr. Janja Zupan)
- J1-1717-Razvoj novih zaviralcev Hsp90 s protitumornim delovanjem (nosilec: izr. prof. dr. Tihomir Tomašič)
- J3-1759 - Celostna karakterizacija zadetkov analiz GWAS – pot do novih terapevtskih tarč za anabolno zdravljenje osteoporoze (GWASforAna) (nosilka: prof. dr. Janja Marc)
- J3-1745 - Vloga imunoproteasoma v oblikovanju imunskega odziva posredovanega s trombociti (nosilka: doc. dr. Martina Gobec)
- J4-1776 - Izboljšanje imunoterapevtske vrednosti NK celic z modulacijo cistatina F (koordinator na UL FFA: prof. dr. Janko Kos, nosilec: prof. dr. Janko Kos, IJS)
- J4-1778 - Uporaba malega proteina bakteriofaga v boju proti razvoju odpornosti proti antibiotikom pri bakteriji *Staphylococcus aureus* (koordinator na UL FFA: prof. dr. Stanislav Gobec, nosilec: doc. dr. Matej Butala, UL BF)

## FACULTY OF PHARMACY RESEARCH PROJECTS

### ARRS basic research projects

- J3-9256 - Development of NOD2 agonists and dual NOD2/TLR7 agonistic conjugates as novel vaccine adjuvants (PI: Assoc. Prof. Dr. Žiga Jakopin)
- J1-9192 - New anticancer leads for emerging cancer target potassium ion channels hEag1 and its validation in lymphoma tumors (PI: Prof. Dr. Lucija Peterlin Mašič)
- J1-9194 - Nanomedicines with antibiotics and probiotics for local treatment of periodontal disease (PI: Prof. Dr. Julijana Kristl)
- J3-9267 - Inhibition of cathepsin X activity as a novel strategy for the treatment of Parkinson's disease (PI: Assist. Prof. Dr. Anja Pišlar)
- J4-9327 - Targeting, imaging, and treating of colorectal cancer with safe theranostic bacteria (coordinator at UL FFA: Prof. Dr. Janko Kos, PI: Prof. Dr. Aleš Berlec, Jožef Stefan Institute)
- J3-1749 - Mesenchymal stem cells - the keepers of tissue endogenous regenerative capacity facing up to aging of the musculoskeletal system (PI: Assist. Prof. Dr. Janja Zupan)
- J1-1717 - Development of novel Hsp90 inhibitors with anticancer activity (PI: Assoc. Prof. Dr. Tihomir Tomašič)
- J3-1759 - Comprehensive characterization of GWAS hits - pipeline to novel drug targets for anabolic treatment of osteoporosis (GWASforAna) (PI: Prof. Dr. Janja Marc)
- J3-1745 - Elucidating the role of immunoproteasome in platelet-driven immune response (PI: Assist. Prof. Dr. Martina Gobec)
- J4-1776 - Improvement of immunotherapeutic potential of NK cells through modulation of cystatin F (coordinator at UL FFA: Prof. Dr. Janko Kos, PI: Prof. Dr. Janko Kos, Jožef Stefan Institute)
- J4-1778 - Exploitation of a virus-borne small protein to combat antibiotic resistance in *Staphylococcus aureus* (coordinator at UL FFA: Prof. Dr. Stanislav Gobec, PI: Assist. Prof. Dr. Matej Butala, University of Ljubljana, Biotechnical Faculty)

- J1-1715-Atlasproteinskihinterakcijzanapovedovanje genskih variacij, povezanih z interakcijami zdravili in razvojem bolezni (koordinator na UL FFA: prof. dr. Stanislav Gobec, nosilka: prof. dr. Dušanka Janežič, UP FAMNIT)
- J1-1709 - Strukturni vpogled v mehanizem tvorbe površine bakterije *Clostridium difficile* (koordinator na UL FFA: izr. prof. dr. Janez Mravljak, nosilec: prof. dr. Dušan Turk, IJS)
- J4-1767 - Selektivna ekstrakcija molekul z visoko vrednostjo za sektor specialnih kemikalij iz ostankov predelave lesa (koordinator na UL FFA: prof. dr. Samo Kreft, nosilka: dr. Andreja Kutnar, InnoRenew CoE)
- J1-2485 - Poljub smrti glavnim dejavnikom apoptoze: razvoj razgrajevalcev proteinov BCL-2 in BAX (nosilec: doc. dr. Izidor Sosič)
- J1-2483 - Radiofarmaki z antagonističnim delovanjem na CCK2R (nosilec: prof. dr. Marko Anderluh)
- J3-2517 - Razvoj himernih multiplih agonistov receptorjev prirojene imunosti kot učinkovitih adjuvansov za cepiva (nosilec: izr. prof. dr. Žiga Jakopin)
- J1-2484 - Razvoj protibakterijskih učinkovin z delovanjem na validirane tarče v biosintezi peptidoglikana (nosilec: prof. dr. Stanislav Gobec)
- J3-2518 - Proteini APOBEC in onkogeneza virusov HPV (koordinatorica na UL FFA: doc. dr. Marija Nika Lovšin, nosilka: doc. dr. Martina Bergant Marušič, UNG)
- J3-2521 - Vnetni procesi pri intersticijskem cistitisu in vrednotenje delovanja agonistov kanabinoidnih receptorjev sečnega mehurja (koordinatorica na UL FFA: izr. prof. dr. Mojca Kerec Kos, nosilec: prof. dr. Peter Veranič, UL MF)
- J7-2603 - Učinkovitost bakteriofagov za zdravljenje ekstracelularnih in intracelularnih bakterijskih okužb implantatov (koordinatorica na UL FFA: doc. dr. Janja Zupan, nosilec: izr. prof. dr. Aleš Podgornik, UL FKKT)
- J1-3030 - MTAvsAMR: novi večtarčni antibiotiki proti večkratno odpornim bakterijam (nosilka: prof. dr. Lucija Peterlin Mašič)
- J1-1715 - Protein interaction atlas for prediction of genetic variations involved in drug interactions and disease development (coordinator at UL FFA: Prof. Dr. Stanislav Gobec, Pl: Prof. Dr. Dušanka Janežič, University of Primorska, FAMNIT)
- J1-1709 - Structural insight into the mechanism of Clostridium difficile surface formation (coordinator at UL FFA: Assoc. Prof. Dr. Janez Mravljak, Pl: Prof. Dr. Dušan Turk, Jožef Stefan Institute)
- J4-1767 - Selective extraction of high value molecules from forest products processing residues in the specialty chemicals sector (coordinator at UL FFA: Prof. Dr. Samo Kreft, Pl: Dr. Andreja Kutnar, InnoRenew CoE)
- J1-2485 - Development of antibacterial compounds targeting validated enzymes in peptidoglycan biosynthesis (Pl: Assist. Prof. Dr. Izidor Sosič)
- J1-2483 - Radiopharmaceuticals with antagonistic activity on CCK2R (Pl: Prof. Dr. Marko Anderluh)
- J3-2517 - Development of innate immune receptor-targeting chimeras as custom-tailored vaccine adjuvants (Pl: Assoc. Prof. Dr. Žiga Jakopin)
- J1-2484 - Development of antibacterial compounds targeting validated enzymes in peptidoglycan biosynthesis (Pl: Prof. Dr. Stanislav Gobec)
- J3-2518 - Role of APOBEC proteins in the oncogenesis of HPV viruses (coordinator at UL FFA: Assist. Prof. Dr. Marija Nika Lovšin, Pl: Assist. Prof. Dr. Martina Bergant Marušič, University of Nova Gorica)
- J3-2521 - Inflammatory process in interstitial cystitis and evaluation of the influence of cannabinoid receptor agonists in urinary bladder - from cells to patients (coordinator at UL FFA: Assoc. Prof. Dr. Mojca Kerec Kos, Pl: Prof. Dr. Peter Veranič, University of Ljubljana, Faculty of Medicine)
- J7-2603 - Efficacy of bacteriophages for treatment of extracellular and intracellular bacterial infections of implants (coordinator at the Faculty of Pharmacy: Assist. Prof. Dr. Janja Zupan, Pl: Assoc. Prof. Dr. Aleš Podgornik, University of Ljubljana, Chemistry and Faculty of Chemical Technology)
- J1-3030 - MTAvsAMR: new MultiTargeting Antibiotics against AntiMicrobial Resistance (Pl: Prof. Dr. Lucija Peterlin Mašič)

- J1-3031 - Razvoj novih zaviralcev bakterijskih topoizomeraz za boj proti odpornim infekcijam (nosilec: izr. prof. dr. Nace Zidar)
- J3-3062 - Avtologni imunohibridomi in napredno zdravljenje trojno negativnega raka dojk stadijev II in III (nosilec: prof. dr. Matjaž Jeras)
- J4-3096 - Rekombinantni probiotiki kot bio-alternativni protimikroben pristop proti bakteriji Clostridioides difficile (nosilec: prof. dr. Borut Štrukelj)
- J3-3071 - Katepsina B in X v tumorskih matičnih celicah raka dojke - molekulske tarče in pomen za protitumorno terapijo (koordinator na UL FFA: Janko Kos, nosilka: asist. dr. Ana Mitrović, IJS)
- J1-3018 - Pametne sonde za zgodnjo napoved Alzheimerjeve bolezni z ex vivo testom (koordinator na UL FFA: Stanislav Gobec, nosilec: prof. dr. Janez Košmrlj, UL FKKT)
- J1-3021 - Platforma osnovana na sintetičnih biofilmih za študij in razvoj novih protimikrobnih pristopov (koordinator na UL FFA: izr. prof. dr. Nace Zidar, nosilec: doc. dr. Iztok Dogša, UL BF)
- J2-3043 - Izkoriščanje magneto-mehanskega učinka pri zdravljenju nevrodgenerativnih bolezni (koordinatorica na UL FFA: Petra Kocbek, nosilec: doc. dr. Slavko Kralj, IJS)
- J4-3092 - Razvoj biološko aktivnih in kemijsko obstojnih ksantofilov, temelječ na trajnostnemu estrenju ksantofilov iz obnovljivih naravnih virov (koordinator na UL FFA: izr. prof. dr. Ilija German Ilić, nosilec: doc. dr. Alen Albreht, KI)
- J3-3079 - Baktericidna nanorezila: preizkus bimodalnega mehanokemijskega odstranjevanja trdovratnih biofilmov (nosilec: doc. dr. Stane Pajk)
- J1-3031 - Development of new inhibitors of bacterial topoisomerases to overcome antimicrobial resistance (PI: Assoc. Prof. Dr. Nace Zidar)
- J3-3062 - Autologous immunohybridomas and advanced treatment of stage II and III triple-negative breast cancer (PI: Prof. Dr. Matjaž Jeras)
- J4-3096 - Recombinant probiotics as bio-alternative antimicrobial approach against Clostridioides difficile (PI: Prof. Dr. Borut Štrukelj)
- J3-3071 - Cathepsins B and X in breast cancer stem cells - molecular targets and relevance for antitumor therapy (coordinator at UL FFA: Prof. Dr. Janko Kos, PI: Assist. Dr. Ana Mitrović - IJS)
- J1-3018 - Smart probes for ex vivo assay-based early prediction of Alzheimer disease (coordinator at UL FFA: Prof. Dr. Stanislav Gobec, PI: Prof. Dr. Janez Košmrlj - UL FKKT)
- J1-3021 - A synthetic biofilm-based platform for studying and development of new antibiofilm strategies (coordinator at UL FFA: Assoc. Prof. Dr. Nace Zidar, PI: Assist. Prof. Dr. Iztok Dogša - UL BF)
- J2-3043 - Exploitation of the magneto-mechanical effect in the treatment of neurodegenerative diseases (coordinator at UL FFA: Assoc. Prof. Dr. Petra Kocbek, PI: Assist. Prof. Dr. Slavko Kralj - IJS)
- J4-3092 - Development of biologically active and chemically stable xanthophylls based on a sustainable esterification of xanthophylls from renewable natural resources (coordinator at UL FFA: Assoc. Prof. Dr. Ilija German Ilić, PI: Assoc. Prof. Dr. Alen Albreht - KI)
- J3-3079 - Bactericidal nanoblades: a proof-of-concept approach for bimodal chemo-mechanical eradication of persistent biofilms (PI: Assist. Prof. Dr. Stane Pajk).

### **Aplikativni raziskovalni projekti ARRS**

- L1-3160 - Razvoj visokokoncentriranih proteinских formulacij in vrednotenje kinetike absorpcije po subkutani aplikaciji(nosilec: prof. dr. Iztok Grabnar)
- L3-3176-Vlogainmožnauporabaimunomodulatornih mezenhimskih matičnih celic v zdravljenju bolezni COVID-19(nosilka: doc. dr. Janja Zupan)
- L3-3177 - Vrednotenje varnosti kanabinoidov in pomen za javno zdravje in vedenje potrošnikov (koordinator na UL FFA: doc. dr. Jurij Trontelj, nosilka: prof. dr. Metka Filipič, NIB)

### **Ciljni raziskovalni programi**

- V4-2038 - DNK cepiva in peptidni inhibitorji proti SARS-CoV-2 (koordinator na UL FFA: prof. dr. Borut Štrukelj, nosilec: prof. dr. Roman Jerala, KI)

### **Podoktorski raziskovalni projekti**

- Z1-1859 - Kovalentni zaviralcii: zaviranje monoamin oksidaze preko nekatalitskih aminokislinskih ostankov(nosilec: doc. dr. Damijan Knez)
- Z1-2635 - Modularna asimetrična totalna sinteza biološko aktivnih naravnih produktov z več kiralnimi centri(nosilec: asist. dr. Andrej Emanuel Cotman)

### **Drugi nacionalni projekti**

- NC-0009 - Razvoj novih karbamatičnih sond za holinestereze(nosilec: prof. dr. Stanislav Gobec)
- N1-0098 - Odkrivanje in mehanizem delovanja novih spojin vodnic hEagl kalijevih kanalov s protirakovim delovanjem(nosilka: prof. dr. Lucija Peterlin Mašič)
- N1-0169 - Kovalentni pristop k boju proti bakterijski rezistenci(nosilec: prof. dr. Stanislav Gobec)
- N1-0172 - Fotokemijski pristop za odkrivanje naprednih ATP-kompetitivnih prob z zaviralnim delovanjem na Topoizomerazo IIalfa (nosilec: prof. dr. Janez Ilaš)

### **ARRS's applied research projects**

- L1-3160 - Development of highly concentrated protein formulations and evaluation of absorption kinetics after subcutaneous administration (PI: Prof. Dr. Iztok Grabnar)
- L3-3176 - The Role and Potential Application of Immunomodulatory Mesenchymal Stem Cells in COVID-19 Disease(PI: Assist. Prof. Dr. Janja Zupan)
- L3-3177 - Safety evaluation of cannabinoids and implications for public health and consumers' behaviour (coordinator at UL FFA: Assist. Prof. Dr. Jurij Trontelj, PI: Prof. Dr. Metka Filipič - NIB)

### **Target research programmes**

- V4-2038 - DNA vaccine and peptide inhibitors against SARS-CoV-2 (coordinator at the Faculty of Pharmacy: Prof. Dr. Borut Štrukelj, PI: Prof. Dr. Roman Jerala, National Institute of Chemistry)

### **Post-doctoral research projects**

- Z1-1859 - Targeted covalent inhibitors: inhibiting monoamine oxidase through non-catalytic amino-acid residues (PI: Assist. Prof. Dr. Damijan Knez)
- Z1-2635 - Modular asymmetric total synthesis of bioactive multi-chiral natural products (PI: Assist. Prof. Dr. Andrej Emanuel Cotman)

### **Other national projects**

- NC-0009 - Development of new carbamate-based imaging probes for cholinesterases (PI: Prof. Dr. Stanislav Gobec)
- N1-0098 - Discovery and mechanism of action of novel hEagl potassium channel lead molecules with anti-cancer activity(PI: Prof. Dr. Lucija Peterlin Mašič)
- N1-0169 - A Covalent approach against antibiotic resistance(PI: Prof. Dr. Stanislav Gobec)
- N1-0172 - Photochemistry toolbox for discovery of advanced ATP-competitive chemical probes with Topoisomerase II alpha inhibitory activity (PI: Prof. Dr. Janez Ilaš)

## MEDNARODNI RAZISKOVALNI PROJEKTI V 2021

### EU PROJEKTI

#### PROJEKTI OBZORJE 2020

##### PhD4GlycoDrug

UL FFA je v okviru programa Obzorje 2020 Marie Skłodowska-Curie Innovative Training Networks izvajala štiriletni projekt European Joint Doctorate z akronimom PhD4GlycoDrug. To je skupni evropski doktorski program na področju odkrivanja in razvoja spojin vodnic na osnovi ogljikovih hidratov z delovanjem na lektinske receptorje in encime, ki vežejo in procesirajo ogljikove hidrate. Skupni izobraževalni in raziskovalni program konzorcija PhD4GlycoDrug vključuje vse faze razvoja do spojine vodnice, od identifikacije in karakterizacije novih tarč, odkrivanja novih bioaktivnih spojin, njihove optimizacije in biokemijskega vrednotenja v sistemih *in vitro* ter *in vivo*. Koordinator projekta na UL FFA je prof. dr. Marko Anderluh.

##### EATRIS-Plus

V okviru programa Obzorje 2020 je evropski infrastrukturni center za translacijsko medicino EATRIS pridobil financiranje Evropske komisije za vodilni projekt EATRIS-Plus. Namenjen je krepitvi zmogljivosti in zagotavljanju inovativnih znanstvenih orodij za doseganje trajnosti programa EATRIS na področju personalizirane medicine. Specifični cilji projekta vključujejo utrjevanje zmogljivosti centra EATRIS na področju personalizirane medicine za boljše delovanje akademskih institucij in industrije ter povečanje povezovanja centra EATRIS z velikimi farmacevtskimi podjetji, krepitev trajnostnega finančnega modela EATRIS, spodbujanje deležnikov k aktivnemu vključevanju v infrastrukturno delovanje in razširitev strateškega partnerstva z raziskovalno infrastrukturo. EATRIS-Plus bo prispeval k združevanju in izkorisčanju translacijske infrastrukturne zmogljivosti akademskih

## INTERNATIONAL RESEARCH PROJECTS IN 2021

### EU PROJECTS

#### HORIZON 2020 PROJECTS

##### PhD4GlycoDrug

Within the context of Horizon 2020 Marie Skłodowska-Curie Innovative Training Networks the UL FFA acquired a four-year European Joint Doctorate with acronym PhD4GlycoDrug. PhD4GlycoDrug project is a common European doctoral programme in the field of discovery and development of lead compounds based on carbohydrate structure, with the action on lectin receptors and enzymes that bind and process carbohydrates. The joint education and research programme of the consortium PhD4GlycoDrug includes all stages of development till the lead compound, from the identification and characterization of new targets, discovery of new bioactive compounds, their optimization and biochemical evaluations in *in vitro* and *in vivo* systems. Project coordinator at the Faculty of Pharmacy is Prof. Dr. Marko Anderluh.

##### EATRIS-Plus

Within the context of Horizon 2020 the European Infrastructure for Translational Medicine EATRIS gained funding from the European Commission for the leading project EATRIS-Plus. The project is designed to strengthen the capacity and provide innovative scientific tools to achieve the sustainability of the EATRIS programme in the field of personalized medicine. The specific objectives of the project include: consolidating the capacity of the EATRIS centre in the field of personalized medicine to improve the functioning of academic institutions and industry and to enhance the integration of the EATRIS centre with large pharmaceutical companies; to strengthen the sustainable EATRIS financial model; to encourage stakeholders to actively integrate into infrastructure operations; and to extend the strategic partnership with research infrastructure. EATRIS-Plus will

institucij na področju različnih tehnologij omik ter priskrbel dostop do podatkov, pridobljenih s tovrstnimi sodobnimi tehnologijami. Projekt bo s tem omogočil lažje reševanje globalnih znanstvenih in družbenih izzivov na področju personalizirane medicine. Koordinatorica na UL FFA je prof. dr. Irena Mlinarič-Raščan.

## ORBIS

Open Research Biopharmaceutical Internships Support (ORBIS) je mednarodni projekt v okviru programa Obzorje 2020 – MSCA - Research and Innovation Staff Exchange (RISE). Šest akademskih ustanov in štiri farmacevtska podjetja iz sedmih držav sodelujejo z namenom izboljšanja predklinične poti razvoja zdravil s povečano produktivnostjo raziskav in razvoja, zlasti z osredotočanjem na postopke in tehnologije, ki obravnavajo slabo biološko uporabnost zdravil. Shema RISE podpira napotitve, da se tako mladi kot izkušeni raziskovalci napotijo v konzorcijske partnerske ustanove na napredne študije iz farmacevtske preformulacije, dozirne oblike in sistemov za dajanje zdravil ter metode biofarmacevtskega vrednotenja. Projekt ORBIS omogoča raziskovalcem, ki so napoteni na gostujoče institucije, pridobivanje novih veščin in razvijanje kompetenc v mednarodnem in medsektorskem okolju ter krepitev človeškega kapitala in sinergij znanja v evropskem farmacevtskem raziskovalnem in razvojnem sektorju.

V letu 2021 se je konzorciju partnerjev ORBIS med drugimi pridružila tudi UL FFA, ki bo v okviru projekta na usposabljanje poslala 9 svojih zaposlenih ter gostovala 13 tujih raziskovalcev. Nositelca projekta sta izr. prof. dr. Rok Dreu in prof. dr. Stanko Srčič.

## PROJEKTI ERASMUS+

### ADVANCE

Projekt Erasmus+ ADVANCE je evropski izobraževalni projekt. Zasnovan je na tristopenjskem učnem programu s področja naprednih zdravil (ATMP) in

contribute to combining and exploiting the translational infrastructure capacity of academic institutions in the field of different "omic technologies" and provide access to data obtained through such modern technologies. The project will facilitate the resolution of global scientific and societal challenges in the field of personalized medicine. The coordinator at the University of Pharmacy is Prof. Dr. Irena Mlinarič-Raščan.

## ORBIS

Open Research Biopharmaceutical Internships Support (ORBIS) is an international project within the Horizon 2020 programme - MSCA - Research and Innovation Staff Exchange (RISE). Originally, six academic institutions and four pharmaceutical companies from seven countries are working together to improve the preclinical pathway of drug development through increased R&D productivity, in particular by focusing on processes and technologies that address the poor bioavailability of drugs. The RISE scheme supports referrals by referring both young and experienced researchers to consortium partner institutions for advanced studies in pharmaceutical reformulation, dosage form and drug delivery systems, and biopharmaceutical evaluation methods. The ORBIS project enables researchers seconded to host institutions to acquire new skills and develop competencies in an international and cross-sectoral environment, and to strengthen human capital and knowledge synergies in the European pharmaceutical research and development sector.

In 2021 the consortium of ORBIS partners was joined by, among others, UL FFA, which will send 9 of its employees for training as part of the project and host 13 foreign researchers. The project leaders are Assoc. Prof. Dr. Rok Dreu and Prof. Dr. Stanko Srčič.

## ERASMUS+ PROJECTS

### ADVANCE

The Erasmus + ADVANCE project is an example of the implementation of the good practice of complex learning. It is based on a three-stage learning

vsebuje: 1) spletne tečaje, 2) spletne seminarje ter 3) praktični enotedenski delavnici. UL FFA je z italijanskim Inštitutom za zdravje (Istituto Superiore di Sanita - ISS) zadolžena za sodelovanje pri pripravi učnega načrta ter izvedbo delavnic. Vsaka delavnica sprejme do 30 slušateljev. Udeleženci programa izobraževanja prejmejo potrdila, s pomočjo katerih bodo dokazovali ekspertizo s področja ATMP. Program je namenjen študentom in znanstvenikom s širšega področja biomedicine, ki bi na začetku svoje kariere želeli pridobiti specifična znanja in kompetence za spopadanje z izzivi pri razvoju, izdelavi, trženju in uporabi ATMP. Koordinator projekta je EATRIS ERIC, Nizozemska. Poleg UL FFA kot partnerji sodelujejo še: Istituto Superiore di Sanita, Italija; Universite Libre de Bruxelles, Belgija; Elevate, Nizozemska; KU Leuven, Belgija in Takis SRL, Italija. Koordinatorica na UL FFA je prof. dr. Irena Mlinarič-Raščan.

## OEMONOM

»Open access Educational Materials on Naturally Occurring Molecules – sources, biological activity and use« je projekt Erasmus+. Glavni cilj projekta je pripraviti gradiva o pozitivnih in negativnih učinkih naravnih spojin oz. rastlin, v katerih se nahajajo in ki se uporabljajo za več različnih indikacij (okužbe, menopavza in ginekološke težave, benigna hiperplazija prostate, kašelj, bolezni srca in ožilja, centralnega živčnega sistema ter kože in motnje prebavil) v skladu z najnovejšimi znanstvenimi dokazi. Pripravljena gradiva bodo na voljo za delo v spletnih učilnicah za študente, prav tako bodo objavljena v strokovnih in laičnih revijah. Koordinator projekta je izr. prof. dr. Przemysl Mladěnka, Fakulteta za farmacijo na Univerzi Charles, Hradec Králové. Koordinatorica projekta na UL FFA je prof. dr. Marija Sollner Dolenc.

programme in the field of ATMP and will encompass: 1) online courses, 2) webinars and 3) a practical one-week workshop. Together with the Italian Health Institute (Istituto Superiore di Sanita - ISS), The Faculty of Pharmacy at the University of Ljubljana is responsible for participating in the preparation of the curriculum and the implementation of both practical workshops. Each workshop will accept up to 30 participants. Programme participants will receive certificates or badges during the individual stages of education, with the help of which they will prove an expertise in the field of ATMP. Programme is aimed at scientists from the broader area of biomedicine, who would like to acquire specific knowledge and competences at the start of their career to meet the challenges of development, manufacturing, marketing and use of ATMP. The project coordinator is EATRIS ERIC, Netherlands. As partners of the project and in addition to the Faculty of Pharmacy at the University of Ljubljana, the following also participate: Istituto Superiore di Sanita, Italy; Universite Libre de Bruxelles, Belgium; Elevate, Netherlands; KU Leuven, Belgium and Takis SRL, Italy. The coordinator at the Faculty of Pharmacy is Prof. Dr. Irena Mlinarič-Raščan.

## OEMONOM

»Open access Educational Materials on Naturally Occurring Molecules – sources, biological activity and use« is an Erasmus+ project. The main goal of this project is to prepare materials on the positive and negative effects of natural compounds or plants in which they are located and used for several different indications (infections, menopause and gynaecological problems, benign prostatic hyperplasia, cough, cardiovascular disease, central nervous system and skin and gastrointestinal disorders), according to the latest scientific evidence. The prepared materials will be available as e-learning material for students in Moodle platform as well as published in professional journals and literature for laypersons. The project coordinator is Assoc. Prof. Dr. Przemysl Mladěnka, Faculty of Pharmacy in Hradec Králové, Charles University. The coordinator at the Faculty of Pharmacy is Prof. Dr. Marija Sollner Dolenc.

## DRUGI EU PROJEKTI

### INTERREG boDEREC-CE

Glavni cilj projekta »Board for Detection and Assessment of Pharmaceutical Drug Residues in Drinking Water - Capacity building for Water Management in CE« (boDEREC-CE) je priprava sistema celostnega upravljanja vodovodov, s katerim naj bi zagotovili višjo kakovost pitne vode. Projekt poteka v okviru programa Interreg CENTRAL EUROPE. Pri njem sodeluje 12 partnerjev iz 7 držav in spodbuja ter podpira sodelovanje pri skupnih regionalnih izzivih. Aktivnosti partnerjev vključujejo razvoj podrobnega načrta spremljanja farmacevtskih izdelkov in sredstev za osebno nego (PPCP) v pitni vodi, oblikovanje orodja, ki omogoča optimizacijo postopka čiščenja vode, kot tudi pripravo priporočil za zakonodajne spremembe v zvezi s standardi pitne vode in priporočili za inženirske rešitve. Vodilni partner projekta je Hrvatski geološki institut, v imenu Univerze v Ljubljani sta izvajalki projekta članici UL NTF in UL FFA. Vodja projekta na UL FFA je doc. dr. Jurij Trontelj.

### CELSA

Znanstveni cilj predlaganega projekta je priprava novih protirakavih spojin vodnic in validacija ter modulacija rakave tarče hEag1 s potencialom za zdravljenje ne-Hodgkinovega limfoma. Predlagani projekt pokriva celoten cikel zgodnjega odkrivanja novih učinkovin: molekulska modeliranje, sinteza, testiranje na ionskih kanalih ter platforma za protitumorno vrednotenje novih učinkovin. Koordinator projekta je prof. dr. Jan Tytgat, KU Leuven, Pharmaceutical and Pharmacological Sciences, Toxicology and Pharmacology. Vodja projekta na UL FFA je prof. dr. Lucija Peterlin Mašič.

S proteinom G sklopljeni receptorji so dobro validirane tarče, saj nanje deluje ena tretjina vseh zdravil na tržišču. CCR7 je primer takšnega receptorja, a je kljub udeleženosti v številnih človeških boleznih slabo raziskan (npr. rak, vnetne in imunske bolezni). V projektu bomo s pomočjo vrednotenja kemijske knjižnice, virtualnega rešetanja in optimizacije že znanih

## OTHER EU PROJECTS

### INTERREG boDEREC-CE

The main goal of the project "Board for Detection and Assessment of Pharmaceutical Drug Residues in Drinking Water - Capacity building for Water Management in CE" (boDEREC-CE) is to set up a system for integrated water supply management to ensure higher quality of drinking water. The project is a part of the Interreg CENTRAL EUROPE programme, where 12 partners from 7 countries participate together. It encourages and supports the participation in common regional challenges. The partners' activities include the development of a detailed monitoring plan for pharmaceuticals and personal care products (PPCP) in drinking water, the development of tools to optimize the water purification process, as well as the preparation of recommendations for legislative changes regarding the drinking water standards and recommendations for engineering solutions. The leading partner of the project is the Croatian Geological Institute, the project contractors are members of UL NTF and UL FFA, on behalf of the University of Ljubljana. The project leader at UL FFA is Assist. Prof. Jurij Trontelj.

### CELSA

The Head of the project at the Faculty of Pharmacy is Prof. Dr. Lucija Peterlin Mašič. The scientific objective of the proposed project is the preparation of new antibacterial compounds and validation and modulation of the cancer target hEag1 with the potential for treatment of non-Hodgkin lymphoma. The proposed project covers the full cycle of early discovery of new active substances: molecular modelling, synthesis, ion channel testing, and a platform for the antitumor action evaluation of new compounds. The project coordinator: Prof. Dr. Jan Tytgat, KU Leuven, Pharmaceutical and Pharmacological Sciences, Toxicology and Pharmacology.

The Head of the project at the Faculty of Pharmacy is Prof. Dr. Stanislav Gobec. Protein G coupled receptors are well-validated targets targeted by one third of all medicinal products on the market. CCR7 is an example of such a receptor, although it is poorly studied despite being involved in many human diseases (e.g. cancer,

neselektivnih ligandov skušali odkriti selektivni ligand za receptor CCR7. Modulacijo delovanja receptorja bomo potrdili z različnimi *in vitro* biološkimi testi. Vodja projekta na UL FFA je prof. dr. Stanislav Gobec.

Cilj projekta »Generation of nanobodies against immunomodulating checkpoint receptors in glioblastoma tumor cells« je pridobiti nanotelesa proti najpogosteje izraženim imunomodulacijskim receptorjem kontrolnih točk v tumorskih celicah glioblastoma. Raziskovalna skupina z UL (MF in FFA) bo obogatila, izolirala in okarakterizirala nova nanotelesa. Vodja projekta na UL FFA je prof. dr. Robert Roškar, na UL MF dr. Ivana Jovčevska.

inflammatory and immunodeficiency diseases). In the project the discovery of selective ligand for the CCR7 receptor will be attempted through the use of the chemical library, virtual screening and optimization of the already known non-selective ligands. Modulation of the receptor action will be confirmed by various *in vitro* biological tests.

The Head of the project at the Faculty of Pharmacy is Prof. Dr. Robert Roškar, at the Faculty of Medicine Dr. Ivana Jovčevska runs the project: the goal of the project "Generation of nanobodies against immunomodulating checkpoint receptors in glioblastoma tumor cells" is to obtain nanobodies against the most commonly expressed immunomodulatory receptor checkpoints in glioblastoma tumor cells. The research team from UL (MF and FFA) will enrich, isolate and characterize the new nanobodies.

## BILATERALNI PROJEKTI

UL FFA je imela v letu 2021 vzpostavljenih 13 bilateralnih projektov, kjer sodeluje z akademskimi institucijami v naslednjih državah: Francija, Hrvaška, Kitajska, Litva, Madžarska, Nemčija, Rusija in ZDA.

## COST PROJEKTI

COST - European CO-operation in Science and Technology je medvladni okvir za sodelovanje raziskovalnih organizacij iz različnih evropskih držav na področju znanosti in tehnologije, ki omogoča koordinacijo nacionalno financiranih raziskav na evropski ravni s strani raziskovalnih organizacij samih, ki delujejo na istem področju in problemu. V COST akcije se lahko vključijo raziskovalci na vseh stopnjah raziskovalne kariere. Njihov namen je, da z inovativnimi, izvirnimi idejami, ki vodijo do novih konceptov in izdelkov prispevajo h krepitvi evropske raziskovalne in inovacijske zmogljivosti. COST ne financira izvajanja raziskav, temveč zagotavlja podporo raziskovalni dejavnosti s spodbujanjem mobilnosti v okviru COST akcij, ki potekajo v obliki sestankov, delavnic, konferenc, šol za usposabljanje, kratkoročnih znanstvenih misij in različnih dejavnosti razširjanja rezultatov raziskovalnega dela. UL FFA sodeluje v 10 COST projektih.

## BILATERAL PROJECTS

In 2021 the Faculty of Pharmacy was involved in thirteen bilateral projects. We cooperated with academic institutions from France, Croatia, China, Lithuania, Hungary, Germany, Russia and United States of America.

## COST PROJECTS

COST - European CO-operation in Science and Technology is an intergovernmental framework for the cooperation of research organizations from different European countries in the field of science and technology, which allows coordination of nationally funded research at European level by research organizations working in the same field and problem. Researchers at all stages of their research careers can participate in COST actions. Their aim is to contribute in strengthening Europe's research and innovation capacity through innovative, original ideas that lead to new concepts and products. COST does not fund research, but provides support for research activities by promoting mobility through COST actions in the form of meetings, workshops, conferences, training schools, short-term scientific missions and various dissemination activities. UL FFA participates in 10 COST projects.

## PROJEKTI ESS, ESRR

### RAZISKOVALCI NA ZAČEKU KARIERE 2.1

Namen projekta je vzpostaviti povezavo med raziskovalnim in podjetniškim okoljem, kjer je povezovalni člen raziskovalec na začetku kariere.

Cilji projekta so:

- spodbuditi izvedbo neodvisnih raziskav (raziskovalnih projektov) raziskovalnih organizacij v okviru učinkovitega sodelovanja z gospodarstvom (z gospodarskimi subjekti). Neodvisne raziskave za več znanja in boljše razumevanje so izvedene v splošno korist in za potrebe gospodarstva kot celote, ne pa posameznega sodelujočega gospodarskega subjekta;
- spodbuditi raziskovalne aktivnosti raziskovalcev na začetku kariere v okviru raziskovalnih organizacij in z učinkovitim sodelovanjem tudi njihovo povezovanje z gospodarstvom, pri čemer se rezultati sodelovanja splošno, obsežno in nediskriminаторno razširjajo in se kakršne koli pravice intelektualne lastnine, ki izhajajo iz dejavnosti raziskovalne organizacije, v celoti pripisujejo raziskovalni organizaciji;
- okrepitev povezovanja med akademsko sfero in gospodarstvom ter hkrati krepitev raziskovalnega potenciala institucij znanja in razvojno naravnanih gospodarskih subjektov;
- prenos znanja in dobrih praks iz tujine, ki bodo imele vpliv na RRI.

Na UL FFA smo v okviru projekta za 3 leta zaposlili 2 raziskovalca:

- dr. Aljoša Boljeta, z naslovom operacije: Struktorna karakterizacija proteinov v trdnih farmacevtskih oblikah v sodelovanju z Lekom d. d.
- dr. Eva Kranjc, z naslovom operacije: Razvoj in vpeljava naprednih analitskih pristopov, ki temeljijo na kvantitativni uporabi masne spektrometrije med razvojem biofarmacevtskih učinkovin v sodelovanju z Lekom d. d.

## ESS, ESRR PROJECTS

### EARLY CAREER RESEARCHERS 2.1

The purpose of the project is to establish a connection between the research and entrepreneurial environment, where the connecting link is the researcher at the beginning of his/her career.

The goals of the project are:

- encourage the implementation of independent research (research projects) of research organizations in the framework of effective cooperation with the economy (economic operators). Independent research for more knowledge and better understanding is carried out for the general benefit and for the needs of the economy as a whole, rather than the individual participating economic operator;
- encourage early-stage researchers' research activities within research organizations and, through effective cooperation, their integration into the economy, disseminating the results of cooperation in a broad, comprehensive and non-discriminatory manner and fully enforcing any intellectual property rights arising from the research organization's activities, attributed to the research organization;
- strengthening the connection between the academic sphere and the economy and at the same time strengthening the research potential of knowledge institutions and development-oriented economic entities;
- transfer of knowledge and good practices from abroad that will have an impact on RDI.

As part of the project, we employed 2 researchers at UL FFA for 4 years:

- Dr. Aljoša Bolje, with the title of the operation: Structural characterization of proteins in solid pharmaceutical forms in collaboration with Lek d. d.
- Dr. Eva Kranjc, with the title of the operation: Development and introduction of advanced analytical approaches based on the quantitative use of mass spectrometry during the development of biopharmaceuticals in collaboration with Lek d. d.

## LAKTIKA

Spodbujanje izvajanja raziskovalno-razvojnih projektov (TRL 3-6): Ekstrakcija in oplemenitevanje sirotkinih proteinov ter izraba preostanka za oblikovanje novih funkcionalnih živil in prehranskih dopolnil »LAKTIKA«. Koordinator projekta je ARHEL d. o. o., koordinator projekta na UL FFA je prof. dr. Albin Kristl, sodelujeta Katedra za biofarmacijo in farmakokinetiko ter Katedra za farmacevtsko tehnologijo.

## LAKTIKA

Promoting research and development projects (TRL 3-6): Extraction and enrichment of whey proteins and the use of the residuals for the design of new functional foods and dietary supplements (LAKTIKA). The PI of the project is ARHEL d. o. o., the coordinator at the Faculty of Pharmacy is Prof. Dr. Albin Kristl, and the participating chairs are the Chair of Biopharmaceutics and Pharmacokinetics and the Chair of Pharmaceutical Technology.

## EATRIS-TRI.si

Razvoj raziskovalne infrastrukture za mednarodno konkurenčnost slovenskega RRI prostora - RI-SI-EATRIS-TRI.si. V projekt sta pod koordinatorstvom vodilnega partnerja UL FFA vključena še dva konzorcijska partnerja: Kemijski inštitut in Univerza v Mariboru (Medicinska fakulteta). Koordinatorica na UL FFA je prof. dr. Irena Mlinarič-Raščan.

## EATRIS-TRI.si

Development of the research infrastructure for international competitiveness of Slovenian RRI space - RI-SI-EATRIS-TRI.si (coordinated by the leading partner the Faculty of Pharmacy at the University of Ljubljana in collaboration with consortium partners: National institute of Chemistry and University of Maribor (Faculty of Medicine); the coordinator at the University of Pharmacy is Prof. Dr. Irena Mlinarič-Raščan.

## DRUGI MEDNARODNI PROJEKTI

### Projekt RiskAwareTTS o varnosti vektorskih cepiv proti SARS-CoV-2, ki ga UL FFA izvaja za Evropsko agencijo za zdravila

V okviru projekta RiskAwareTTS proučujemo vpliv regulatornih odločitev in priporočil, povezanih s tveganjem za sindrom tromboze s trombocitopenijo ob cepljenju s SARS-CoV-2 adenovirusnimi vektorskimi cepivi. Raziskujemo zavedanje in poznavanje tveganja za zaplete tako med zdravstvenimi delavci kot tudi v splošni javnosti ter kako je slednje vplivalo na odnos do cepljenja z izbranimi cepivi. Katedra za socialno farmacijo, UL FFA sodeluje v konzorciu partnerjev iz šestih držav, ki raziskavo izvajajo za Evropsko agencijo za zdravila (EMA). Vodja projekta na UL FFA je prof. dr. Mitja Kos.

## OTHER INTERNATIONAL PROJECTS

### RiskAwareTTS project on the safety of vector vaccines against SARS-CoV-2, implemented by UL FFA for the European Medicines Agency

The RiskAwareTTS project is studying the impact of regulatory decisions and recommendations related to the risk of thrombosis syndrome with thrombocytopenia when vaccinated with SARS - CoV - 2 adenovirus vector vaccines. We are researching awareness and knowledge of the risk of complications both among healthcare professionals and the general public, and how the latter has influenced the attitude towards vaccination with selected vaccines. The Department of Social Pharmacy, UL FFA, participates in a consortium of partners from six countries conducting research for the European Medicines Agency (EMA). The project leader at UL FFA is Prof. Dr. Mitja Kos.

**Novel diagnostic and therapeutic approaches to complex genetic disorders (CIII-HR-0611).**

**Projekt CEEPUS**, regionalni program, katerega cilj je vzpostaviti in spodbujati mobilnosti študentov in profesorjev med sodelujočimi državami in ga koordinira univerza v Zagrebu. V projekt so vključene fakultete iz držav partneric: Avstrija, Bolgarija, Češka, Hrvaška, Madžarska, Poljska, Romunija, Slovaška, Slovenija, Srbija, Albanija, Makedonija in Črna gora. Koordinatorica na UL FFA je prof. dr. Janja Marc.

#### **Gostujoči tuji strokovnjaki Univerze v Ljubljani (GTS, BI)**

Krajša in daljša gostovanja tujih strokovnjakov in visokošolskih učiteljev na slovenskih visokošolskih zavodih 2019–2022 (Suzana Šegota in Anja Sadžak – gostovanje: 7. 7.– 9. 7. 2021, Michele Protti – gostovanje: 12. 7.–16. 7. 2021, Cyril Balsollier – gostovanje: april–maj 2021, dr. Thierry Touze, dr. Helene Barreteau in dr. Didier Blanot – gostovanje: 18. 10.–20. 10. 2021.

## **PRENOS ZNANJA IN SODELOVANJE Z OKOLJEM**

**Prof. dr. Julijana Kristl, prejemnica zahvale za dolgoletno mentorsko delo in vsestransko podporo Krkinim nagradam**

Prof. dr. Julijana Kristl je prejemnica zahvale za dolgoletno mentorsko in vsestransko podporo Krkinim nagradam, ki jo je podelila Krka štirim posebej zaslužnim posameznikom na slovenski akademiji v počastitev 50-letnice Krkinih nagrad 3. septembra 2021. V njen obrazložitev so zapisali: »Med največje dosežke prof. dr. Julijane Kristl spadata razvoj in uveljavitev področja farmacevtske nanotehnologije pri nas. Njeno poslanstvo je raziskovanje, generiranje znanja ter prenašanje odkritij s predavanji in mentorstvom na študente in znanstveno skupnost. Za prispevek k znanosti in farmacevtski stroki je prejela vrsto nagrad, tudi tri Krkine nagrade. Dolgoletna

**Novel diagnostic and therapeutic approaches to complex genetic disorders(CIII - HR - 0611). The CEEPUS project**, a regional programme aimed at establishing and promoting the mobility of students and professors between participating countries and coordinated by the University of Zagreb. The project involves faculties from partner countries Austria, Bulgaria, the Czech Republic, Croatia, Hungary, Poland, Romania, Slovakia, Slovenia, Serbia, Albania, Macedonia and Montenegro. The coordinator on the UL FFA side is Prof. Dr. Janja Marc.

#### **Visiting foreign experts from the University of Ljubljana (GTS, BI)**

Shorter and longer visits of foreign experts and higher education teachers to Slovenian higher education institutions 2019 - 2022(Suzana Šegota and Anja Sadžak - guest: 7 July – 9 July 2021, Michele Protti - guest: 12 July – 16 July 2021, Cyril Balsollier April – May 2021, Dr. Thierry Touze, Dr. Helene Barreteau and Dr. Didier Blanot - guest appearance: from 18 to 20 October 2021).

## **KNOWLEDGE TRANSFER AND COOPERATION WITH THE ENVIRONMENT**

**Prof. Dr. Julijana Kristl, recipient of thanks for many years of mentoring work and comprehensive support for the Krka Awards**

Prof. Dr. Julijana Kristl is the recipient of a letter of appreciation for the long-term mentoring and comprehensive support of the Krka Awards given by Krka to four particularly deserving individuals at the ceremonial academy in honor of the 50th anniversary of the Krka Awards on 3 September 2021. Prof. Dr. Julijana Kristl is someone, who played a crucial role in the development and establishment of the field of pharmaceutical nanotechnology in our country. Her mission is to research and generate knowledge and pass on discoveries through lectures and mentoring to students and the scientific community. She has received a number of awards for

profesorica na Fakulteti za farmacijo Univerze v Ljubljani je že več desetletij mentorica številnim prejemnikom Krkinih nagrad«.

### **Podelitev 51. Krkinih nagrad**

V Krki je oktobra 2021 potekala slavnostna podelitev 51. Krkinih nagrad mladim znanstvenikom za njihova dodiplomska in podiplomska raziskovalna dela. Jože Colarič, predsednik uprave in generalni direktor Krke ter predsednik častnega odbora Krkinih nagrad, in dr. Aleš Rotar, član Krkine uprave, direktor Razvoja in proizvodnje zdravil ter predsednik sveta sklada Krkinih nagrad, sta veliko Krkino nagrado podelila 5 raziskovalcem. Na Fakulteti za farmacijo Univerze v Ljubljani (UL FFA) si štejemo v veliko čast, da so med prejemniki 51. velikih Krkinih nagrad tudi doktorandi Fakultete za farmacijo: dr. Žane Temova Rakuša, dr. Anja Kolarič in dr. Jelena Mandić.

Poleg tega so Krkino nagrado za dodiplomsko ali podiplomsko raziskovalno delo prejeli še študentje UL FFA: Žiga Skok, Dejan Lamešič, Žan Toplak, Ana Baumgartner, Jaka Dernovšek, Aljoša Gradišek, Monika Simčič, Tjaša Žagar, Matej Makše, Marja Škrlj Miklavčič, Vita Levart, Tajda Vöröš. Krkino posebno pohvalo za dodiplomske in podiplomske raziskovalne naloge so prejeli: Abida Zahirović, Tadeja Kuret, Eva Shannon Schifferrer, Marko Pongrac, Katja Veber, Nataša Puntar, Marko Breznik, David Dolhar, Lara Smrdel, Ana Presinger, Tonja Petrovič Fras, Tanja Gavranić, Simona Pokovec, Klementina Borovnik, Tilen Huzjak, Larisa Mlinarič, Vid Lah. Krkino priznanje za dodiplomske in podiplomske raziskovalne naloge so prejeli: Krištof Bozovičar, Maša Kenda, Helena Plešnik, Uroš Hribar, Kristjan Mrđole, Katarina Torkar, Katja Legan, Alma Tana Jakoš Djordjevič, Nika Terlep, Jera Stritar.

### **Priznanje Zvezde – zunanji partnerji 2020, Novartis**

Fakulteta za farmacijo in njeni sodelavci izr. prof. dr. Rok Dreu, prof. dr. Stanko Srčič, asist. dr. Zoran Lavrič, prof. dr. Mirjana Gašperlin in prof. dr. Borut Božič so prejeli **priznanje Zvezde – zunanji partnerji 2020**, ki

her contribution to science and the pharmaceutical profession, including three Krka awards. As a long-time professor at the Faculty of Pharmacy of the University of Ljubljana, she has been a mentor to many recipients of the Krka Awards for several decades.

### **Presentation of the 51st Krka Awards**

In October 2021 Krka hosted the 51st Krka Awards ceremony for young scientists for their undergraduate and postgraduate research work. President of the Management Board and CEO of Krka and President of the Krka Awards Honorary Committee Jože Colarič and Dr. Aleš Rotar, Member of the Krka Management Board, Director of Drug Development and Production and President of the Board of the Krka Prize Fund, presented the Krka Grand Prize to 5 researchers. At the Faculty of Pharmacy of the University of Ljubljana (UL FFA) we consider it a great honor that among the recipients of the 51st Krka Grand Prix are also doctoral students of the Faculty of Pharmacy: Dr. Žane Temova Rakuša, PhD Anja Kolarič and Dr. Jelena Mandić.

In addition to that, Krka Award for undergraduate or postgraduate research work was received by the UL FFA students: Žiga Skok, Dejan Lamešič, Žan Toplak, Ana Baumgartner, Jaka Dernovšek, Aljoša Gradišek, Monika Simčič, Tjaša Žagar, Matej Makše, Marja Škrlj Miklavčič, Vita Levart, Tajda Vöröš. Krka's special commendations for undergraduate and postgraduate research projects were received by: Abida Zahirović, Tadeja Kuret, Eva Shannon Schifferrer, Marko Pongrac, Katja Veber, Nataša Puntar, Marko Breznik, David Dolhar, Lara Smrdel, Ana Presinger, Tonja Petrovič Fras, Tanja Gavranić, Simona Pokovec, Klementina Borovnik, Tilen Huzjak, Larisa Mlinarič, Vid Lah. Krka's recognition for undergraduate and postgraduate research projects was received by: Krištof Bozovičar, Maša Kenda, Helena Plešnik, Uroš Hribar, Kristjan Mrđole, Katarina Torkar, Katja Legan, Alma Tana Jakoš Djordjevič, Nika Terlep, Jera Stritar.

### **Star Recognition - External Partners 2020, Novartis**

Faculty of Pharmacy and its associates Assoc. Prof. Dr. Rok Dreu, Prof. Dr. Stanko Srčič, Assist. Dr. Zoran Lavrič, Prof. Dr. Mirjana Gašperlin and Prof. Dr. Borut Božič received the Star Award - External Partners 2020,

ga je letos prvič v tej kategoriji podelil Novartis Slovenija. Novartis s priznanji Zvezde obeležuje ter praznuje dosežke sodelavk, sodelavcev, timov ter zunanjih partnerjev, ki še posebej izstopajo s svojim delovnim in osebnim doprinosom. Skupina UL FFA je bila nominirana s strani sodelavcev Novartisa in prepozna na kot eden izmed ključnih zunanjih partnerjev v letu 2020. Slovenska podelitev priznanj Zvezde je bila v oktobru 2021 izvedena v obliki virtualnega slavnostnega dogodka, ki sta ga vodila Robert Ljoljo, predsednik uprave Leka d. d. in predsednik Novartisa v Sloveniji, ter dr. Darja Ferčej Temeljtotov, vodja strateških programov v Novartisu v Sloveniji. Novartis v Sloveniji je s sodelavci UL FFA vzpostavil platformo »Predformulacijski (PF) inkubator« ter uspešno nadaljeval s projektom »Razvoj kadrov«. Oba projekta omogočata vzdrževanje trajnih partnerskih povezav, ki so osnova poklicne rasti vseh udeležencev, spodbujanje inovacij ter razvoj zdravil z dodano vrednostjo za pacienta.

which was awarded for the first time in this category by Novartis Slovenia. With the Zvezda awards Novartis marks and celebrates the achievements of colleagues, teams and external partners, who stand out with their work and personal contributions. The UL FFA Group was nominated by Novartis employees and recognized as one of the key external partners in 2020. The Star Awards ceremony was held in October 2021 in the form of a virtual ceremony hosted by Robert Ljoljo, CEO of Lek d.d. and President of Novartis in Slovenia, and Dr. Darja Ferčej Temeljtotov, Head of Strategic Programmes at Novartis in Slovenia. Novartis in Slovenia, together with the UL FFA employees, established the "Preformulation (PF) Incubator" platform and successfully continued the "Human Resources Development" project. Both projects enable the maintenance of lasting partnerships, which are the basis of professional growth of all participants, the promotion of innovation and the development of value-added medicines for the patient.



Prejemniki priznanja Zvezde / Recipients of the Star Award

## **EATRIS-Plus delavnica: Teorija in praksa sodelovanja med industrijo in akademijo**

Septembra 2021 se je v okviru projekta H2020 EATRIS-Plus v soorganizaciji UL FFA, Biocat (Barcelona, Španija) in EATRIS (Amsterdam, Nizozemska) odvijala mednarodna dvodnevna delavnica »Teorija in praksa 27. sodelovanja med industrijo in akademijo«. Delavnica je združila 40 akademikov, podoktorskih raziskovalcev, posameznikov iz pisarn za prenos znanja ter predstavnikov biotehnoških podjetij. Udeleženci so v delavnicah poslušali kratke predstavitev predstavnikov inovacijskih konzorcijev in biotehnoških podjetij ter si med seboj izmenjevali izkušnje. Razpravljeni so o težavah, na katere so naleteli pri sodelovanju med industrijo in akademijo ter iskali rešitve za reševanje teh izzivov. Spoznali so pravne osnove v javno-zasebnem partnerstvu in imeli možnost predstaviti svoj projekt v predstavitvah t. i. »pitch talks«.

## **Spletni festival UNI.MINDS 2021**

V okviru festivala UNI.MINDS in 3. dneva raziskovalcev Novartis Slovenija, ki je 10. 11. 2021 potekal na oddaljen način, so aktivno sodelovali sodelavci in alumni UL FFA: izr. prof. dr. Rok Dreu, prof. dr. Albin Kristl ter dr. Rebeka Jereb. Predstavili so odlične prakse sodelovanja med UL FFA in Lekom d. d., predvsem v platformi "Predformulacijski inkubator" in v projektu »Razvoj kadrov«. Dr. Jereb je predstavila svojo doktorsko raziskavo, ki je plod takšnega sodelovanja.

## **Inovacijski sklad Univerze v Ljubljani**

Pomemben pogoj za uspešno komercializacijo izumov so dolgoročna partnerstva z gospodarstvom in sposobnost preverjanja delovanja idej znotraj univerze. Namen razpisa Inovacijskega sklada UL 2021 je podpreti obetavne projekte in jim pomagati doseči višjo stopnjo tehnološke pripravljenosti in s tem povečati privlačnost tehnologij za potencialne kupce. UL je vzpostavila sklad za lajšanje komercializacije tehnologij in z njim omogoča ekipam, ki na UL razvijajo

## **EATRIS-Plus Workshop: Theory and Practice of Industry-Academy Cooperation**

In September 2021, as part of the H2020 EATRIS-Plus project, an international two-day workshop "Theory and Practice of 27 Industrial-Academic Cooperation" took place in the co-organization of UL FFA, Biocat (Barcelona, Spain) and EATRIS (Amsterdam, the Netherlands). The workshop brought together 40 academics, postdoctoral researchers, individuals from knowledge transfer offices and representatives of biotechnology companies. During the workshop, participants listened to short presentations by representatives of innovation consortia and biotechnology companies, and exchanged experiences. They discussed the problems encountered in the collaboration between industry and academia and sought solutions to address these challenges. They learned the legal basis in a public-private partnership and had the opportunity to present their project in the so called »Pitch talks« presentations.

## **UNI.MINDS 2021 online festival**

As part of the UNI.MINDS festival and the 3rd Researchers' Day, Novartis Slovenia, which took place on a remote basis on 10 November 2021, the collaborators and alumni of UL FFA actively participated: Assoc. Prof. Dr. Rok Dreu, Prof. Dr. Albin Kristl and Dr. Rebecca Jereb. They presented excellent practices of cooperation between UL FFA and Lek d.d., especially in the form of a pre-formulation incubator and the "Human Resources Development" project. Dr. Jereb presented her doctoral research, which is the result of such collaboration.

## **Innovation Fund of the University of Ljubljana**

An important condition for the successful commercialization of inventions is establishing long-term partnerships with the economy and the ability to test the operation of ideas within the university. The purpose of the tender of the Innovation Fund UL 2021 is to support promising projects and help them achieve a higher level of technological readiness and thus increase the attractiveness of technologies for potential buyers. UL has established a fund in order to facilitate

inovativne rešitve, da te približajo industrijskim partnerjem oz. trgu. Rektor UL prof. dr. Gregor Majdič je v okviru festival UNI.MINDS javno razglasil prejemnike sredstev drugega razpisa Inovacijskega sklada UL 2021. Ocenjevalna komisija je izmed 13 prijavljenih projektov za sofinanciranje izbrala pet projektov in med njimi sta kar dva projekta Fakultete za farmacijo:

1. projekt z naslovom **»Razvoj zdravil za zdravljenje kognitivnih motenj pri psih«**, ki ga razvija ekipa Fakultete za farmacijo prof. dr. Stanislav Gobec, assist. dr. Urban Košak in doc. dr. Damijan Knez.
2. projektz naslovom **»Širokospektralneprotibakterijske učinkovine«**, ki ga razvijata prof. dr. Marko Anderluh in doc. dr. Martina Hrast.

#### **Prvo mesto za digitalno rešitev UL FFA na poletni šoli EIT Digital Summer School 2021**

Luka Hiti in sodelavci, pod mentorstvom prof. dr. Mitje Kosa in izr. prof. dr. Igorja Locatellija, so s skupino Outfit7 delili prvo mesto na poletni šoli EIT Digital Summer School 2021. Digitalne tehnologije postajajo vse pomembnejše v farmacevtskem in širšem biomedicinskem okolju, kljub temu pa se ne uporabljajo dovolj pogosto. Poletna šola EIT Digital Summer School 2021, ki deluje pod okriljem Evropske unije za digitalno preobrazbo Evropske unije (<https://www.eitdigital.eu/>), je zasnovana prav z namenom, da deležnikom pomaga pri digitalni preobrazbi. Poletna šola je potekala v sodelovanju z Ekonomsko fakulteto Univerze v Ljubljani od 26. julija do 8. avgusta 2021. V okviru poletne šole je bil razvit koncept digitalne rešitve z namenom izmenjave informacij med zdravstvenimi delavci na primarnem in sekundarnem nivoju ter bolniki oz. njihovimi skrbniki. Posebna pozornost je bila namenja posredovanju informacij starejšim odraslim, skladno z njihovo računalniško in zdravstveno pismenostjo.

#### **Ponosni smo na naše doktorande**

Med prejemniki najvišjega **Novartisovega priznanja za uglednega znanstvenika v letu 2021** sta kar dva od treh nagrajencev doktorirala na Katedri za biofarmacijo in farmakokinetiko na UL FFA: **dr. Igor Legen**, vodja

the commercialization of technologies, consequently enabling teams that develop innovative solutions at UL to bring them closer to industrial partners or the market. Rector of UL Prof. Dr. Gregor Majdič publicly announced the recipients of the second tender of the Innovation Fund UL 2021 as part of the UNI.MINDS festival.

1. Project entitled "**Development of drugs for the treatment of cognitive disorders in dogs**", developed by the team of the Faculty of Pharmacy Prof. Dr. Stanislav Gobec, Assist. Dr. Urban Košak and Assist. Prof. Dr. Damijan Knez.
2. Project entitled "**Broad-spectrum antibacterial agents**", developed by Prof. Dr. Marko Anderluh and Assist. Dr. Martina Hrast.

#### **First place for the UL FFA digital solution at the EIT Digital Summer School 2021**

Luka Hiti and the colleagues, under the mentorship of Prof. Dr. Mitja Kos and Assoc. Prof. Dr. Igor Locatelli, shared with the group Outfit7 the first place at the EIT Digital Summer School 2021. Digital technologies are becoming increasingly important in the pharmaceutical and wider biomedical environment, but they are still not used often enough. The EIT Digital Summer School 2021, which operates under the auspices of the European Union for the Digital Transformation of the European Union (<https://www.eitdigital.eu/>), is designed to help stakeholders with the digital transformation. The summer school was held in cooperation with the Faculty of Economics, University of Ljubljana from 26 July to 8 August 2021. Within the summer school, the concept of a digital solution was developed in order to exchange information between health professionals at the primary and secondary levels and patients or their guardians. Particular attention was paid to providing information to older adults in accordance with their computer and health literacy.

#### **We are proud of our doctoral students**

Among the recipients of the highest Novartis award for eminent scientist in 2021, as many as two of the three winners received their doctorates from the Department of Biopharmacy and Pharmacokinetics at UL FFA. **Dr. Igor**

Kliničnega razvoja v Razvojnem centru Slovenija pod mentorstvom prof. dr. Albina Kristla, in **dr. Marija Bošković Ribarski**, vodilna raziskovalka v Kliničnem razvoju pod mentorstvom prof. dr. Iztoka Grabnarja. Novartisove znanstvene nagrade prepoznavajo tiste posameznike in ekipe, ki so se pri delu še posebej izkazali ter pomembno prispevali k razvoju in raziskavam v podjetju.

#### **Neža Brezovec, članica zmagovalne ekipe BioCampa 2021(Lek)**

Novartis v Sloveniji je že enajsto leto zapored izvedel znanstveni dogodek BioCamp, ki je namenjen povezovanju vrhunskih študentov, akademskih institucij in gospodarstva. BioCampa 2021 se je udeležilo 36 študentov iz 10 držav. Osrednja tema tokratnega foruma je bila vpliv podatkov in umetne inteligence na farmacevtsko industrijo. Tako v Sloveniji kot po celi svetu Novartis v zadnjem času veliko vлага v opremo in novo znanje na področju digitalizacije, avtomatizacije ter umetne inteligence. Razvijanje kompetenc s področja bioinformatike, statistike in podatkovne znanosti ter sodelovanje z razvojno-aziskovalnimi organizacijami na tem področju namreč odpirata nove možnosti za pridobivanje vpogleda in iskanje vzorcev, ki presegajo zmogljivosti tradicionalnih človeških orodij. Neža Brezovec, doktorska študentka UL FFA, je bila članica zmagovalne ekipe BioCampa 2021.

## **IZUMI, INTELEKTUALNA LASTNINA**

Fakulteta za farmacijo je v letu 2021 vložila štiri mednarodne patentne prijave in tako nadaljevala s prakso inovacijske dejavnosti, saj je izsledke svojih raziskav ob sodelovanju s Pisarno za prenos znanja na UL zaščitila z vložitvijo štirih mednarodnih patentnih prijav. Patentne prijave so vložene na različnih področjih farmacevtskih znanosti, tudi na področju boja proti bolezni COVID-19.

- **KOS, Janko, MITROVIĆ, Ana, SOSIČ, Izidor, MARCELLO,**

**Legen**, Head of Clinical Development at the Development Centre of Slovenia under the mentorship of Prof. Dr. Albin Kristl and **Dr. Marija Bošković Ribarski**, leading researcher in Clinical Development under the mentorship of Prof. Dr. Iztok Grabnar. Novartis Scientific Awards recognize those individuals and teams who have excelled in their work and made important contributions to development and research in the company.

#### **Neža Brezovec, a member of the winning BioCamp 2021 (Lek)**

For the eleventh year in a row Novartis team in Slovenia held the BioCamp scientific event, which is intended to connect top students, academic institutions and the economy. BioCamp 2021 was attended by 36 students from 10 countries. The main topic of this forum was the impact of data and artificial intelligence on the pharmaceutical industry. Both in Slovenia and around the world Novartis has recently been investing heavily in equipment and new knowledge in the field of digitization, automation and artificial intelligence. The development of competencies in the field of bioinformatics, statistics and data science, as well as cooperation with research and development organizations in this field, opens up new possibilities for gaining insight and finding patterns that exceed the capabilities of traditional human tools. Neža Brezovec, a doctoral student at UL FFA, was a member of the winning BioCamp 2021 team.

## **INNOVATIONS AND INVENTIONS**

In 2021 the Faculty of Pharmacy filed four international patent applications and thus continued the practice of innovation activities, as it protected the results of its research in cooperation with the Office for Knowledge Transfer at the University of Ljubljana by filing four international patent applications. Patent applications are filed in various fields of pharmaceutical sciences, including COVID-19.

- **KOS, Janko, MITROVIĆ, Ana, SOSIČ, Izidor, MARCELLO,**

Alessandro, BONOTTO, Rafaela so vložili patentno prijavo z naslovom 8-hydroxyquinoline cysteine protease inhibitors for use in the prevention and/or treatment of a corona virus disease.

- KRULJEC, Nika, **BRATKOVIČ, Tomaž**, MOLEK, Peter, LUNDER, Mojca so vložili patentno prijavo z naslovom Affinity ligands for antibody Fc region.
- LUNDER, Mojca, ŠTRUKELJ, Borut, KOROŠEC, Peter, KOREN, Ana so vložili patentno prijavo z naslovom IgE epitope-like peptides and uses thereof.
- TOMAŠIČ, Tihomir, ZIDAR, Nace, DURCIK, Martina, ILAŠ, Janez, ZEGA, Anamarija, DURANTE CRUZ, Cristina, TAMMELA, Päivi, PÁL, Csaba, NYERGES JÓZSEF, Ákos, KIKELJ, Danijel, PETERLIN-MAŠIČ, Lucija so vložili patentno prijavo z naslovom New class of DNA gyrase and/or topoisomerase IV inhibitors with activity against gram-positive and gram-negative bacteria.

Alessandro, BONOTTO, Rafaela filed a patent application entitled 8-hydroxyquinoline cysteine protease inhibitors for use in the prevention and/or treatment of a coronavirus disease.

- KRULJEC, Nika, **BRATKOVIČ, Tomaž**, MOLEK, Peter, LUNDER, Mojca filed a patent application entitled Affinity ligands for antibody Fc region.
- LUNDER, Mojca, ŠTRUKELJ, Borut, KOROŠEC, Peter, KOREN, Ana filed a patent application entitled IgE epitope-like peptides and uses thereof.
- TOMAŠIČ, Tihomir, ZIDAR, Nace, DURCIK, Martina, ILAŠ, Janez, ZEGA, Anamarija, DURANTE CRUZ, Cristina, TAMMELA, Päivi, PÁL, Csaba, NYERGES JÓZSEF, Ákos, KIKELJ, Danijel, PETERLIN-MAŠIČ, Lucija patent application entitled New class of DNA gyrase and/or topoisomerase IV inhibitors with activity against gram-positive and gram-negative bacteria.

## UDEJSTVOVANJE V STROKI

- Sodelovanje v organih izven UL (ministrstva, mednarodne organizacije).
- Uredništva (več kot 30 uredništev nacionalnih in mednarodnih revij).
- Javni nastopi (TV in radijski intervjuji in prispevki).
- Vseživljenjska izobraževanja in usposabljanja - konstantni prenos znanja v stroko (tečaji LBM, usposabljanje za farmacevte, poletne šole, mednarodne šole ...).
- Strokovno izpopolnjevanje s področja farmacije: Samotestiranje, hitro testiranje ali testiranje ob preiskovancu? (junij 2021).
- Neposredni projekti (ekspertize, mnenja) za partnerje iz javnega sektorja in gospodarstva.

## PERFORMANCE IN THE PROFESSION

- Participation in bodies outside the UL (ministries, international organizations).
- Editorial offices (more than 30 editorial offices of national and international journals).
- Public appearances (TV and radio interviews and contributions).
- Lifelong education and training - constant transfer of knowledge to the profession (LBM courses, training for pharmacists, summer schools, international schools, ...).
- Implementation of PROFESSIONAL TRAINING IN THE FIELD OF PHARMACY: SELF-TESTING, QUICK TESTING OR TESTING WITH THE RESPONDENT? (June 2021).
- Direct projects (expertise, opinions) for partners from the public sector and the economy.

## **Prof. dr. Mitji Kosu podeljen naziv častnega člana organizacije Pharmaceutical Care Network Europe**

Prof. dr. Mitja Kos, predstojnik Katedre za socialno farmacijo UL FFA, je v letu 2021 na spletni delovni konferenci evropske mreže raziskovalcev s področja farmacevtske skrbi Pharmaceutical Care Network Europe (PCNE) postal častni član te organizacije. Naziv prejmejo posamezniki z 20- ali večletnim aktivnim delovanjem v PCNE, ki so v tem času delovali tudi v izvršnem odboru organizacije. Plod njegovega dela znotraj PCNE so številni mednarodni raziskovalni projekti na področju farmacevtske skrbi, mednarodno sprejeta definicija pregleda zdravil, boljša organizacijska struktura PCNE in krepitev vloge farmacevtske skrbi v tujini in doma.

## **Strokovni večeri: Digitalna preobrazba v farmaciji**

Slovensko farmacevtsko društvo (SFD) je v sodelovanju z UL FFA organiziralo strokovne večere, posvečene digitalni preobrazbi v farmaciji, s katerimi so želeli spodbuditi zanimanje in gradnjo kompetenc ter oblikovati skupnost, ki bo tej izjemno aktualni temi posvečala vso potrebno pozornost. Strokovni večeri so potekali ob sredah v novembру in decembru 2021.

## **AKTIVNOSTI Z ALUMNI**

- Promocija Kluba alumnov UL FFA med študenti zadnjih letnikov in bivšimi diplomanti vseh študijskih programov (na predavanjih, vabila z e-pošto, ob zaključku študija, promocija na dogodkih, ki jih organizira UL FFA).
- Povečanje števila članov iz 349 (prvo četrletje leta 2021) na 404 članov (prvo četrletje leta 2022) - 16 % rast.
- Sodelovanje alumnov na promocijskih dogodkih UL FFA.
- Sodelovanje v RSF projektu Mentorstvo alumn-študent z namenom osvetlitve delovnega mesta.

## **Prof. Dr. Mitja Kos was awarded the title of Honorary Member of the Pharmaceutical Care Network Europe**

Prof. Dr. Mitja Kos, Head of the Department of Social Pharmacy UL FFA, became an honorary member of the European Pharmaceutical Care Network Europe (PCNE) in 2021 at the online working conference of the European Pharmaceutical Care Research Network. The title is awarded to individuals with 20 or more years of active service in the PCNE, who at that time also served on the executive board of the organization. The fruit of his work within the PCNE are numerous international research projects in the field of pharmaceutical care, the internationally accepted definition of drug review, better organizational structure of the PCNE and strengthening the role of pharmaceutical care abroad and at home.

## **Professional evenings: Digital transformation in pharmacy**

The Slovenian Pharmaceutical Society(SFD)in cooperation with UL FFA organized professional evenings dedicated to the Digital Transformation in Pharmacy, with which we wanted to stimulate interest and build competencies and create a community that will pay full attention to this extremely current topic. Professional evenings were held on Wednesdays in November and December 2021.

## **ALUMNI ACTIVITIES**

- Promotion of the UL FFA Alumni Club among final year students and former graduates of all study programmes(lectures, e-mail invitations, at the end of studies, promotion at events organized by UL FFA).
- Increase in the number of members from 349 (first quarter of 2021) to 404 members(first quarter of 2022) -16% growth.
- Participation of alumni in UL FFA promotional events. Participation in the RSF project Alumni-Student Mentoring in order to highlight the workplace.

## MEDNARODNA DEJAVNOST

UL FFA sodi med večje farmacevtske fakultete v Evropi in pomembno prispeva v slovensko in svetovno zakladnico raziskovanja in znanja ter iz nje prenaša izkušnje in znanje na prihodnje generacije. Tudi v letu 2020/2021 smo spodbujali in ohranjali visoko število študentskih izmenjav na vseh študijskih programih, navkljub neugodnim razmeram trajajoče pandemije COVID-19. Število izmenjav učiteljev, raziskovalcev in administrativnih sodelavcev v študijskem letu 2020/21 še vedno ostaja nizko.

Naši cilji so skladno s tem ponovno vzpostaviti intenzivne izmenjave predavateljev in raziskovalcev z namenom doseganja strateških partnerstev, doseči uravnovežen interes za izmenjave iz različnih partnerskih univerz po vsej Evropi in ustvariti boljše pogoje študija, omogočiti kakovostno mobilnost čim večjemu številu študentov UL FFA in na tak način prispevati k nadgradnji splošnih kompetenc diplomantov.

## PROGRAMI MOBILNOSTI

V okviru programa Erasmus+ imamo na UL FFA sklenjenih 67 medinstiucionalnih sporazumov in dogovorjenih približno 160 mest za mobilnost študentov ter 75 za mobilnost učiteljev. V letu 2021 smo potrdili interes vseh naših dosedanjih Erasmus partnerjev za podaljšanje sporazumov v EWP platformi za obdobje 2021-2027. V okviru srednjeevropskega programa za mobilnost študentov in profesorjev CEEPUS sodelujemo v dveh mrežah. UL FFA je partner v CEEPUS mreži CIII-RS-1113-00-2021(Central European Knowledge Alliance for Teaching, Learning & Research in Pharmaceutical Technology). Kontakt je prof. dr. Stanko Srčič. UL FFA je koordinator CEEPUS mreže CIII-SI-0611-10-2021 (Novel diagnostic and therapeutic approaches to complex genetic disorders). Koordinatorica je prof. dr. Janja Marc. Študentje opravljajo izmenjave pogosto tudi v okviru programa Mednarodne zveze študentov farmacije (IPSF) in Evropske zveze študentov farmacije (EPSA). Izmenjave študentov in zaposlenih potekajo tudi z drugimi mehanizmi spodbujanja in financiranja.

## INTERNATIONAL ACTIVITY

UL FFA is one of the largest pharmaceutical faculties in Europe and makes an important contribution to the Slovenian and global treasury of research and knowledge. Thereby, it transfers experience and knowledge to future generations. In 2020/2021, we encouraged and maintained a high number of student exchanges in all study programmes, despite the unfavourable conditions of the ongoing COVID-19 pandemic. The number of exchanges of teachers, researchers and administrative staff in the academic year 2020/21 remained low.

Accordingly, our goals are to re-establish intensive mobilities of lecturers and researchers in order to achieve strategic partnerships, to achieve a balanced interest in international exchanges from different partner universities across Europe and to create better study conditions and quality mobility for as many UL FFA students as possible and thereby contribute to general competencies of graduates.

## MOBILITY-PROGRAMMES

Under the Erasmus+ programme 67 interinstitutional agreements are signed at the UL FFA to provide approximately 160 places for student mobility, and 75 for staff mobility. In 2021 we confirmed the interest of all our current Erasmus partners in extending the agreements in the EWP platform for the period 2021-2027. Within the Central European Exchange Programme for University Studies - CEEPUS, we participate in two networks. UL FFA is a partner in the CEEPUS network CIII - RS - 1113-00-2021 (Central European Knowledge Alliance for Teaching, Learning & Research in Pharmaceutical Technology). Contact person is Prof. Dr. Stanko Srčič. UL FFA is the coordinator of the CEEPUS network CIII-SI-0611-10-2021 (Novel diagnostic and therapeutic approaches to complex genetic disorders). The coordinator and the contact person is Prof. Dr. Janja Marc. Students also conduct mobilities within the framework of the International Pharmacy Students Association (IPSF) programme and the European Pharmacy Students Association (EPSA) programme. Student and staff exchanges also take place through other initiatives and funding mechanisms.

## MOBILNOST V ŠTEVILKAH

### Naši študenti na mednarodnih inštitucijah

34 študentov se je udeležilo mednarodne mobilnosti v okviru programa Erasmus+, od tega 20 za študij, 14 za praktično usposabljanje, od teh 3 diplomanti. Največ (5) študentov je bilo na izmenjavi v Belgiji, na Finskem in v Španiji (4), Nemčiji, Avstriji, Portugalski in Estoniji (3), v Franciji in Italiji (2) ter v Norveški, Švici, Poljski, Veliki Britaniji in Malti (1). 14 študentov je opravilo krajšo mobilnost za praktično usposabljanje v trajanju do 1 meseca v okviru IPSF.

### Gostuječi študenti na UL FFA

51 mednarodnih študentov je opravilo del svojih študijskih obveznosti na UL FFA v okviru programa Erasmus+ (27 jih je opravljalo predmete, 17 samo raziskovalno delo za magistrsko nalogo in 7 raziskovalno delo v laboratoriju). 18 študentov je opravilo krajšo mobilnost za praktično usposabljanje v trajanju do 1 meseca v okviru IPSF.

### Izmenjave učiteljev, raziskovalcev in administrativnih sodelavcev

Zaradi epidemije in izrednih razmer je število mobilnosti učiteljev, raziskovalcev in administrativnih sodelavcev v letu 2020/2021 še vedno zelo majhno. V študijskem letu 2020/21 sta na UL FFA gostovala 2 mednarodna znanstvena delavca in raziskovalna sodelavca, ki sta sodelovala v znanstvenoraziskovalnem procesu (1 za obdobje do 1 meseca in 1 za obdobje nad 6 mesecev).

## KLJUČNI DOSEŽKI V LETU 2021

Potrdili smo interes vseh naših dosedanjih Erasmus partnerjev za podaljšanje sporazumov v EWP platformi za obdobje 2021-2027. V 2020/21 je mednarodnim študentom na voljo 15 učnih enot v angleškem jeziku. Na ta način želimo povečati interes in ustvariti boljše pogoje študija za mednarodne študente. Pričeli smo z aktivnostmi za izvedbo študijskega programa S2 Industrijska farmacija popolnoma v angleškem jeziku. Z virtualnimi dogodki smo uspešno obveščali študente in promovirali mednarodne izmenjave.

## MOBILITY IN NUMBERS

### Our students at international institutions

34 students took part in international mobility under the Erasmus + programme, among them 20 for the purpose of study, 14 for the purpose of practical training, 3 of them for the purpose of final thesis research. Exchange students were in Belgium(5), Finland and Spain(4), Germany, Austria, Portugal and Estonia (3), France and Italy (2), and Norway, Switzerland, Poland, the United Kingdom and Malta (1). 14 students completed a short mobility for practical training lasting up to 1 month under the IPSF.

### Visiting students at UL FFA

51 international students completed part of their study obligations at UL FFA within the Erasmus + programme (27 of them took courses, 17 performed research work for final thesis and 7 performed research internship in a laboratory). 18 students completed a short mobility for practical training lasting up to 1 month under the IPSF.

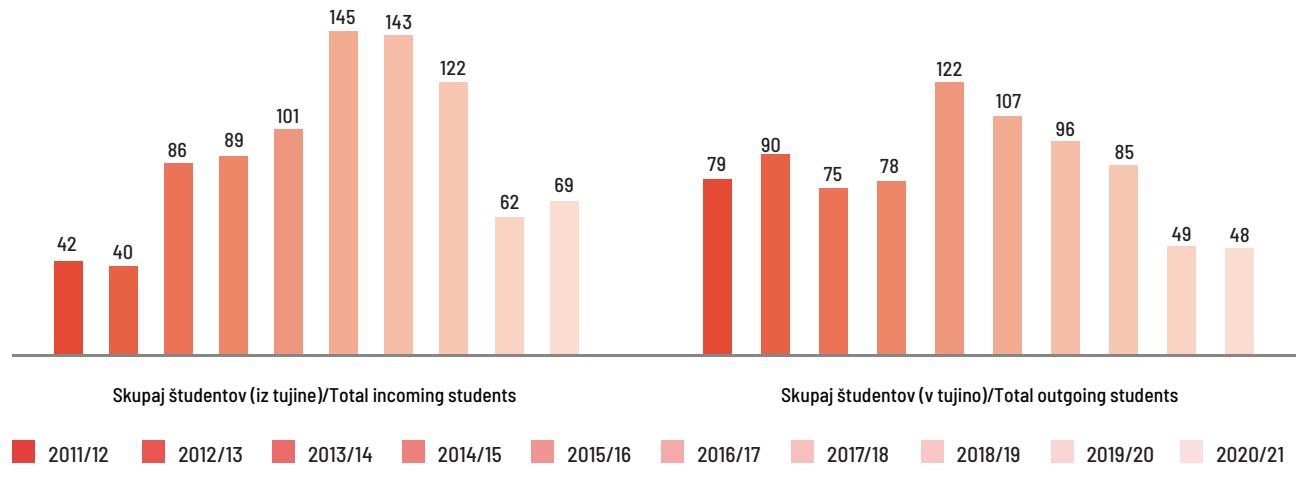
### Exchanges of teachers, researchers and administrative staff

Due to the epidemic and the emergency situation, the mobilities of teachers, researchers and administrative staff in 2020/2021 remain low. In the 2020/21 academic year 2 international researchers and research associates who participated in the scientific research process (1 for a period of up to 1 month and 1 for a period of more than 6 months) visited the UL FFA.

## KEY ACHIEVEMENTS IN 2021

We have confirmed the interest of all our current Erasmus partners in extending the agreements in the EWP platform for the period 2021-2027. In 2020/21 as many as 15 courses in English are available to international students. In this way we want to increase interest and create better study conditions for international students. Activities for the implementation of the study programme S2 Industrial Pharmacy entirely in English were initiated. We successfully informed students and promoted international exchanges through virtual events.

## MOBILNOST ŠTUDENTOV / STUDENT MOBILITY



Število študentov UL FFA na izmenjavi v tujini in število mednarodnih študentov na izmenjavi na UL FFA (zadnjih deset študijskih let).

The number of faculty students in the exchange programme abroad, and the number of foreign students in the exchange programme at the faculty (data for the last ten years).

# OBŠTUDIJSKA DEJAVNOST

Študentska organiziranost na UL FFA je specifična in študentom omogoča velik spekter delovanja tako na strokovnih področjih kot obštudijskem delovanju in mednarodnem udejstvovanju.

**Študentski svet UL FFA (ŠS FFA)** je organ študentov UL FFA. Že vrsto let uspešno deluje, skozi svoj obstoj pa se je uveljavil kot zelo konstruktiven sogovornik pri vprašanjih, vezanih na študijski proces in kakovost UL FFA. Ena izmed mnogih nalog ŠS FFA je ustvarjanje ter oblikovanje mnenj o pedagoških delavcih, s čimer pa slednjim omogoča izvolitev v zahtevane nazive. ŠS FFA je uradni zastopnik študentov UL FFA na vseh organizacijskih nivojih in uspešno sodeluje v sklopu drugih organov fakultete (Senat, Upravni odbor, Komisija za študijsko področje, Akademski zbor, Komisija za kakovost). Svoje študente prav tako zastopa v okviru Univerze v Ljubljani na sejah ŠS UL.

Poleg omenjenih nalog in aktivnosti je ŠS FFA 1. 10. 2021 že drugo leto zapored uspešno organiziral **Uvodni dan za bruce (UDB)**. Dogodek je namenjen študentom prvih letnikov študijskih programov Kozmetologija, EMŠ Farmacija in prve stopnje programa Laboratorijska biomedicina, njegov namen je novim študentom olajšati prehod iz srednješolskega v univerzitetno okolje ter jih podrobnejše seznaniti z UL FFA. Pod okriljem ŠS FFA pa prav tako že od leta 2020 deluje **pevski zbor UL FFA**.

Na UL FFA poleg ŠS FFA delujejo tudi Društvo študentov farmacije Slovenije (DŠFS), **Društvo študentov farmacevtskih ved (DŠFV)** in **Študentska sekcija Slovenskega farmacevtskega društva (ŠSSFD)** – preko slednjega študenti tudi zelo aktivno sodelujejo

# EXTRACURRICULAR ACTIVITIES

The extracurricular opportunities at the Faculty of Pharmacy at the University of Ljubljana are specific and enable students a wide spectrum of work, both in professional areas and also extracurricular activities and international engagements.

**The Student Council of the Faculty of Pharmacy (ŠS FFA)** is a student body of UL FFA. It has been successfully functioning for many years and has established itself as a very constructive contributor, when it comes to questions regarding the study process and other wider qualities of the faculty. One of the many tasks of the Student Council is to produce and form objective opinions about the work of the teaching staff and therefore enabling them the possibility of election into the desired titles. It is the official representative of the faculty's students at all organisational levels and it successfully collaborates in other bodies of the faculty (Senate, Management Board, Commission of Study Affairs, Academic Assembly, Commission of Quality). It also represents its students on the university level at the sessions of the Student's Council of the University of Ljubljana (ŠS UL).

Apart from said functions, ŠS FFA successfully organised **Introductory day for 1st year students (UDB)** on the 1 October 2021 for a second year in a row. The aim of this event is to facilitate the transition of first year students from secondary school into the university environment and familiarising them with UL FFA. Furthermore, ŠS FFA also established the **UL FFA Choir**, which has been operating since 2020.

In addition to the Student Council there are a lot of other student entities at the faculty that also successfully continue their work. These include **The Slovenian Pharmacy Students' Society (DŠFS)**, **The Society of Pharmaceutical Studies students (DŠFV)** and **The Students' Section of the Slovenian Pharmaceutical Society (ŠSSFD)**. The latter

v svetovnem in evropskem okolju. Skupaj s ŠS FFA in Študentsko organizacijo Fakultete za farmacijo so uspešno sodelovali pri organizaciji strokovnih in družabnih projektov, kot so Inkubator inovativnosti, 1. ŠSSFD kongres, strokovni večeri in okrogle mize.

**Študentska organizacija Fakultete za farmacijo (ŠOFFA)** je ena izmed podružnic ŠOU v Ljubljani. Organizacija je tudi v letu 2021 organizirala različne dogodke, ki pomagajo študentom v prostem času bolje spoznati svoje sošolce in druge študente UL FFA ter ostalih članic UL.

### Spatula

Spatula je glasilo Študentske sekcije Slovenskega farmacevtskega društva, s katerim se študente UL FFA seznanja o aktualnih obštudijskih dogodkih in novostih na področju farmacije, kozmetologije in laboratorijske biomedicine, ki izhaja periodično. V letu 2021 je kot posebna izdaja Spatule prvič izšla tudi strokovna Spatula, ki je bila v obliki strokovnih člankov posvečena obdobju epidemije virusa SARS-CoV-2, njegovi biologiji, zdravljenju bolezni COVID-19 ter cepljenju.

### 7. simpozij Študentske sekcije Slovenskega farmacevtskega društva: Zdravstvo v koraku z digitalizacijo

16. 10. 2021 se je na 7. ŠSSFD simpoziju zvrstilo šest predavanj strokovnjakov z različnih področij, ki so predavali o aktualni tematiki digitalizacije in umetne inteligence v zdravstvu in farmaciji. Simpozij je potekal v dvorani prof. dr. Janeza Hribarja na Biotehniški fakulteti Univerze v Ljubljani, udeležilo pa se ga je okoli osemdeset študentov UL FFA.

### Inkubator inovativnosti

Inkubator inovativnosti študentom UL FFA omogoča vpogled v delo farmacevta na področju marketinga. Inkubator inovativnosti 2021 je potekal med 18. in 24. 10. 2021. Pri izvedbi dogodka sta sodelovali farmacevtski podjetji Bayer in Novartis. Sodelujoči študenti so delali v ekipah, ki so v drugem delu dogodka predstavile

enables our students to be actively involved in European and worldwide projects. Working together with ŠS FFA and The Students' Organisation of the Faculty of Pharmacy, they were very successful at organising many professional work-related and social projects. These included The Incubator of Innovations, The First ŠSSFD Congress and discussion panels.

**The Students' Organisation of the Faculty of Pharmacy (ŠOFFA)** is one of the many subsidiaries of The Students' Organisation of the University of Ljubljana (ŠOU). In 2021 they organised many events which helped our students to get to know each other better in their free time.

### Spatula

Spatula is the periodically published newsletter of the Students' section of the Slovenian Pharmaceutical Society, through which the students of Faculty of Pharmacy are being informed about various extracurricular activities taking place and on the latest developments in the field of pharmacy, cosmetology and laboratory biomedicine. In 2021 the Professional Spatula was published for the first time as a special issue of Spatula which included articles on the SARS-CoV-2 epidemic, its biology, the treatment of COVID-19 and vaccination.

### 7<sup>th</sup> Symposium of The Students' section of Slovenian Pharmaceutical Society: Healthcare in step with digitalization

The 7<sup>th</sup> ŠSSFD Symposium took place on 16 October 2021. It featured six lectures given by acclaimed professionals at the top of their respective fields of digitalization and artificial intelligence in healthcare and pharmacy. The symposium took place in the hall of Prof. Dr. Janez Hribar at the Faculty of Biotechnology, University of Ljubljana, and was attended by around eighty UL FFA students.

### Incubator of Innovations

The Incubator of Innovations gives UL FFA students an insight into the work of a pharmacist in the field of marketing. The Innovation Incubator 2021 took place from 18 to 24 October 2021 and was co-organised by Bayer and Novartis. Participating students worked

svoje rešitve zastavljenega problema s področja farmacevtskega marketinga.

#### **Strokovni večer: Atopijski dermatitis, več kot le rdeči madeži!**

Strokovni večer se je odvil 3.11.2021 v živo v prostorih UL FFA. Študentom so tematiko atopijskega dermatitisa in nege kože predstavile štiri predavateljice – udeleženci so pridobili znanje o bolezni z vidika dermatologa in o farmacevtskem pristopu k zdravljenju in negi atopijskega dermatitisa.

#### **Javne kampanje**

Študenti so v letu 2021 organizirali in izvedli naslednje javne kampanje: PneumoSTOP, Si (ne)varen? in InterAKCIJA.

#### **Informativni dnevi, Informativa in Karierni sejem za srednješolce 2021**

Študenti UL FFA smo predstavljali fakulteto, študijske programe in obštudijske aktivnosti na vsakoletnih informativnih dogodkih za dijake srednjih šol.

in teams and then presented their idea of a solution to a certain problem in the field of pharmaceutical marketing.

#### **Professional evening: Atopic dermatitis, more than just red spots!**

The Professional evening took place on 3 November 2021 at the UL FFA premises. Four of the speakers, all professionals in their respective fields, gave lectures on the topic of atopic dermatitis and skin care. The participants gained knowledge about the disease from a dermatologist's point of view and about the pharmaceutical approach to the treatment and care of atopic dermatitis.

#### **Public campaigns**

In 2021 the students organised the following public campaigns: Public campaign: PneumoSTOP, Public campaign: Are you (un)safe? and Public campaign: InterACTION.

#### **Information days, Informativa, Career fair for secondary school students 2021**

Students of our faculty were actively involved in many presentations of the faculty, its study programmes and extracurricular activities. These presentations took place at our annual informative events.

# ŠPORT NA UL FFA / SPORT AT UL FFA

## ORGANIZACIJA ŠPORTNE VZGOJE NA UL FFA V LETU 2021

## ORGANISATION OF SPORTS EDUCATION AT UL FFA IN 2021

### 1. ŠPORTNE DEJAVNOSTI ZA ŠTUDENTE NA UL FFA / SPORTS ACTIVITIES FOR STUDENTS AT UL FFA

- Odbojka / Volleyball
- Plavanje / Swimming
- Pohodništvo / Hiking
- Planinski izleti / Mountain excursions
- Nordijska hoja / Nordic walking
- Mali nogomet / Futsal
- Košarka / Basketball
- Fitnes / Fitness
- Joga / Yoga
- Aerobika / Aerobics
- Alpsko smučanje / Alpine skiing
- Deskanje na snegu / Snowboarding
- Tek na smučeh / Cross-country skiing

### 2. ŠTUDENTI S STATUSOM VRHUNSKEGA ŠPORTNIKA 2021 / STUDENTS WITH THE STATUS OF A TOP ATHLETE 2021

Rok Bergant – Vaterpolo / Water polo

Kaja Debevc – Atletika / Athletics

Tina Hajdinjak – Gimnastika / Gymnastics

Urška Krašovec – Atletika / Athletics

Karin Kumer – Moderni tekmovalni plesi / Modern competitive dance

Anja Mandeljc – Tek na smučeh / Cross-country skiing

Špela Morgan – Odbojka na mivki / Beach volleyball

Laura Potisk – Karate / Karate

Anja Prezelj – Strelstvo / Shooting

Taša Rojko - Konjeništvo / Horse riding

Nika Simšič - Rokomet / Handball

Hana Šurka - Atletika / Athletics

Jaka Vrevc Žlajpah - Akrobatski ples R&R / Dance acrobatic R&R

3. ŠTUDENTA UL FFA – UDELEŽENCA OI 2022 V PEKINGU /  
STUDENTS UL FFA - PARTICIPANT OF THE OI 2022 (BEIJING)

Anja Mandeljc - Tek na smučeh / Cross-country skiing

Miha Ličef - Tek na smučeh / Cross-country skiing

4. UNIVERZITETNA LIGAŠKA TEKMOVANJA – SESTAVA EKIP 2021 /  
UNIVERSITY LEAGUE COMPETITIONS – TEAM 2021

ODBOJKA – ŽENSKE / VOLLEYBALL – WOMEN

Tjaša Škerl Rifelj (kapetanka/captain)

Ema Sopčič

Izza Rozman

Veronika Klančič

Mia Medved

Vesna Slatinek

Špela Morgan

Nuša Svetanič

Žana Županc

Eva Kop

Gaja Pušnik

Ajda Dedič

Hana Koletnik

Ljubka Pavlova

Zala Klobčič

Špela Pajer

Laura Satošek

Aleksandra Šoronda

ODBOJKA – MOŠKI / VOLLEYBALL – MEN

Mihael Lebar (kapetan/captain)

Jan Hribenik

Maks Istenič

Miha Rožič

Urban Linke

Klemen Bele

David Vuk

Leon Lombergar

Tit Jelenko

Žan Rekar

Toni Travnik

Matej Dragovan

Lev Grabnar

KOŠARKA – MOŠKI / BASKETBALL – MEN

Žan Vodopivec (kapetan/captain)

Luka Garb

Jaka Rotman

Matjaž Weiss

David Vuk

Tilen Mrcina

Andraž Herman

Luka Horvat

Gašper Škoberne

Blaž Matoh

Lars Martin Riedl

Vid Tement

Peter Kastelan

DVORANSKI NOGOMET - MOŠKI / FUTSAL - MEN

Tilen Strmšnik (kapetan/captain)

Aljaž Bojnec (kapetan/captain)

Žiga Škalič

Tilen Kralj

Anže Močnik

Jaša Bojnec

Klemen Bele

Patrik Torhač

Jan Tonchia

David Vuk

Nejc Ajlec

Andraž Tkalec

Jan Hribernik

Marko Suvajac

Martin Pančur

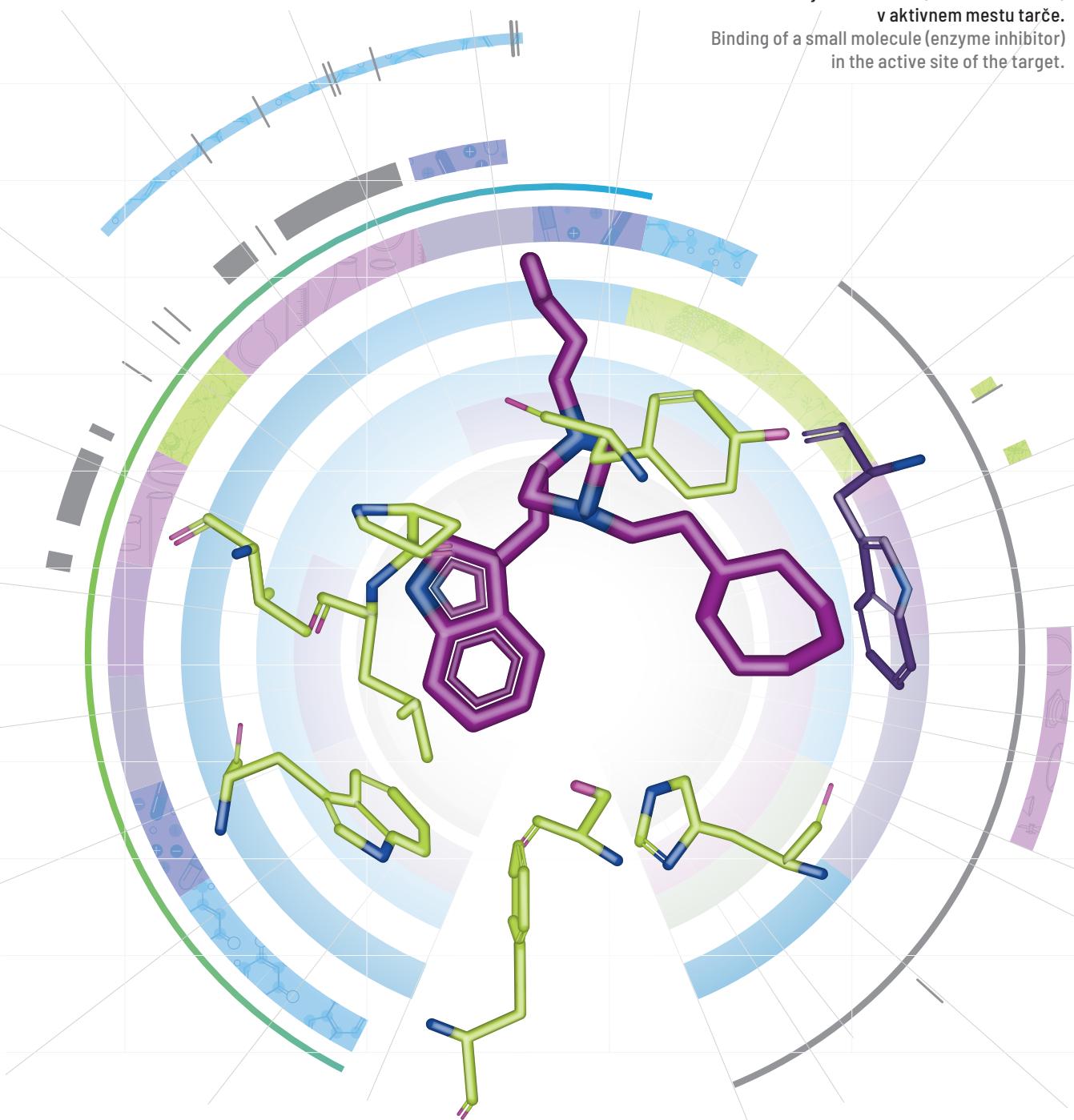
## Razvijamo nova zdravila

Z računalniško podprtим načrtovanjem učinkovin odkrivamo in razvijamo številne učinkovine, predvsem za zdravljenje rakavih obolenj in nevrodegenerativnih bolezni, kot je Alzheimerjeva bolezen.

## Developing new drugs

Through computer-aided drug design, we discover and develop a number of active ingredients, primarily for the treatment of various cancers and neurodegenerative diseases such as Alzheimer's disease.

Vezava majhne molekule (zaviralca encima)  
v aktivnem mestu tarče.  
Binding of a small molecule (enzyme inhibitor)  
in the active site of the target.



3

Ponosni smo - priznanja in nagrade  
We are proud of - awards and prizes

Odbor Republike Slovenije za podelitev nagrad in priznanj je tudi v letu 2021 podelil Zoisove nagrade in priznanja za izjemne dosežke v znanstvenoraziskovalni in razvojni dejavnosti, najvišja državna priznanja na področju znanosti in raziskovanja. Leto 2021 je bilo za Fakulteto za farmacijo prav posebno. Med Zoisovimi nagrajenci so bili namreč kar trije profesorji Fakultete za farmacijo, Univerze v Ljubljani. To je neposreden kazalec o dolgoročni izraziti raziskovalni usmeritvi fakultete, ki vodi do objektivnih raziskovalnih uspehov. Dodatno kakovost in aktualnost raziskovalnega dela fakultete potrjuje tudi vzpostavitev nove ARRS programske skupine na UL FFA s področja cepiv, imunoloških zdravil in celične terapije. Posebej velja izpostaviti tudi, da so raziskovalci UL FFA v 2021 prejeli kar dve priznanji za najodličnejši raziskovalni dosežek Univerze v Ljubljani v letu 2021. Leto 2021 je leto presežkov UL FFA na raziskovalnem področju.

Raziskovalne dosežke so sodelavci UL FFA objavljali v prestižnih publikacijah s področja naravoslovja in medicine in preko citatov dosegali znatno družbeno odmevnost. Kljub oviram epidemije je UL FFA v 2021 ohranila sodelovanje s ključnimi gospodarskimi subjekti na področju farmacije, doma in v tujini. Ključni kazalci uspešnosti raziskovalnega dela (število objav, število citatov in količina FTE) so pokazali, da je UL FFA tudi v letu 2021 glede na predhodno leto beležila znatno pozitivno rast, kar potrjuje odličen uspeh raziskovalnega dela UL FFA v zadnjem petletnem obdobju.

In 2021 the Committee of the Republic of Slovenia for the Presentation of Awards and Recognitions continued to award Zois Awards and recognitions for outstanding achievements in scientific research and development, the highest national recognitions in the field of science and research. The year 2021 was very special for the Faculty of Pharmacy. Among Zois' laureates were three professors from the Faculty of Pharmacy, University of Ljubljana. This is a direct indicator of the long-term pronounced research orientation of the Faculty, leading to objective research successes. The additional quality and topicality of the research work of the faculty is also confirmed by the establishment of a new ARRS programme group at UL FFA, in the field of vaccines, immunological drugs and cell therapy. It is also worth mentioning that in 2021 UL FFA researchers received two awards for the most excellent research achievement of the University of Ljubljana in 2021. It is therefore a year of UL FFA surpluses in the field of research.

Research achievements were published by UL FFA collaborators in prestigious publications in the field of science and medicine, and through citations they achieved significant social impact. Despite the obstacles of the epidemic, the UL FFA in 2021 maintained cooperation with key economic entities in the field of pharmacy, at home and abroad. Key indicators of research success (number of publications, number of citations and amount of FTE) showed that UL FFA continued to record significant positive growth in 2021 compared to the previous year, which confirms the robustness of the UL FFA research work in the last five years.

## **IZJEMNI DOSEŽKI UL FFA 2021**

**Prof. dr. Julijana Kristl je prejela Zoisovo nagrado za življenjsko delo za trajnostni razvoj farmacevtske nanotehnologije v Republiki Sloveniji.**

Prof. dr. Julijana Kristl je kot mednarodno priznana znanstvenica na področju farmacevtske nanotehnologije to perspektivno vejo znanosti uvedla v farmacevtsko stroko v Republiki Sloveniji. Ukvarya se z razvojem visokotehnološko zahtevnih nanodostavnih sistemov učinkovin (nanozdravil), ki podpirajo zdravljenje na popolnoma nov način in po mehanizmih, ki jih ni možno dosegči s klasičnimi zdravili. Prepoznavnost njenih rezultatov odseva v visoki citiranosti objavljenih del v vrhunskih revijah, vabljenih predavanjih ter pridobljenih projektih evropskih raziskovalnih agencij. Njeno življenjsko poslanstvo je raziskovanje in prenašanje najpomembnejših odkritij farmacevtske (nano)tehnologije na študente, farmacevtsko stroko in mednarodno znanstveno skupnost. Temu namenja svoj čas tako v poklicnem kot zasebnem življenju. Svoje vedenje, izkušnje in ideje prenaša na mlajše generacije. Njene doktorandke so prejemnice različnih pomembnih nagrad in priznanj. Kot prorektorica na Univerzi v Ljubljani, dekanja in prodekanja Fakultete za farmacijo, predstojnica katedre in predsednica številnih odborov in komisij je imela pomembno vlogo pri oblikovanju in razvoju Fakultete za farmacijo.

**Prof. dr. Stanislav Gobec je prejel Zoisovo nagrado za izjemne dosežke na področju osnovnih in uporabnih raziskav v farmaciji.**

Prof. dr. Stanislav Gobec je priznan strokovnjak na področju farmacije, tako v Sloveniji kot v mednarodnih strokovnih krogih. Uvršča se na vrh najboljših raziskovalcev po podatkih baze SICRIS. V zadnjih letih je raziskovalno aktivnen na različnih področjih farmacije. Največ pozornosti je namenil strukturno podprtemu

## **EXCEPTIONAL ACHIEVEMENTS UL FFA 2021**

**Prof. Dr. Julijana Kristl received the Zois Lifetime Achievement Award for the sustainable development of pharmaceutical nanotechnology in the Republic of Slovenia**

Prof. Dr. Julijana Kristl, as an internationally recognized scientist in the field of pharmaceutical nanotechnology, introduced this promising branch of science to the pharmaceutical profession in the Republic of Slovenia. It is engaged in the development of high-tech demanding delivery systems of active ingredients (nanodrugs), which support treatment in a completely new way and by mechanisms that cannot be achieved with conventional drugs. The visibility of her results is reflected in the high citation rate of published works in top journals, invited lectures and acquired projects of various European research agencies. Her life mission is to research and transfer the most important discoveries of pharmaceutical (nano) technology to students, the pharmaceutical profession and the international scientific community. She devotes her time to this in both her professional and private life. She passes her skills, experience and ideas to younger generations. Her doctoral students are recipients of various important awards and recognitions. As Vice-Rector at the University of Ljubljana, Dean and Vice-Dean of the Faculty of Pharmacy, Head of the Department and Chair of numerous committees and commissions, she played an important role in the formation and development of the Faculty of Pharmacy.

**Prof. Dr. Stanislav Gobec received the Zois Award for outstanding achievements in the field of basic and applied research in pharmacy**

Prof. Dr. Stanislav Gobec is a renowned expert in the field of pharmacy, both in Slovenia and in international professional circles. It ranks among the top researchers according to the SICRIS database. In recent years he has been active in research in various fields of pharmacy. He devoted most of his attention to the structurally

razvoju nizkomolekularnih zaviralcev terapevtsko zanimivih encimov. V njegovem raziskovalnem opusu ima pomembno vlogo tudi razvoj zaviralcev katepsinov, kar predstavlja pomemben prispevek k razumevanju vloge katepsinov pri različnih obolenjih, predvsem raku, in pomemben korak proti novim protitumorskim zdravilnim učinkovinam. V zadnjih letih je usmeril svoje raziskave tudi v razvoj holinergičnih zaviralcev in multifunkcionalnih spojin s potencialnim delovanjem na Alzheimerjevo bolezen. Mnoge razvite potencialne učinkovine je skupaj s sodelavci patentiral in jih želi v sodelovanju s farmacevtsko industrijo razviti do končnih zdravil.

supported development of low-molecular-weight inhibitors of therapeutically interesting enzymes. The development of cathepsin inhibitors also plays an important role in his research work, which is an important contribution to understanding the role of cathepsins in various diseases, especially cancer, and an important step towards new anticancer drugs. In recent years he has also focused his research on the development of cholinergic inhibitors and multifunctional compounds with potential action on Alzheimer's disease. He has patented many of the developed potential active ingredients together with his colleagues and wants to develop them to the final medicines in cooperation with the pharmaceutical industry.



Zoisova nagrjenca prof. dr. Julijana Kristl in prof. dr. Stanislav Gobec / Zois award winner Prof. Dr. Julijana Kristl and Prof. Dr. Stanislav Gobec

## **Prof. dr. Marko Anderluh je prejel Zoisovo priznanje za leto 2021.**

Prof. dr. Marko Anderluh je od leta 2017 redni profesor in prodekan za študijsko področje na Fakulteti za farmacijo. Je eden od pionirjev na področju glikozdravil. Raziskovalno intenzivno deluje na področju ved o življenju s poudarkom na molekulskih probah, ki modulirajo receptorje za sladkorne ligande oz. modulirajo encime, ki presnavljajo sladkorje. V preteklem obdobju lahko izpostavimo tudi njegovo delo na temo zaviralcev bakterijske DNA giraze kot bodočih protibakterijskih učinkovin.

## **Prof. dr. Matjaž Jeras je prejemnik priznanja za najodličnejši raziskovalni dosežek Univerze v Ljubljani v letu 2021.**

Komisija za raziskovalno in razvojno delo Univerze v Ljubljani je raziskovalni dosežek »Novo napredno celično zdravilo za imunsko terapijo raka prostate« izbrala za enega od najodličnejših Univerze v Ljubljani v letu 2021. Prestižno priznanje je s soavtorji prejel član Katedre za klinično biokemijo, prof. dr. Matjaž Jeras. Izsledki raziskave so bili objavljeni v ugledni reviji Clinical and Translational Medicine.

## **Prof. dr. Marko Anderluh in doc. dr. Martina Hrast sta del skupine, ki je prejela priznanje za najodličnejši raziskovalni dosežek Univerze v Ljubljani v letu 2021.**

Skupina raziskovalcev, ki sta jo vodila prof. dr. Marko Anderluh s Fakultete za farmacijo Univerze v Ljubljani in dr. Nikola Minovski s Kemijskega inštituta, je sintetizirala nove molekule z zavirnimi delovanjem na superodporne bakterije, ki predstavljajo veliko grožnjo javnemu zdravju. Hkrati je prvič dokazala mehanizem delovanja teh molekul, ki je bil do zdaj zgolj hipotetičen. V članku »Potent DNA gyrase inhibitors bind asymmetrically to their target using symmetrical bifurcated halogen bonds«, objavljenem v reviji Nature Communications, je predstavljena kristalna struktura, ki predstavlja mejnik v razumevanju posebnega tipa vezi, saj dokazane simetrične razcepljene halogene vezi lahko s pridom uporabljamo pri načrtovanju novih zdravilnih učinkovin.

## **Prof. Dr. Marko Anderluh received the Zois Award for 2021**

Prof. Dr. Marko Anderluh has been a full professor since 2017 and vice dean for study at the Faculty of Pharmacy. He is one of the pioneers in the field of glycol drugs. He works intensively in the field of life sciences with an emphasis on molecular probes that modulate receptors for sugar ligands or modulate sugar-metabolizing enzymes. His past work on the topic of bacterial DNA gyrase inhibitors as future antibacterial agents can also be pointed out.

## **Prof. Dr. Matjaž Jeras, recipient of the award for the best research achievement of the University of Ljubljana in 2021**

The Commission for Research and Development of the University of Ljubljana has chosen the research achievement "New Advanced Cellular Drug for Immune Therapy of Prostate Cancer" as one of the most excellent of the University of Ljubljana in 2021. The prestigious award was received by a member of the Department of Clinical Biochemistry, Prof. dr. Matjaž Jeras. The results of the study were published in the prestigious journal called Clinical and Translational Medicine.

## **Prof. Dr. Marko Anderluh and Assist. Prof. Dr. Martina Hrast are part of the group that received the award for the best research achievement of the University of Ljubljana in 2021**

A group of researchers led by Prof. Dr. Marko Anderluh from the Faculty of Pharmacy, University of Ljubljana, and Dr. Nikola Minovski from the Institute of Chemistry, has synthesized new molecules with inhibitory action on super-resistant bacteria, which pose a major threat to public health. It simultaneously proved the mechanism of action of these molecules for the first time, which has so far been purely hypothetical. The article "Potent DNA gyrase inhibitors bind asymmetrically to their target using symmetrical bifurcated halogen bonds", published in the journal called Nature Communications, presents a crystal structure that represents a milestone in understanding a specific type of bond, as proven symmetrical split halogen bonds are used for planning new active substances.

## **Objava članka sodelavcev UL FFA Katedre za farmacevtsko kemijo o longitudinalni študiji novega BchE PET sledilca kot zgodnjega *in vivo* biološkega označevalca v mišjem modelu Alzheimerjeve bolezni v reviji Theranostics**

Raziskovalci s Katedre za farmacevtsko kemijo (Urban Košak, Damijan Knez, Stanislav Gobec) so v sodelovanju s partnerji iz UL FKKT, Španije in Argentine objavili članek v reviji Theranostics (IF = 11,556), kjer so opisali longitudinalno študijo novega BChE PET sledilca kot zgodnjega *in vivo* biološkega označevalca v možganih miši v modelu Alzheimerjeve bolezni. Rezultate aktivnosti BChE so korelirali z odlaganjem amiloida -*in vivo*, ki so ga določili s PET slikanjem [<sup>18</sup>F]-florbetabena. Rezultati nedvoumno potrjujejo, da je BChE obetaven biološki označevalc za zgodnjo obliko Alzheimerjeve bolezni.

## **Objava članka sodelavcev UL FFA Katedre za farmacevtsko kemijo o zaviralcih ionskega kanala hEAG1 s protitumornim delovanjem v reviji Cancers**

Raziskovalci s Katedre za farmacevtsko kemijo (Žan Toplak, Špela Gubič, Tihomir Tomašič, Lucija Peterlin Mašič) so v sodelovanju z raziskovalci iz KU Leuvna, Max-Planck instituta ter Nacionalnega instituta za biologijo objavili članek v reviji Cancers (IF = 6,639), kjer so kot prvi predstavili uporabo 3D farmakofornih modelov za načrtovanje novih zaviralcev napetostno odvisnih kalijevih kanalov KV10.1 kot novih potencialnih protitumornih učinkovin. Uporabljenja metodologija za načrtovanja novih KV10.1 zaviralcev, z uporabo 3D farmakofornih modelov, se je izkazala za uspešno, pri čemer ostaja izzik izboljšanja selektivnosti napram kanalu hERG.

## **Doc. dr. Špela Zupančič, prejemnica zlatega znaka Jožefa Stefana**

Doc. dr. Špela Zupančič je marca 2021 prejela zlati znak Jožeta Stefana za odmevnost doktorskega dela "Razvoj dvoslojnih nanovlaken za inovativno zdravljenje parodontalne bolezni", izvedenega pod mentorstvom prof. dr. Julijane Kristl. To priznanje vsakoletno podeljuje

## **Publication of an article by the UL FFA associates in the Department of Pharmaceutical Chemistry on the longitudinal study of a new BchE PET follower as an early *in vivo* biological marker in a mouse model of Alzheimer's disease in Theranostics**

Researchers from the Department of Pharmaceutical Chemistry (Urban Košak, Damijan Knez, Stanislav Gobec) in collaboration with partners from UL FKKT, Spain and Argentina published an article in Theranostics (IF = 11,556), describing a longitudinal study of a new BChE PET follower as early *in vivo* biological marker in mouse brain in a model of Alzheimer's disease. The results of BChE activity correlated with *-in vivo* amyloid deposition determined by PET imaging [<sup>18</sup>F] -florbetaben. The results unequivocally confirm that BChE is a promising biological marker for the early form of Alzheimer's disease.

## **Publication of an article by the UL FFA associates of the Department of Pharmaceutical Chemistry on hEAG1 ion channel inhibitors with antitumor activity in the journal Cancers**

Researchers from the Department of Pharmaceutical Chemistry (Žan Toplak, Špela Gubič, Tihomir Tomašič, Lucija Peterlin Mašič) in collaboration with the researchers from KU Leuvno, Max-Planck Institute and the National Institute of Biology, published an article in the journal called Cancers (IF = 6,639), where were the first to present the use of 3D pharmacophore models for the design of new inhibitors of voltage-gated potassium channels KV10.1 as new potential antitumor agents. The methodology used to design new KV10.1 inhibitors, using 3D pharmacophore models, has proven successful, while the challenge of improving selectivity towards the hERG channel remains.

## **Assist. Prof. Dr. Špela Zupančič, recipient of the Jožef Stefan Golden Badge**

Assist. Prof. Dr. Špela Zupančič, received the Jožef Stefan Golden Badge in March 2021 for the impact of her doctoral dissertation "Development of two-layer nanofibers for innovative treatment of periodontal disease", conducted under the mentorship of Prof. Dr. Julian Christle. This

Institut Jožefa Stefana za odmevna doktorska dela s področja naravoslovno-matematičnih, tehniških, medicinskih in biotehniških ved.

#### **Rektorjeva nagrada za naj inovacijo Univerze v Ljubljani 2021 v kategoriji študentk in študentov ter alumne in alumni**

Nagrado za najboljšo inovacijo v kategoriji študentke in študenti ter alumne in alumni je prejel projekt z naslovom "Pufer za izvedbo PCR testov SARS-CoV-2 na vzorcu sline" raziskovalcev skupine prof. dr. Irene Mlinarič-Raščan v sodelovanju z raziskovalci Kemijskega inštituta in Nacionalnega inštituta za biologijo. Članice podjetniške skupine: mag. Eva Rajh (Medicinska fakulteta Univerze v Ljubljani, Kemski inštitut), Katarina Pivko (Ekonomski fakulteta Univerze v Ljubljani), dr. Mojca Benčina (Kemski inštitut), dr. Maruša Bizjak (Fakulteta za farmacijo Univerze v Ljubljani). Inovacija je pufer za stabilizacijo virusne RNA, združljiv z reakcijami RT-qPCR in RT-LAMP za diagnosticiranje SARS-CoV-2 v vzorcih sline. Ta proces ne zahteva predhodne izolacije RNA, kar izrazito skrajša čas obdelave vzorcev.

award is given annually by the Jožef Stefan Institute for outstanding doctoral dissertation in the field of natural sciences, mathematics, engineering, medicine and biotechnology.

#### **Rector's Best Innovation Award of the University of Ljubljana 2021 in the category of teralum and alumni students**

Best Innovation Award in the category of students and alumni was given to the project entitled 'Buffer for performing PCR tests SARS-CoV-2 on a saliva sample' by researchers from the group of Prof. Dr. Irena Mlinarič-Raščan in collaboration with researchers from the Institute of Chemistry and the National Institute of Biology. Members of the business group: Eva Rajh, Msc (Faculty of Medicine, University of Ljubljana, Institute of Chemistry), Katarina Pivko (Faculty of Economics, University of Ljubljana), Dr. Mojca Benčina (Institute of Chemistry), Dr. Maruša Bizjak (Faculty of Pharmacy, University of Ljubljana). The innovation is a viral RNA stabilization buffer compatible with RT-qPCR and RT-LAMP reactions to diagnose SARS-CoV-2 in saliva samples. This process does not require prior RNA isolation, which significantly shortens the sample processing time.

#### **SLAVIMO ZNANOST – RAZISKOVALNI DAN UL FFA**

V okviru Tedna Univerze je bil 1. 12. 2021 po spletni platformi Zoom organiziran prvi del Raziskovalnega dne UL FFA. Dogodek je bil namenjen osvetlitvi in počastitvi izjemnih dosežkov fakultete. Dekanovi nagrajeni so predstavili svoje članke, odmevno raziskovalno delo pa je predstavil prof. dr. Marko Anderluh.

Slavnostni del Raziskovalnega dne UL FFA je bil organiziran 15. 12. 2021 na hibriden način, deloma v živo ter po spletni platformi Zoom. Na prireditvi so bile podeljene nagrade, priznanja in pohvale, ki jih Fakulteta za farmacijo podeljuje izstopajočim posameznikom, katerih delo pomembno zaznamuje znanstveni prostor ali vpliva na ugled in kakovost fakultete. Dodatno je fakulteta v obliki intervjuja obeležila letošnje prejemnike

#### **WE CELEBRATE SCIENCE - FACULTY OF PHARMACY RESEARCH DAY**

As part of the University Week, the first part of the UL FFA Research Day was organized on 1 December 2021 via the Zoom online platform. The event was intended to highlight and celebrate the outstanding achievements of the faculty. The Dean's laureates presented their articles and the resounding research work was presented by Prof. Dr. Marko Anderluh.

The ceremonial part of the UL FFA Research Day was organized on 15 December 2021 in a hybrid way, partly live and via the Zoom online platform. At the event, awards, recognitions and commendations were given by the Faculty of Pharmacy to outstanding individuals, whose work significantly marks the scientific space or affects the reputation and quality of the faculty. In addition to

Zoisovih nagrad in priznanj: prof. dr. Julijano Kristl, prof. dr. Stanislava Gobca in prof. dr. Marka Anderluha.

### **Priznanje UL FFA za življenjsko delo je prejel prof. dr. Janko Kos.**

Profesor dr. Janko Kos je eden od najprepoznavnejših obrazov na področju slovenske biokemijske znanosti in je pomembno prispeval k uveljavitvi tega znanstvenoraziskovalnega in pedagoškega področja na Fakulteti za farmacijo. Kot redni profesor se je fakulteti pridružil leta 2005, med leti 2006 in 2011 pa je opravljal tudi funkcijo prodekana za raziskovalno delo. Desetletje in pol je vzporedno deloval kot vodja Odseka za biotehnologijo na Institutu Jožef Stefan. Profesor Kos ima z več kot 220 znanstvenimi članki, Hirschevim indeksom 49 in več kot 7000 citati izjemno znanstveno bibliografijo. Področja njegovih raziskav segajo od proteolize, tumorske biologije in imunobiologije do dostavnih sistemov. Izsledki njegovih raziskav so naravnani izrazito translacijsko, saj proučuje uporabnost proteaz za diagnostične namene in kot tarčnih molekul za načrtovanje novih protitumorskih učinkovin. Za svoje raziskovalno in pedagoško delo je dobil več priznanj, med drugimi mu je nagrado za izjemne dosežke leta 1998 podelila revija International Journal of Oncology, leta 2013 pa je prejel Zoisovo nagrado RS za vrhunske dosežke na področju proteolize in njene regulacije. Pogosto je bil vabljen predavatelj na domačih in mednarodnih konferencah ter univerzah. Vodil je številne domače in tujne raziskovalne in razvojne projekte ter organiziral številna strokovna in znanstvena srečanja. Aktivno je sodeloval in sodeluje v raznih domačih in tujih strokovnih društvih in ekspertnih skupinah, prav tako pa je dolgoletni predsednik Slovenskega biokemijskega društva. Na pedagoškem področju je profesor Kos pustil neizbrisljiv pečat na mnogih generacijah študentov Fakultete za farmacijo. Bil je mentor многim diplomantom, magistrantom in doktorandom.

that, the faculty marked this year's recipients of Zois awards and recognitions in the form of an interview with Prof. Dr. Juliana Kristl, Prof. Dr. Stanislav Gobec and Prof. Dr. Marko Anderluh.

### **The UL FFA Lifetime Achievement Award was received by Prof. Dr. Janko Kos.**

Prof. Dr. Janko Kos is one of the most recognizable faces in the field of Slovenian biochemical science and has made an important contribution to the establishment of this scientific research and pedagogical field at the Faculty of Pharmacy. He joined the faculty as a full professor in 2005, and between 2006 and 2011 he also held the position of Vice Dean for Research. For a decade and a half, he worked in parallel as the Head of the Department of Biotechnology at the Jožef Stefan Institute. Professor Kos has an outstanding scientific bibliography with more than 220 scientific articles, a Hirsch index of 49 and over 7,000 citations. Areas of his research range from proteolysis, tumor biology and immunobiology to delivery systems. The results of his research are highly translational, as he studies the usefulness of proteases for diagnostic purposes and as target molecules for the design of new antitumor agents. He has received several awards for his research and pedagogical work, including the International Journal of Oncology Award for Outstanding Achievement in 1998, and in 2013 he received the Zois Award of the Republic of Slovenia for outstanding achievements in proteolysis and its regulation. He has often been a lecturer at national and international conferences and universities. He has led numerous domestic and foreign research and development projects and organized numerous professional and scientific meetings. He has actively participated in various domestic and foreign professional societies and expert groups, and is also a long-time president of the Slovenian Biochemical Society. In pedagogical field Professor Kos has left an indelible mark on many generations of students at the Faculty of Pharmacy. He has mentored many graduates, masters and doctoral students.



Prejemnik nagrade za življenjsko delo prof. dr. Janko Kos / Recipient of the Lifetime Achievement Award Prof. Dr. Janko Kos

### Priznanje UL FFA za izjemne rezultate pri delu je prejel prof. dr. Zdenko Časar.

Prof. Časar je v zadnjih letih, še posebej pa v letih 2020 in 2021, naredil izjemno veliko na znanstvenoraziskovalnem in pedagoškem področju ter s tem močno prispeval k skupnim dosežkom Fakultete za farmacijo. Izmed 162 objavljenih SCI člankov FFA v letu 2020 jih je prof. Časar prispeval kar 11. Sodeluje kot mentor in somentor doktorskim študentom. Fakulteto zastopa tudi na mednarodnih konferencah in srečanjih. Pedagoško sodeluje na Enovitem magistrskem študiju farmacije pri predmetu Načrtovanje in sinteza učinkovin ter na programu Biomedicina. Ker študentom nazorno prikaže probleme dela v farmacevtski industriji, so njegova predavanja zelo dobro obiskana in sprejetja.

The UL FFA award for outstanding results at work was received by Prof. Dr. Zdenko Časar.

In recent years, and especially in 2020 and 2021, Prof. Dr. Časar has done a great deal in the field of scientific research and pedagogy, thus making a significant contribution to the joint achievements of the Faculty of Pharmacy. Of the 162 published SCI articles of the FFA in 2020 Prof. Dr. Časar contributed as many as 11. He participates as a mentor and co-mentor or supervisor to doctoral students. He also represents the faculty at international conferences and meetings. He pedagogically participates in the Unified Master's Degree in Pharmacy in the subject Planning and Synthesis of Active Ingredients and in the Biomedicine programme. Because he clearly shows students the problems of working in the pharmaceutical industry, his lectures are very well attended and accepted.

### **Priznanje UL FFA za izjemne rezultate pri delu je prejela prof. dr. Mirjana Gašperlin.**

Prof. dr. Mirjana Gašperlin s svojim predanim pedagoškim, raziskovalnim in strokovnim delom skrbi za napredok stroke in prenos znanja mlajšim kolegom in študentom. Od leta 2013 je tudi predstojnica Katedre za farmacevtsko tehnologijo. Vsa njena poklicna pot je močno prezeta z aktivnim udejstvovanjem na strokovnem področju, tako znotraj fakultete kot širše v slovenskem prostoru in zunaj državnih meja. S svojim delovanjem si prizadeva za dobrobit stroke in promocijo farmacije ter kozmetologije. V svojem mandatu prodekanje za študijsko področje je bila odgovorna za prenovo študija farmacije v skladu z bolonjsko prenovo in za vpeljavo 6-mesečnega praktičnega usposabljanja kot integralnega dela študija farmacije. Zelo pomembno vlogo je imela pri vpeljavi univerzitetnega študijskega programa Kozmetologija. Trenutno je članica delovne skupine pri Ministrstvu za zdravje za pripravo novele zakona o lekarniški dejavnosti, v okviru katere se s kolegi trudi za ohranitev enakomerne dostopnosti lekarniške mreže in kakovostnih storitev izvajalcev lekarniške dejavnosti, usmerjenih k pacientom. Danes, ko se zdi, da smo priče prelomnim trenutkom za slovensko lekarništvo, je glas vsakega angažiranega posameznika še kako pomemben in prof. Gašperlin se je tudi v takšnih trenutkih pripravljena izpostaviti in maksimalno angažirati za dobrobit stroke. Pomembno dimenzijo strokovnega udejstvovanja prof. Gašperlin predstavljajo tudi nastopi v različnih klasičnih in elektronskih medijih, s čimer ozavešča laično javnost o aktualnih znanstvenih dognanjih s področja farmacije in predvsem kozmetologije.

### **Priznanje UL FFA za izjemne rezultate pri delu je prejel izr. prof. dr. Janez Mravljak.**

Izr. prof. dr. Janez Mravljak je od leta 2017 član in od leta 2021 predsednik Komisije za kakovost UL FFA. Ob tem je opravljal pedagoško delo, se raziskovalno udejstvoval in ohranjal povezavo z raziskovalno skupino na Institutu Jožef Stefan. Kot član komisije

### **The UL FFA award for outstanding results at work was received by Prof. Dr. Mirjana Gašperlin.**

With her dedicated pedagogical, research and professional work, Prof. Dr. Mirjana Gašperlin takes care of the progress of the profession and the transfer of knowledge to younger colleagues and students. Since 2013 she has also been the Head of the Department of Pharmaceutical Technology. Her entire career is strongly imbued with active participation in the professional field, both within the faculty and throughout Slovenia and abroad. Through her activities she strives for the benefit of the profession and the promotion of pharmacy and cosmetology. During her term of office, the Vice-Dean for Academic Affairs was responsible for the renewal of pharmacy studies in line with the Bologna renewal and for the introduction of 6-month practical training as an integral part of pharmacy studies. She played a very important role in the introduction of the university study programme called Cosmetology. She is currently a member of the working group at the Ministry of Health to prepare an amendment to the Pharmacy Act, in which she and her colleagues strive to maintain equal access to the pharmacy network and quality services of pharmacy providers aimed at patients. Today, when it seems that we are witnessing turning points for Slovenian pharmacy, the voice of every engaged individual is even more important in such moments, and Prof. Dr. Gašperlin is ready to expose herself and fully engage for the benefit of the profession. An important dimension of the professional activity of Prof. Dr. Gašperlin also presents appearances in various classical and electronic media, thus raising awareness of the lay public about current scientific findings in the field of pharmacy and especially cosmetology.

### **The UL FFA award for outstanding results at work was received by Assoc. Prof. Dr. Janez Mravljak.**

Assoc. Prof. Dr. Janez Mravljak has been a member since 2017 and the President of the UL FFA Quality Commission since 2021. Moreover, he performed pedagogical work, engaged in research and maintained contact with the research group at the Jožef Stefan

za kakovost je sooblikoval nov način izvedbe samoevalvacij študijskih programov fakultete ter sodeloval pri pisanju poslovnih poročil. Tako je pomembno prispeval k organiziranemu sistemu kakovosti Fakultete za farmacijo v celoti. Močno je prispeval k prepoznavnosti UL FFA v laični javnosti z izvedbo različnih aktivnosti in projektov. Koordiniral je tudi predstavitev fakultete v okviru Znanstivala, kjer je s sodelavci fakulteta vrsto let predstavljal laični javnosti s stojnico na »Vrtu eksperimentov«. Sodeloval je tudi pri izvedbi sejma Informativa in obiskovanju srednjih šol, kjer je dijakom srednjih šol približal študijske programe Fakultete za farmacijo. S svojimi številnimi aktivnostmi je pomembno doprinesel k uvedbi sistema kakovosti na fakulteti, prepoznavnosti fakultete laični javnosti in bodočim študentom ter tako k razvoju številnih bodočih mladih strokovnjakov.

**Priznanje fakultete poslovnemu partnerju za dolgoletno in uspešno sodelovanje, ki je prispevalo k pedagoškim in raziskovalnim dosežkom ter ugledu Fakultete prejme Klinični inštitut za klinično kemijo in biokemijo Univerzitetnega kliničnega centra v Ljubljani.**

Klinični inštitut za klinično kemijo in biokemijo je tesno povezan s Fakulteto za farmacijo že desetletja. Pravzaprav je bilo v času po ustanovitvi Katedre za klinično biokemijo leta 1986 na takratni VTOZD (Visokošolski temeljni organizaciji združenega dela) Farmacija delo katedre prepleteno z inštitutom tako kadrovsko kot izvedbeno, saj so večino vaj opravili v laboratorijih inštituta. Katedra je formalno prevzela znanstvene, pedagoške in strokovne naloge s področja klinične biokemije, čeprav na začetku še ni imela lastnih zaposlenih: njeni člani so bili strokovnjaki, zaposleni pretežno v laboratorijih Kliničnega centra Ljubljana. Prvi predstojnik Katedre je bil hkrati pobudnik njene ustanovitve in predstojnik Inštituta prof. dr. Niko Jesenovec. Obdobje

Institute. As a member of the quality commission, he co-created a new way of conducting self-evaluations of the study programmes of the faculty and participated in the writing of business reports. Thus, he made an important contribution to the organized quality system of the Faculty of Pharmacy as a whole. He has strongly contributed to the visibility of the UL FFA in the lay public by implementing various activities and projects. He also coordinated the presentation of the faculty within the framework of Znanstival, where he and his colleagues presented the faculty to the lay public for many years with a stand at the "Garden of Experiments". He also participated in the implementation of the Informativa fair and attending secondary schools, where he introduced the study programmes of the Faculty of Pharmacy to secondary school students. With his numerous activities, he made an important contribution to the introduction of a quality system at the faculty, the recognition of the faculty among the lay public and future students, and thus to the development of many future young professionals.

The Faculty Institute recognizes the Clinical Institute of Clinical Chemistry and Biochemistry of the University Medical Centre in Ljubljana for its long-term and successful cooperation, which has contributed to pedagogical and research achievements and the Faculty's reputation.

The Clinical Institute of Clinical Chemistry and Biochemistry has been closely associated with the Faculty for decades. In fact, in the period after the establishment of the Department of Clinical Biochemistry in 1986 at the then VTOZD (Higher Basic Organization of United Work) Pharmacy, the work of the Department was intertwined with the Institute both in terms of staff and implementation, as most exercises were performed in the institute's laboratories. The department formally took over scientific, pedagogical and professional tasks in the field of clinical biochemistry, although at the beginning it did not have its own employees: its members were experts, mostly employed in the laboratories of the Clinical Centre Ljubljana. The first head of the Department was at the same time the initiator of its establishment and the head of the Institute Prof. Dr. Niko Jesenovec.

predstojništva prof. dr. Joška Osredkarja je sovpadalo s procesom bolonjske prenove študijskih programov in oblikovanja magistrskega študijskega programa laboratorijske biomedicine. Tesno sodelovanje med obema institucijama je bilo ključno za vzpostavitev sodobnih programov, ki povezujejo teorijo in prakso na vseh treh ravneh. Ne glede na izboljšanje prostorskih pogojev fakultete se je pomemben del vaj opravljal v laboratorijih inštituta tudi v obdobju predstojnika izr. prof. dr. Milana Skitka, ko je bil podpisan celo poseben sporazum o sodelovanju med Inštitutom in Fakulteto. V skupnem sodelovanju sta bili obe stopnji programa Laboratorijske biomedicine prepoznani tudi s strani Ministrstva za zdravje kot modelna programa za vstop v specializacijo iz medicinske biokemije, ki je nosilna zdravstvena specializacija za naravoslovce v laboratorijski diagnostiki. Pri tem je imel ključno vlogo sedanji predstojnik Inštituta prof. dr. Darko Černe. KIKKB je pomemben zunanji partner Fakultete za farmacijo, njegovo sodelovanje pa je prispevalo k dosežkom Fakultete na pedagoškem in raziskovalnem področju, pa tudi njenemu ugledu v stroki in širši družbi.

The period of presidency of Prof. Dr. Joško Osredkar coincided with the process of the Bologna renovation of study programmes and the creation of a master's study programme in Laboratory Biomedicine. Close cooperation between the two institutions has been key to establishing modern programmes linking theory and practice in all three levels. Regardless of the improvement of the spatial conditions of the Faculty an important part of the exercises was performed in the laboratories of the institute also in the period, when the Head of Assoc. Prof. Dr. Milan Skitek was in charge, when a special agreement on cooperation between the Institute and the Faculty was signed. In joint cooperation both stages of the Laboratory Biomedicine programme were also recognized by the Ministry of Health as a model programme for entering the specialization in Medical Biochemistry, which is the main medical specialization for naturalists in Laboratory Diagnostics. The current Head of the Institute, Prof. Dr. Darko Černe, played a key role. KIKKB is an important external partner of the Faculty of Pharmacy, and its cooperation has contributed to the achievements of the Faculty in pedagogical and research field, as well as its reputation in the profession and wider society.



Nagrajenci 2021 / Award winners 2021

# NOVOIZVOLJENI REDNI PROFESORJI UL FFA V LETU 2021



## Prof. dr. MATJAŽ JERAS

Rodil se je leta 1958 v Ljubljani. Po končanem univerzitetnem študiju na UL FFA je leta 1991 pridobil tudi magistrski naziv. Leta 1995 je na Medicinski fakulteti Univerze v Ljubljani uspešno zagovarjal doktorsko disertacijo za raziskovalno delo, ki ga je opravil v Centre Régional de Transfusion Sanguine (CRTS) v Strasbourg. Tam je med drugim razvil funkcionalni test *in vitro* za kvantitativno določanje antigensko specifičnih klonov limfocitov T, ki proizvajajo IL-2 ter tehnologijo prenesel v celični laboratorij Centra za tipizacijo tkiv (CTT), Zavoda Republike Slovenije za transfuzijsko medicino (ZTM).

V letih 1984–1989 je bil zaposlen na **Zavodu za farmacijo in preizkušanje zdravil** v Ljubljani, leta 1989 se je zaposlil na **Zavodu za transfuzijo krvi**, kjer je kot mladi raziskovalec pod mentorstvom prof. prof. dr. Mateje Bohinjec pričel z raziskovalnim delom. Leta 1991 je soustanovil nacionalni register prostovoljnih darovalcev kostnega mozga Slovenija Donor, ki je leto pozneje postal polnopravni član svetovnega registra Bone Marrow Donors Worldwide, kar je našim bolnikom s hematološkimi rakavimi boleznimi omogočilo dostop do velikega števila potencialno ustreznih darovalcev.

# NEWLY APPOINTED FULL PROFESSORS AT UL FFA IN 2021

## Prof. Dr. MATJAŽ JERAS

He was born in Ljubljana in 1958. After completing his university studies at the UL FFA, he obtained a master's degree in 1991. In 1995 he successfully presented his doctoral research dissertation at the Faculty of Medicine at the University of Ljubljana, which he completed at the Centre Régional de Transfusion Sanguine (CRTS) in Strasbourg. Among other things he developed an *in vitro* functional test for the quantitative determination of antigen-specific clones of IL-2-producing T lymphocytes and transferred the technology to the cell laboratory of the Tissue Typing Centre (CTT), Blood Transfusion Centre of Slovenia (ZTM).

From 1984 to 1989 he was employed at the **Institute for Pharmacy and Drug Testing** in Ljubljana, in 1989 he started working for the Institute for Blood Transfusion as a young researcher under the mentorship of Prof. Dr. Mateja Bohinjec. In 1991 he co-founded the Slovenija Donor national registry of voluntary bone marrow donors, which became a full member of the Bone Marrow Donors Worldwide Registry a year later, giving our patients with haematological cancers access to a large number of potentially eligible donors.

Od leta 1994/1995 bil najprej vršilec dolžnosti direktorja, nato pa v letih 1995–2006 direktor Centra za tipizacijo tkiv (CTT). V tem obdobju, natančneje leta 2000, je CTT prvič pridobil, nato pa redno, uspešno podaljševal oz. nadgrajeval akreditacijo Evropske federacije za imunogenetike, kar je je bil eden od osnovnih pogojev za vstop Slovenije v polnopravno članstvo Eurotransplanta in velik dosežek za Republiko Slovenijo. Leta 2005 je soustanovil Društvo za celično in tkivno inženirstvo Slovenije. V obdobju 2006–2009 je bil direktor Zavoda Republike Slovenije za transfuzijsko medicino (ZTM). V tem obdobju je bila na ZTM vzpostavljena nacionalna javna banka popkovnične krvi.

Leta 2010 se je zaposlil na delovnem mestu visokošolskega učitelja za področje klinične biokemije in laboratorijske biomedicine na UL FFA. Od leta 2017 je predsednik upravnega odbora UL FFA.

Prof. dr. Matjaž Jeras ima preverjeno pedagoško aktivnost, uspešno rešuje znanstvene, raziskovalno-razvojne in strokovne probleme, vpet je v mednarodno okolje in izkazuje mednarodno odmevnost. Vodil je in uspešno zaključil 5 nacionalnih raziskovalnih projektov, kot raziskovalec pa sodeloval še pri 16. Bil je tudi vodja raziskovalno-razvojne faze dveh uspešno zaključenih projektov s področja tehnoloških spodbud in delovnih sklopov v okviru dveh zaključenih evropskih projektov. Je soavtor dveh nacionalnih patentov.

Področja njegovega raziskovalnega dela zajemajo imunogenetiko in tkivno skladnost, aloreaktivnost, celično imunologijo, dendritične celice, pripravljene iz monocitov, ter celično in tkivno inženirstvo in napredno zdravljenje. Na osnovi postopka za gojenje avtolognih hondrocytov, ki ga je razvil, je več kot 200 bolnikov z globokimi poškodbami sklepne hrustance v kolenu prejelo implantate omenjenih celic, več kot 5 pacientov pa se je zdravilo s fibrinimi kožnimi nadomestki, ki jih je razvil skupaj s sodelavci. V zadnjem času je pomembno prispeval k začetku in razvoju imunske terapije za zdravljenje raka, ki temelji na uporabi avtolognih imunohibridomov in je bila uspešno preskušena na bolnikih s kastracijsko odpornim rakom

From 1994 to 1995 he was acting Manager and then from 1995 to 2006 the Manager of the Tissue Typing Centre (CTT). During this period, more precisely in 2000, CTT for the first time acquired the accreditation (which was later regularly extended or upgraded) of the European Federation for Immunogenetics, which was one of the basic conditions for Slovenia's entry into full membership in Eurotransplant. In 2005 he co-founded the Society for Cell and Tissue Engineering Society of Slovenia. From 2006 to 2009 he was the Manager of the Institute for Blood Transfusion of the Republic of Slovenia (ZTM). During this period a national public umbilical cord blood bank was established at ZTM.

In 2010 he started teaching clinical biochemistry and laboratory biomedicine at the UL FFA. Since 2017 he has been the Chairman of the Board of UL FFA.

Assoc. Prof. Dr. Matjaž Jeras has proven pedagogical activity, successfully solves scientific, research and development and professional problems, is involved in the international environment and shows international resonance. He has led and successfully completed 5 national research projects and participated in 16 as a researcher. He was also the Head of the Research and Development Phase of two successfully completed projects in the field of technological incentives and work packages within two completed European projects. He is the co-author of two national patents.

Areas of his research work include immunogenetics and tissue compliance, alloreactivity, cell immunology, monocyte-derived dendritic cells, and cell and tissue engineering and advanced therapy. Based on the autologous chondrocyte culture he developed, more than 200 patients with deep articular cartilage injuries in the knee received implants from these cells, and more than 5 patients were treated with fibrin skin substitutes he developed together with colleagues. Recently, he has made an important contribution to the initiation and development of immune therapy for cancer treatment based on the use of autologous immunohybrids, and which has been successfully tested in patients with castration-resistant prostate cancer in a recently completed clinical study. He has received numerous awards for his work.

prostate v okviru nedavno zaključene klinične študije. Za svoje delovanje je prejel številne nagrade. Objavil je 54 recenziranih člankov v mednarodnih revijah (PubMed) in trenutno izkazuje Hl indeks h=16.

Prof. dr. Matjaž Jeras je bil na Univerzi v Ljubljani prvič izvoljen v naziv asistenta leta 1988, nato v docenta leta 2005 in izrednega profesorja leta 2012. Januarja 2021 ga je Senat UL izvolil v naziv rednega profesorja za področje klinične biokemije in laboratorijske biomedicine.

He has published 54 peer-reviewed articles in international journals (PubMed) and currently shows an Hl index of  $h = 16$ .

Prof. Dr. Matjaž Jeras was first elected Assistant Professor at the University of Ljubljana in 1988, then Assistant Professor in 2005 and Associate Professor in 2012. In January 2021 the UL Senate elected him a full professor of Clinical Biochemistry and Laboratory Biomedicine.

# PRIZNANJA UNIVERZE V LJUBLJANI

V okviru Tedna Univerze so bile na slovesnosti UL izpostavljene navdihujuče posameznice in posamezniki, ki so pomembno prispevali k uspešnemu delu univerze.

- **Zlata plaketa Univerze v Ljubljani za spremljanje in obveščanje o novostih na področju terapije COVID-19 ter razvoja protivirusnih zdravil SARS-CoV-2** je bila podeljena skupini prof. dr. Borut Štrukelj, izr. prof. dr. Tomaž Bratkovič, izr. prof. dr. Mojca Lunder, prof. dr. Marko Anderluh, izr. prof. dr. Žiga Jakopin, doc. dr. Lea Knez, izr. prof. dr. Igor Locatelli.
- **Svečana listina mladim visokošolskim učiteljicam/učiteljem in visokošolskim sodelavkam/sodelavcem:** doc. dr. Špeli Zupančič.
- **Plaketa "Pro Universitate labacensi":** Lekarniški zbornici Slovenije.
- **Svečana listina za študentke/študente Univerze v Ljubljani vseh treh stopenj:** Ani Baumgartner in Jaki Vrevcu Žlajpah.
- **Priznanje za posebne dosežke študentk/študentov Univerze v Ljubljani:** Društvu študentov farmacije Slovenije in Študentski sekiji Slovenskega farmacevtskega društva.
- **Priznanje strokovnim delavkam/strokovnim delavcem Univerze v Ljubljani:** Tanji Kadunc.
- **Univerzitetna Prešernova nagrjenka:** Maša Vozlič za magistrsko nalogu z naslovom »Vpliv fosfonskih prevlek na biokompatibilnost fluorescenčnih nanodelcev«.

Mentor: doc. dr. Lovro Žiberna,  
somentorica: izr. prof. dr. Darja Lisjak

# AWARDS OF THE UNIVERSITY OF LJUBLJANA

As part of the University Week inspiring individuals who made an important contribution to the successful work of the University were pointed out at the UL ceremony.

- **The Golden Plaque of the University of Ljubljana for monitoring and informing about innovations in the field of COVID-19 therapy and the development of antiviral drugs SARS-CoV-2** was awarded to the group of Prof. Dr. Borut Štrukelj, Assoc. Prof. Dr. Tomaž Bratkovič, Assoc. Prof. Dr. Mojca Lunder, Prof. dr. Marko Anderluh, Assoc. Prof. Dr. Žiga Jakopin, Assist. Prof. Dr. Lea Knez, Assoc. Prof. Dr. Igor Locatelli.
- **Ceremonial document to young higher education teachers:** Assist. Prof. Dr. Špela Zupančič.
- **Plaque "Pro Universitate labacensi":** Pharmacy Chamber of Slovenia.
- **Formal certificate for students of the University of Ljubljana of all three levels:** Ana Baumgartner and Jaka Vrevc Žlajpah.
- **Recognition for special achievements of students of the University of Ljubljana:** The Association of Students of Pharmacy of Slovenia and the Student Section of the Slovenian Pharmaceutical Association.
- **Recognition to professionals of the University of Ljubljana:** Tanja Kadunc.
- **University Prešeren Award winner:** Maša Vozlič for her master's thesis entitled: "Influence of phosphonic coatings on the biocompatibility of fluorescent nanoparticles".

Mentor: doc. dr. Lovro Žiberna,  
co-mentor: Assoc. Prof. Dr. Darja Lisjak

## PREJEMNIKI DEKANOVIH NAGRAD

Dekanove nagrade se podelijo študentom, raziskovalcem ali doktorandom UL FFA, ki so v preteklem obdobju kot prvi ali vodilni avtor objavili delo v reviji z visokim faktorjem vpliva ali v reviji, ki sodi v zgornjih 10 odstotkov revij s posameznega področja in s tem doprinesli k razvoju farmacevtske znanosti in stroke.

Prejemniki dekanovih nagrad 2021 so:

- **Asist. Andrej Grobin** za znanstveni članek z naslovom: »Večparameterska ocena tveganja 41 izbranih spojin z endokrinim delovanjem v svetovnih površinskih vodah«, objavljen v reviji Chemosphere.  
Mentor: doc. dr. Jurij Trontelj, somentor: prof. dr. Robert Roškar.
- **Raziskovalec Samo Guzelj** za znanstveni članek: »Novi in vivo aktivni adjuvansi z delovanjem na receptor NOD2«, objavljen v reviji Journal of medicinal chemistry.  
Mentor: izr. prof. dr. Žiga Jakopin.
- **Raziskovalka Emanuela Senjor** za znanstveni članek: »Cystatin F kot mediator imunske supresije v tumorskem mikrookolju glioblastoma«, objavljen v reviji Cellular oncology.  
Mentor: prof. dr. Janko Kos, somentorica: znan. sod. dr. Milica Perišić Nanut.
- **Mag. Mark Stanojević** za znanstveni članek z naslovom: »Uporaba in silico modelov za napovedovanje endokrinih lastnosti aktivnih snovi v biocidnih proizvodih«, objavljen v reviji Chemosphere.  
Mentorka: prof. dr. Marija Sollner Dolenc, somentor: doc. dr. Marjan Vračko Grobelšek.
- **Raziskovalec dr. Žan Toplak** za znanstveni članek z naslovom: »Načrtovanje novih zaviralcev ionskega kanala hEAG1 z uporabo 3D farmakofornih modelov«, objavljen v reviji Cancers.  
Mentor: izr. prof. dr. Tihomir Tomašič, somentorica: prof. dr. Lucija Peterlin Mašič.

## RECIPIENTS OF DEAN'S AWARDS

The dean's awards are conferred upon students, researchers, or doctoral students at the Faculty of Pharmacy that have in the past period published work as the first or leading author in a journal with a high impact factor or in a journal in the top ten percent of journals in a particular field, thereby contributing to the development of pharmaceutical sciences and the profession.

Recipients of the Dean's 2021 Awards are:

- **Assist. Andrej Grobin**, for a scientific article entitled: "Multiparameter risk assessment of 41 selected compounds with endocrine activity in global surface waters", published in the journal Chemosphere. Supervisor: doc. dr. Jurij Trontelj, co-supervisor: Prof. Dr. Robert Roškar.
- **Researcher Samo Guzelj**, for a scientific article: "New in vivo active adjuvants with action on the NOD2 receptor", published in the Journal of Medicinal Chemistry. Supervisor: Assoc. Prof. Dr. Žiga Jakopin.
- **Researcher Emanuela Senjor**, for a scientific article: "Cystatin F as a mediator of immune suppression in the tumor microenvironment of glioblastoma", published in the journal Cellular oncology. Supervisor: Prof. Dr. Janko Kos, co-supervisor: known. barrel. Dr. Milica Perišić Nanut.
- **Mark Stanojević**, Msc., for a scientific article entitled: "Application and silico models for predicting the endocrine properties of active substances in biocidal products", published in the journal Chemosphere. Supervisor: Prof. Dr. Marija Sollner Dolenc, co-author: Assist. Prof. Dr. Marjan Vračko Grobelšek.
- **Researcher dr. Žan Toplak**, for a scientific article entitled: "Design of new hEAG1 ion channel inhibitors using 3D pharmacophore models", published in the journal Cancers. Supervisor: Assoc. Prof. Dr. Tihomir Tomašič, co-supervisor: Prof. Dr. Lucija Peterlin Mašič.

# PREJEMNIKI PREŠERNOVIH NAGRAD 2021

## UNIVERZITETNA PREŠERNOVA NAGRADA

**Maša Vozlič:** Vpliv fosfonskih prevlek na biokompatibilnost fluorescenčnih nanodelcev  
Mentor: doc. dr. Lovro Žiberna,  
somentorica: izr. prof. dr. Darja Lisjak.

## PREJEMNIKI FAKULTETNIH PREŠERNOVIH NAGRAD

**Jaka Dernovšek:** Načrtovanje, sinteza in vrednotenje 1,4-disubstituiranih-1,2,3-triazolo-galaktozidov kot zaviralcev galektinov-1 in -8  
Mentor: izr. prof. dr. Tihomir Tomašič.

**Tjaša Mazej:** Sinteza derivatov 4-fenetil-1-(prop-2-in-1-il) piperidina s hidroksi in karbamatno skupino kot zaviralcev monoamin oksidaz in holin esteraz  
Mentor: izr. prof. dr. Matej Sova.

**Sara Milković:** Razvoj in fizikalno vrednotenje hidrogelov za tvorbo dermalnih filmov iz nanoceluloze z betametazonidipropionatom  
Mentorica: doc. dr. Mirjam Gosenca Matjaž,  
somentorica: assist. dr. Katarina Bolko Seljak.

**Marja Škrlj Miklavčič:** Preučevanje mehanizmov odpornosti celic kronične limfocitne levkemije na venetoklaks  
Mentorica: prof. dr. Irena Mlinarič-Raščan,  
somentor: assist. Damjan Avsec.

**Jan Vegelj:** Ugotavljanje vpliva izbranih izoflavonoidov na aktivnost kresničkine luciferaze  
Mentorica: prof. dr. Marija Sollner Dolenc,  
somentorica: assist. dr. Maša Kenda.

## RECIPIENTS OF PREŠEREN AWARDS

## UNIVERSITY OF LJUBLJANA PREŠEREN AWARD

**Maša Vozlič:** The effect of phosphonic coatings on the fluorescent nanoparticles biocompatibility  
Supervisor: Assist. Prof. Dr. Lovro Žiberna,  
Co-supervisor Assoc. Prof. Dr. Darja Lisjak.

## FACULTY OF PHARMACY PREŠEREN AWARDS

**Jaka Dernovšek:** Design, synthesis and evaluation of 1,4-disubstituted-1,2,3-triazolo-galactosides as galectin-1 and -8 inhibitors  
Supervisor: Assoc. Prof. Dr. Tihomir Tomašič.

**Tjaša Mazej:** Synthesis of 4-phenethyl-1-(prop-2-in-1-il) piperidine derivatives containing hydroxyl and carbamate groups as inhibitors of monoamine oxidases and cholinesterases  
Supervisor: Assoc. Prof. Dr. Matej Sova.

**Sara Milković:** Development and physical evaluation of nanocellulose-based film-forming hydrogels containing betamethasone dipropionate  
Supervisor: Assist. Prof. Dr. Mirjam Gosenca Matjaž,  
co-supervisor: Assist. Dr. Katarina Bolko Seljak.

**Marja Škrlj Miklavčič:** Investigation of venetoclax resistance mechanisms in chronic lymphocytic leukemia cells  
Supervisor: Prof. Dr. Irena Mlinarič-Raščan,  
co-supervisor: Assist. Damjan Avsec.

**Jan Vegelj:** Influence of selected isoflavonoids on firefly luciferase activity  
Supervisor: Prof. Dr. Marija Sollner Dolenc,  
co-supervisor: Assist. Dr. Maša Kenda.

## PRZNANJA FAKULTETE

Priznanja fakultete prejmejo absolventi, ki so v času študija tekoče napredovali (niso pavzirali ali ponavljali letnika) ter pri vseh študijskih obveznostih (razen diplome), opravljenih najpozneje v obdobju enega leta od vpisa absolventskega staža, dosegli povprečno oceno 9,00 ali več.

### Enoviti magistrski študijski program Farmacija

Uniform Master Study Programme Pharmacy (Single-cycle Master Study Programme Pharmacy)

Bajc Grega  
Bek Filip  
Bizjak Špela  
Bokal Meta  
Gričar Eva

Groznik Klara  
Hergouth Lucija  
Jasenc Lara  
Kastelic Anže  
Kobentar Zala

Kralj Sandi  
Kralj Matej  
Lavrenčič Maruša  
Marin Nika  
Potočnik Špela

Prašnikar Monika  
Šentjurc Alenka  
Šuklje Vito  
Topalov Kristijan  
Virant Julija

### Magistrski študijski program Industrijska farmacija

The Master's Programme Industrial Pharmacy

Krošelj Ana  
Müller Ana

Murn Janja  
Zorman Maša

### Magistrski študijski program Laboratorijska biomedicina

The Master Study Programme Laboratory Biomedicine

Colja Sara  
Lešnik Nika

Mraz Nikol  
Srpčić Anja

Štucin Neža  
Železnik Ana

### Univerzitetni študijski program Kozmetologija

The Academic Bachelor Study Programme Cosmetology

Šenk Anja  
Veljanovska Melisa

### Univerzitetni študijski program Laboratorijska biomedicina

The Academic Bachelor Study Programme Cosmetology

Jereb Bec Živa  
Ježek Barbara

Kuster Tamara Picaboo  
Zavrl Nastja

## FACULTY OF PHARMACY RECOGNITIONS

Faculty of Pharmacy Awards are given to those graduates who have shown significant progress and completed all their study obligations (except graduation) with an average mark of 9.00 or more (out of 10) within one year after enrolling into the extra year of studying.

# POHVALE FAKULTETE

## FACULTY OF PHARMACY COMMENDATIONS

### ENOVITI MAGISTRSKI ŠTUDIJSKI PROGRAM FARMACIJA UNIFORM MASTER STUDY PROGRAMME PHARMACY (SINGLE-CYCLE MASTER STUDY PROGRAMME PHARMACY):

#### 4. LETNIK

#### 4. LIST OF GRADUATES

Aubreht Gašper	Meglen Lara
Bojnec Aljaž	Mihelič Blaž
Češek Tjaša	Murn Neža
Dremelj Anja	Pečnik Matija
Gnidovec Klemen	Podgoršek Eva
Gruden Staš	Prelog Urška
Herakovič Lea	Romšak Gal
Jelesijevič Špela	Rotar Eva
Karner Gašper	Rus Žana
Kavaš Vid	Tasič Jaka
Klemenčič Kaja	Valič Tjaša
Košir Pija	Videčnik Blaž
Kvartuh Anja	Voljkar Špela
Markoja Boris	Zobec Lea

#### 3. LETNIK

#### 3. LIST OF GRADUATES

Bračko Tine	Košir Eva
Cvikel Mojca	Kovačič Romi Lea
Čuš Tilen	Kurent Ema
Fišer Metka	Marovič Astrid
Furjanič Lara	Navratil Juš
Gradišek Nina	Oberč Rok
Hlupić Ines	Petančič Žiga
Jelavič Žiga	Roglič Mitja
Kaučič Nuša	Trunkelj Natalija
Kirbus Klemen	Tuškei Kaja
Kolenc Lana	Vidrih Maruša

## 2. LETNIK

### 2. LIST OF GRADUATES

Anžlovar Alja Pestotnik Zala  
Cerovšek Karin Petrič Neja  
Debeljak Ela Prezelj Anja  
Dobaj Nina Seliškar Petra  
Frelih Aljaž Smajilović Sandra  
Habjan Liza Stopar Lucija  
Jereb Filip Šuštarič Tinara  
Kastelec Neža Tretjak Maja  
Knapić Maja Tršek Anja  
Kocjančič Metka Turk John Paul  
Kolar Jakob Vrščaj Ida  
Kolar Tina Žinko Nuša

## 1. LETNIK

### 1. LIST OF GRADUATES

Arzenšek Maša Linke Urban  
Breznik Luka Mihorko Manca  
Faganeli Ema Strupi Luka  
Janža Zala Šimc Ema  
Koder Tia Škufca Kalin Maruša  
Kojek Zala Štante Brina  
Kuralt Vid

## MAGISTRSKI ŠTUDIJSKI PROGRAM INDUSTRIJSKA FARMACIJA

### THE MASTER STUDY PROGRAMME IN INDUSTRIAL PHARMACY:

#### 2. LETNIK

##### 2. LIST OF GRADUATES

Bercko Simon	Müller Ana
Fink Janja	Murn Janja
Gojčič Mojca	Novak Maja
Janežič Nina	Selan Tajka
Jug Ana	Sladič Vila Lidija
Košir Patrik	Staniša Nika
Krošelj Ana	Stražišar Tina
Lipovnik Anja	Šenica Leja
Marovt Tajda	Zorman Maša

#### 1. LETNIK

##### 1. LIST OF GRADUATES

Gošek Teja
Ramšak Urška
Zlatevska Verica

## MAGISTRSKI ŠTUDIJSKI PROGRAM LABORATORIJSKA BIOMEDICINA

### THE MASTER STUDY PROGRAMME LABORATORY BIOMEDICINE:

#### 2. LETNIK

##### 2. LIST OF GRADUATES

Bogovčič Rupnik Ana	Srpčić Anja
Colja Sara	Štaman Melanija
Drame Jasna	Štebih Maša
Golubić Tara	Štucin Neža
Hrastnik Eva	Toman Polona
Hribar Laura	Tomšič Iza
Lešnik Nika	Zlodej Špela
Morel Žana	Železnik Ana
Mraz Nikol	

#### 1. LETNIK

##### 1. LIST OF GRADUATES

Bernard Špela	Mužina Karolina
Breznik Nika	Polajžer Sara
Čurič Sara	Rozman Iza
Frlic Tjaša	Snoj Lara
Karun Tina	Trstenjak Ana
Klinar Katarina	Vrevc Žlajpah Jaka
Markelj Bogataj Neža	

## **UNIVERZITETNI ŠTUDIJSKI PROGRAM LABORATORIJSKA BIOMEDICINA**

## **THE ACADEMIC BACHELOR STUDY PROGRAMME LABORATORY BIOMEDICINE**

### **3. LETNIK**

#### **3. LIST OF GRADUATES**

Ježek Barbara	Šulin Mija
Križnič Maja	Zavrl Nastja
Kuster Tamara Picaboo	Zupančič Matic
Ramšak Patricija	Žižek Pia
Roškarič Damijana	

### **2. LETNIK**

#### **2. LIST OF GRADUATES**

Biškup Nika	Resnik Katarina
Gošnjak Tanja	Verk Zala
Kalan Lanna	Voga Lucija
Košir Katja	

### **1. LETNIK**

#### **1. LIST OF GRADUATES**

Gartner Tanja	Rojc Eva
Jenko Vita	Šimnovec Leja
Jeram Ema	Šuštaršič Teja
Mencin Amadeja	Verhovec Ana

**UNIVERZITETNI ŠTUDIJSKI PROGRAM KOZMETOLOGIJA**  
**THE ACADEMIC BACHELOR STUDY PROGRAMME COSMETOLOGY:**

**3. LETNIK**

**3. LIST OF GRADUATES**

Fekonja Kaja	Papa Sara
Gorenjšček Zala	Pirnat Maša
Grobiša Nika	Serianz Ema
Jenko Damjana	Šenk Anja
Marolt Ana	Vutolen Valentina
Mervar Iva	

**2. LETNIK**

**2. LIST OF GRADUATES**

Brilej Žana
Vovk Tara

**1. LETNIK**

**1. LIST OF GRADUATES**

Ni prejemnikov.

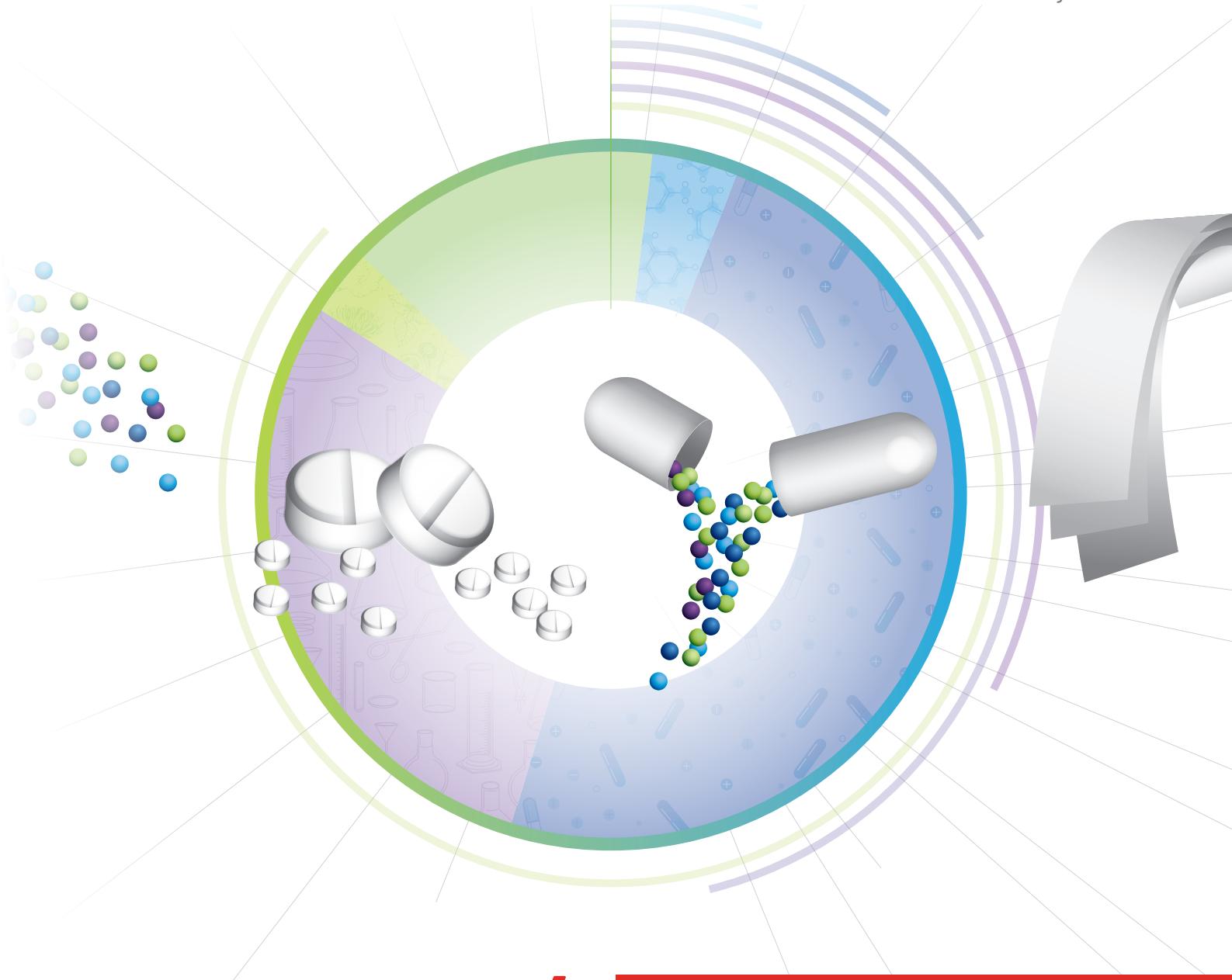
## Oblikujemo do bolnikov prijazna zdravila

Razvoj novih, do bolnikov prijaznih zdravil je ena od osnov za personalizirano zdravljenje in ustrezno sodelovanje bolnikov. To je še posebej pomembno pri zdravljenju kroničnih bolezni. S prilagajanjem velikosti, okusa in drugih lastnosti zdravil zagotovimo, da je zaužitje lažje in zato zdravljenje učinkovitejše.

## Designing patient-friendly medicines

The development of new, patient-friendly pharmaceutical forms is one of the foundations for personalized treatment and patient compliance. This is particularly important in the treatment of chronic diseases. By adjusting the size, taste and other properties of medicines, we ensure that ingestion is easier and therefore treatment is more effective.

Različne do bolnika prijazne farmacevtske oblike – pelete v slamici, zrnca, minitablete in filmi, ki razpadajo in po aplikaciji hitro sprostijo zdravilno učinkovino.  
Various patient-friendly pharmaceutical dosage forms - pellets in a straw, granules, minitablets and films that disintegrate and quickly release the active ingredient.



# 4

## Seznam diplomantov List of graduates

# DIPLOMANTI NA FAKULTETI ZA FARMACIJO V LETU 2021

## 2021 GRADUATES AT THE FACULTY OF PHARMACY

### UNIVERZITETNI ŠTUDIJSKI PROGRAM KOZMETOLOGIJA

#### THE ACADEMIC BACHELOR STUDY PROGRAMME COSMETOLOGY:

Ahdali Hana	Perša Lara
Bangiev Anja	Pirnat Maša
Benedetič Rebeka	Rakuša Teja
Berglez Pia	Rednak Sara
Bokal Larisa	Repar Lara
Cigale Maruša	Romič Lana
Dolar Bratuša Alisa	Simon Pia
Fekonja Kaja	Stegu Bobnar Nina
Kornhauzer Lara	Strašek Larisa
Križovnik Nuša	Šenk Anja
Levstek Manca	Urbanček Alja
Majar Katja	Vehar Mateja
Marinič Laura	Veljanovska Melisa
Marolt Ana	Vetrih Manca
Mervar Iva	Založnik Neža
Papa Sara	

### ENOVITI MAGISTRSKI ŠTUDIJSKI PROGRAM FARMACIJA

#### UNIFORM MASTER STUDY PROGRAMME PHARMACY (SINGLE-CYCLE MASTER STUDY PROGRAMME PHARMACY)

Agović Lejla	Frankovič Monika
Ajlec Nejc	Fras Daša
Anderlič Andrej	Fras Vitjan
Badovinac Maja	Gerič Monika
Balažic Helena	Gicheva Sofija
Ban Pia	Gjorgjevska Nataša
Bangiev Teja	Gorše Ana
Bernhard Ana Maja	Grabar Timotej
Bobič Ana Maria	Gradišek Aljoša
Bolčina Manca	Gruden David
Božič Matej	Güntner Rebeka
Brečko Katja	Harinski Tjaša
Budja Barbara	Hazdovac Klara
Burkeljca Katarina	Herlec Ajda
Car Tjaša	Horvat Tamara
DrameKatarina	Hostar Tamara
Drofenik Lea	Hribenik Vesna
Erjavec Špela	Iskra Anamarija
Fazlič Merima	Jakopić Sara
Ferjančič Benetik Svit	Jakoš Alma
Forštner Patricia	Djordjevič Tana

Japelj Nuša	Levart Vita	Potočnik Špela	Veberič Barbara
Jurić Monika	Ličen Anže	Prelesnik Sara	Vozlič Maša
Jurić Vito	Lukić Stefan	Prevolšek Aljaž	Zorko Lucija
Jusufović Elvis	Maček Anja	Purić Edvin	Zupan Nina
Kelher Rok	Majhenič Eva	Pusser Katarina	Žagar Tjaša
Kepe Tjaša	Malešić Saša	Raščan Primož	Žurman Aljaž
Kešpert Blaž	Marin Nika	Ravbar Nina	
Klopčič Nejc	Mate Urban	Rokavec Tjaša	
Knap Patricija	Mazej Tjaša	Rosc Tajda	
Korelc Karin	Meh Peer Petja Iza	Rotman Primec Jaka	
Korpar Nina	Milković Sara	Slavec Mojca	
Kovše Monika	Novak Teja	Sobočan Nina	
Kozmus Natalija	Osojnik Ajda	Šajn Anja	
Krivec Jure	Oštir Andraž	Škorjanc Špela	
Kugonič Neža	Pavlin Gregorčič Laura	Škrlj Miklavčič Marja	
Kuhar Mitja	Pavlovič Anja	Štor Jerneja	
Kukman Živa	Pavšič Selena	Šubic Eva	
Lamovšek Lea	Pečnik Anže	Šutar Mateja	
Lavrenčič Maruša	Perša Rebecca	Turk Nina	
Levačić Luka	Pivk Maja	Umek Urša	
Levanič Davorin	Pogačnik Jerneja	Urbančič Tajda	

## MAGISTRSKI ŠTUDIJSKI PROGRAM INDUSTRIJSKA FARMACIJA

### THE MASTER STUDY PROGRAMME INDUSTRIAL PHARMACY

Bračič Pia  
Brajer Tanja  
Breznik Marko  
Buchmeister Julija  
Čebašek Sara  
Farina Tilen  
Golob Domen  
Jančan Tatjana  
Jančić Valentina  
Jeknić Nina  
Klenovšek Maša  
Kobe Tadej  
Kocjančić Tjaša  
Kolenc Matej  
Končan Vesna  
Košir Patrik  
Kovačič Ana  
Murn Janja

Oblak Petra  
Oblak Jurij  
Ojsteršek Adrijana  
Peršolja Peter  
Petrovič Fras Tonja  
Pikl Katja  
Pretnar Lucija  
Rajk Luka  
Rupar Katarina  
Stražišar Tina  
Triler Karin Veronika  
Vegelj Jan  
Vidic David  
Virant Urška  
Zorman Maša

## MAGISTRSKI ŠTUDIJSKI PROGRAM LABORATORIJSKA BIOMEDICINA

### THE MASTER STUDY PROGRAMME LABORATORY BIOMEDICINE

Ambruš Ana  
Bezjak Katja  
Borovnik Klementina  
Celjer Valentina  
Černila Manca  
Damjanović Diana  
Dermota Tjaša  
Dragar Brina  
Friedl Fendi  
Gartner Meta  
Ižanc Nadja  
Jakovljević Kaja  
Jandrić Ana  
Kocen Valentina  
Koderman Maruša  
Kodila Anja  
Kopač Urša  
Kramar Eva  
Krašna Mirjam

Marinč Anja  
Mraz Nikol  
Mrhar Liza  
Pavlič Anže  
Pogorevc Diana  
Premužič Deborah  
Purkat Sara  
Radež Manca  
Roudi Samantha  
Somi Simona  
Srpič Anja  
Štangar Anja  
Štebih Maša  
Teskera Mirna  
Triplat Katjuša  
Trstenjak Melani  
Vukoja Jure  
Zupančič Maruša



Diplomanti / Graduates

# DOKTORSKI ŠTUDIJSKI PROGRAM BIOMEDICINA

## DOCTORAL STUDY PROGRAMME OF BIOMEDICINE

### Doktorati s področja farmacevtskih znanosti

**Bergant Loboda Kaja** (mentor Andrej Perdih, somentor Izidor Sosič): Načrtovanje in optimizacija katalitičnih zaviralcev človeške DNA topoizomeraze IIα kot potencialnih protirakovih učinkovin = Design and optimization of catalytic inhibitors of the human DNA topoisomerase IIα as potential anticancer agents, COBISS.SI-ID: 79768579.

**Bjelošević Maja** (mentorica Pegi Ahlin Grabnar): Razvoj in optimizacija procesa liofilizacije formulacij z biološkimi učinkovinami = Development and optimization of lyophilization process of biopharmaceuticals, COBISS.SI-ID: 83259907.

**Bozovičar Krištof** (mentor Tomaž Bratkovič): Načrtovanje in karakterizacija peptidnih ligandov za vezavo regije Fc imunoglobulinov = Design and characterization of peptide ligands that bind the Fc region of immunoglobulins, COBISS.SI-ID: 73571075.

**Brovč Ema Valentina** (mentor Stane Pajk, somentor Janez Mravljak): Razvoj in implementacija analiznih metod za spremljanje sestave in razgradnih poti polisorbatov v medijih in formulacijah terapevtskih proteinov = Development and implementation of the analytical methods to study composition and degradation of polysorbates in the media and in the formulations of therapeutic proteins, COBISS.SI-ID: 73154307.

**Debevec Veronika** (mentor Stanko Srčič): Uporaba modelskih poenostavitev in od ravni neodvisnih spremenljivk pri postavitvi eksperimentalnega prostora za proces filmskega oblaganja tablet = The use of model simplifications and scale-independent parameters for building a design space on film coating process, COBISS.SI-ID: 57124611.

**Dolšak Ana** (mentor Matej Sova, somentor Urban Švajger): Strukturno podprto načrtovanje, sinteza in vrednotenje novih zaviralcev indolamin 2,3-dioksigenaze

### Doctors of Pharmaceutical Sciences

**Bergant Loboda Kaja** (supervisor Andrej Perdih, co-supervisor Izidor Sosič): Načrtovanje in optimizacija katalitičnih zaviralcev človeške DNA topoizomeraze IIα kot potencialnih protirakovih učinkovin = Design and optimization of catalytic inhibitors of the human DNA topoisomerase IIα as potential anticancer agents, COBISS.SI-ID: 79768579.

**Bjelošević Maja** (supervisor Pegi Ahlin Grabnar): Razvoj in optimizacija procesa liofilizacije formulacij z biološkimi učinkovinami = Development and optimization of lyophilization process of biopharmaceuticals, COBISS.SI-ID: 83259907.

**Bozovičar Krištof** (supervisor Tomaž Bratkovič): Načrtovanje in karakterizacija peptidnih ligandov za vezavo regije Fc imunoglobulinov = Design and characterization of peptide ligands that bind the Fc region of immunoglobulins, COBISS.SI-ID: 73571075.

**Brovč Ema Valentina** (supervisor Stane Pajk, co-supervisor Janez Mravljak): Razvoj in implementacija analiznih metod za spremljanje sestave in razgradnih poti polisorbatov v medijih in formulacijah terapevtskih proteinov = Development and implementation of the analytical methods to study composition and degradation of polysorbates in the media and in the formulations of therapeutic proteins, COBISS.SI-ID: 73154307.

**Debevec Veronika** (supervisor Stanko Srčič): Uporaba modelskih poenostavitev in od ravni neodvisnih spremenljivk pri postavitvi eksperimentalnega prostora za proces filmskega oblaganja tablet = The use of model simplifications and scale-independent parameters for building a design space on film coating process, COBISS.SI-ID: 57124611.

**Dolšak Ana** (supervisor Matej Sova, co-supervisor Urban Švajger): Strukturno podprto načrtovanje, sinteza in vrednotenje novih zaviralcev indolamin

in modulatorjev Toll-u podobnih receptorjev tipa 7 in 8 = Structure based design, synthesis and evaluation of novel indoleamine 2,3-dioxygenase inhibitors and Toll-like receptors 7 and 8 modulators, COBISS.SI-ID: 77698563.

**Girardi Benedetta Maria** (mentor Janez Mravljak, somentor Oliver Schwardt): Discovery of novel glycomimetic ligands for Siglec-8 = Odkrivanje novih glikomimetičnih ligandov za Siglec-8, COBISS.SI-ID: 105504003.

**Jazbar Janja** (mentor Mitja Kos, somentor Igor Locatelli): Vpliv uporabe zdravil in alkohola na sindrom krhkosti pri starejših odraslih = The influence of medication and alcohol use of frailty syndrome among older adults, COBISS.SI-ID: 73176323.

**Jereb Rebeka** (mentor Albin Kristl, somentor Simon Žakelj): Razvoj in uporaba fizioloških farmakokinetičnih modelov za vrednotenje vplivov na biološko uporabnost zdravil in napovedovanje bioekvivalence = Development and application of physiologically based pharmacokinetic models for evaluation of influences on drug bioavailability and bioequivalence prediction, COBISS.SI-ID: 77678083.

**Jordan Nika** (mentor Iztok Grabnar, somentor Robert Roškar): Uporaba načrtovanja eksperimentov in multivariabilnih statističnih metod za opredelitev stabilnosti zdravila = Application of design of experiments and multivariable statistical methods for evaluation of drug stability, COBISS.SI-ID: 87344131.

**Novak Doroteja** (mentor Marko Anderluh, somentorka Petra Kolenc): Novi radiooznačeni antagonisti holecistokinin-2/gastrinskega receptorja = Novel radiolabelled cholecystokinin-2/gastrin receptor antagonists, COBISS.SI-ID: 80452867.

**Plavec Tina Vida** (mentor Aleš Berlec, somentor Borut Štrukelj): Površinska predstavitev vezalcev tumorskih antigenov na bakterijah Lactococcus lactis NZ9000 in vrednotenje njihove vezave na izbrane človeške tumorske celične linije = Surface display of tumor antigen binders on Lactococcus lactis NZ9000 and evaluation of their binding to selected human tumor cell lines, COBISS.SI-ID: 76278531.

2,3-dioksigenaze in modulatorjev Toll-u podobnih receptorjev tipa 7 in 8 = Structure based design, synthesis and evaluation of novel indoleamine 2,3-dioxygenase inhibitors and Toll-like receptors 7 and 8 modulators, COBISS.SI-ID: 77698563.

**Girardi Benedetta Maria** (supervisor Janez Mravljak, co-supervisor Oliver Schwardt): Discovery of novel glycomimetic ligands for Siglec-8 = Odkrivanje novih glikomimetičnih ligandov za Siglec-8, COBISS.SI-ID: 105504003.

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**Pohlen Mitja** (mentor Rok Dreu): Razvoj metod izdelave in sestave posušenih emulzij za dostavo učinkovin z izrazito lipofilnostjo = Development of dry emulsion production methods and compositions intended for delivery of highly lipophilic drugs, COBISS.SI-ID: 83339267.

**Prah Alja** (mentor Jernej Stare, somentorica Marija Sollner Dolenc): Raziskovanje vloge elektrostatskih interakcij pri encimski katalizi monoamin-oksidaz s pomočjo večnivojskega računskega modela = Exploring the importance of electrostatics in enzyme catalysis using a multiscale computational model, COBISS.SI-ID: 91896067.

**Preskar Maja** (mentorica Mirjana Gašperlin, somentor Franc Vrečer): Razvoj in optimizacija izdelave liofilizata z ibuprofenom za parenteralno uporabo = Development and process optimization of freeze dried powder with ibuprofen for parenteral application, COBISS.SI-ID: 63708419.

**Schiffner Eva Shannon** (mentor Janez Mravljak, somentor Izidor Sosič): Sinteza in biokemijsko vrednotenje nepeptidnih reverzibilnih in ireverzibilnih zaviralcev imunoproteasoma = Synthesis and biochemical evaluation of nonpeptidic reversible and irreversible immunoproteasome inhibitors, COBISS.SI-ID: 50576131.

**Sibinovska Nadica** (mentorica Katja Kristan, somentor Simon Žakelj): Ustreznost in zanesljivost *in vitro* epitelijskih celičnih modelov za določanje nazalne in pulmonalne permeabilnosti zdravilnih učinkovin = Suitability and reliability of *in vitro* epithelial cell models for nasal and pulmonary drug permeability determination, COBISS.SI-ID: 80440579.

**Temova Rakuša Žane** (mentor Robert Roškar, somentor Albin Kristl): Razvoj stabilnostno indikativnih analiznih metod za vrednotenje stabilnosti hidrofilnih in lipofilnih vitaminov ter načrtovanje njihove stabilizacije = Development of stability indicating methods for stability evaluation of hydrophilic and lipophilic vitamins and design of their stabilization, COBISS.SI-ID: 73496067.

**Pohlen Mitja** (supervisor Rok Dreu): Razvoj metod izdelave in sestave posušenih emulzij za dostavo učinkovin z izrazito lipofilnostjo = Development of dry emulsion production methods and compositions intended for delivery of highly lipophilic drugs, COBISS.SI-ID: 83339267.

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**Toplak Žan** (mentor Tihomir Tomašič, somentorica Lucija Peterlin Mašić): Računalniško podprto načrtovanje in sinteza novih zaviralcev napetostno odvisnih kalijevih kanalov hEAG1 s protitumornim delovanjem = Computer-aided design and synthesis of novel voltage-gated potassium channel hEAG1 inhibitors with anticancer activity, COBISS.SI-ID: 73162755.

**Vrbanac Helena**(mentor Jurij Trontelj): Hidrodinamsko-mehanski vplivi v napravi za posnemanje gibanja želodca in črevesja na trdne dostavne sisteme za peroralno aplikacijo = Hydrodynamic-mechanic effects in apparatus for simulation of the human stomach and small intestine motility on solid oral delivery systems, COBISS.SI-ID: 75013379.

**Žigart Nina** (mentor Zdenko Časar, somentor Janez Ilaš): Kombiniran pristop k študiju kemizma razgradnje venetoklaksa z in silico orodji in načrtovanimi stresnimi testi = A combined approach to the study of venetoclax degradation pathways using in silico tools and designed stress testing, COBISS.SI-ID: 64108547.

#### Doktorati s področja toksikologije

**Grželj Jasna** (mentorica Irena Mlinarič-Raščan, somentorica Alenka Šmid): Farmakogenetski dejavniki odziva na metotreksat pri bolnikih z luskavico = Pharmacogenetic factors of methotrexate response in patients with psoriasis, COBISS.SI-ID: 91905539.

**Kenda Maša** (mentorica Nataša Karas Kuželički, somentorica Marija Sollner Dolenc): Vpliv motilcev endokrinega sistema na delovanje imunskega sistema in celične adhezijske procese = The effect of endocrine disrupting chemicals on the fuction of the immune system and cell adhesion processes, COBISS.SI-ID: 73151747.

**Nabergoj Sanja** (mentor Žiga Jakopin, somentorica Irena Mlinarič-Raščan): Iskanje modulatorjev programirane smrti celic kronične limfocitne levkemije = Identification of programmed cell death modulators in chronic lymphocytic leukemia cells, COBISS.SI-ID: 76236291.

**Toplak Žan** (supervisor Tihomir Tomašič, co-supervisor Lucija Peterlin Mašić): Računalniško podprto načrtovanje in sinteza novih zaviralcev napetostno odvisnih kalijevih kanalov hEAG1 s protitumornim delovanjem = Computer-aided design and synthesis of novel voltage-gated potassium channel hEAG1 inhibitors with anticancer activity, COBISS.SI-ID: 73162755.

**Vrbanac Helena** (supervisor Jurij Trontelj): Hidrodinamsko-mehanski vplivi v napravi za posnemanje gibanja želodca in črevesja na trdne dostavne sisteme za peroralno aplikacijo = Hydrodynamic-mechanic effects in apparatus for simulation of the human stomach and small intestine motility on solid oral delivery systems, COBISS.SI-ID: 75013379.

**Žigart Nina** (supervisor Zdenko Časar, co-supervisor Janez Ilaš): Kombiniran pristop k študiju kemizma razgradnje venetoklaksa z in silico orodji in načrtovanimi stresnimi testi = A combined approach to the study of venetoclax degradation pathways using in silico tools and designed stress testing, COBISS.SI-ID: 64108547.

#### Doctors in the field of Toxicology

**Grželj Jasna** (supervisor Irena Mlinarič-Raščan, co-supervisor Alenka Šmid): Farmakogenetski dejavniki odziva na metotreksat pri bolnikih z luskavico = Pharmacogenetic factors of methotrexate response in patients with psoriasis, COBISS.SI-ID: 91905539.

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## Z nanozdravili dosegamo boljše učinke

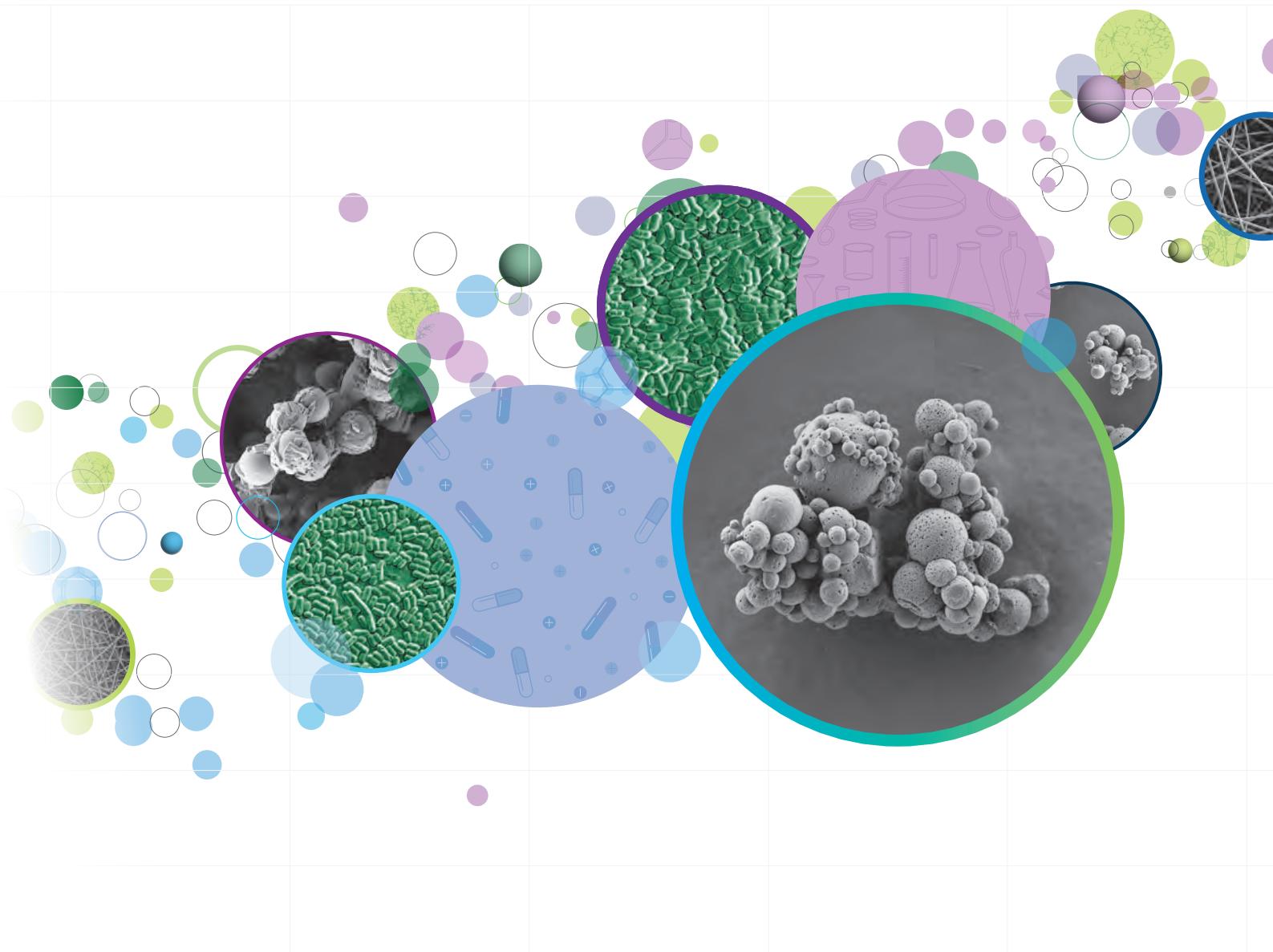
Nanozdravila so napredna zdravila, ki vsebujejo izredno majhne strukture, a z njimi dosegamo velike učinke. Omogočajo bolj učinkovito zdravljenje in so do bolnikov bolj prijazna, saj njihovo uporabo spremišča manj neželenih učinkov. Predstavljajo napredek v zdravljenju najbolj trdovratnih bolezni današnjega časa, kot so rak, nevrodegenerativne in infekcijske bolezni.

## Improving outcomes with nanomedicine

Nanomedicines are advanced pharmaceutical forms that contain extremely small structures, but show tremendous effects. They provide more effective treatment and are patient-friendly, as their use is accompanied by fewer side effects. They represent advances in the treatment of the most persistent diseases of today, such as cancers, neurodegenerative and infectious diseases.

Različne oblike naprednih nanozdravil, kot jih vidimo pod elektronskim mikroskopom.

Different forms of advanced nanomedicines as seen under an electron microscope.



# 5

Znanstvene in strokovne publikacije  
Scientific and professional publications

# RAZISKOVALNA ORGANIZACIJA / RESEARCH ORGANISATION

Univerza v Ljubljani, Fakulteta za farmacijo, l. 2021 / University of Ljubljana, Faculty of Pharmacy, 2021

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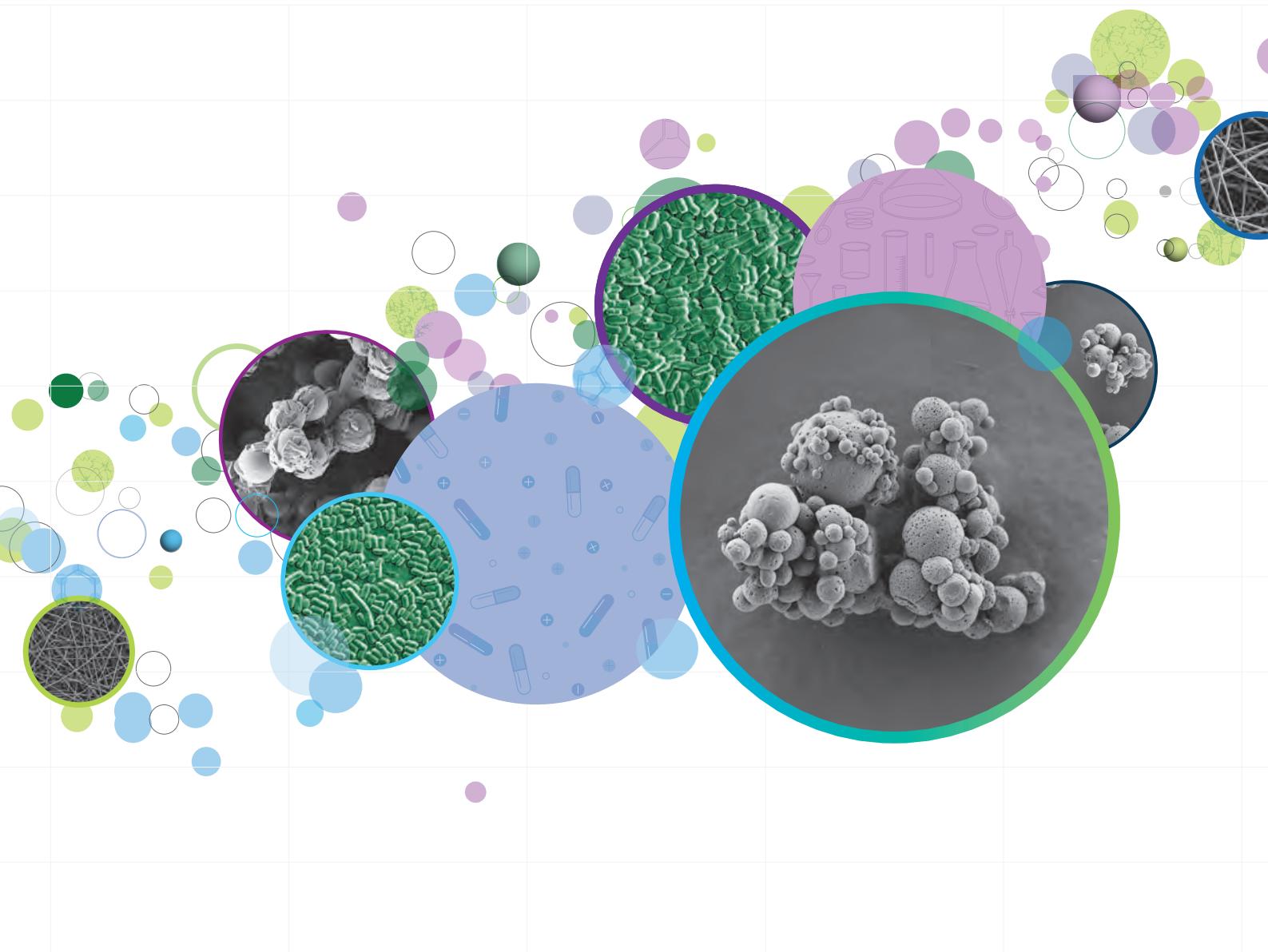
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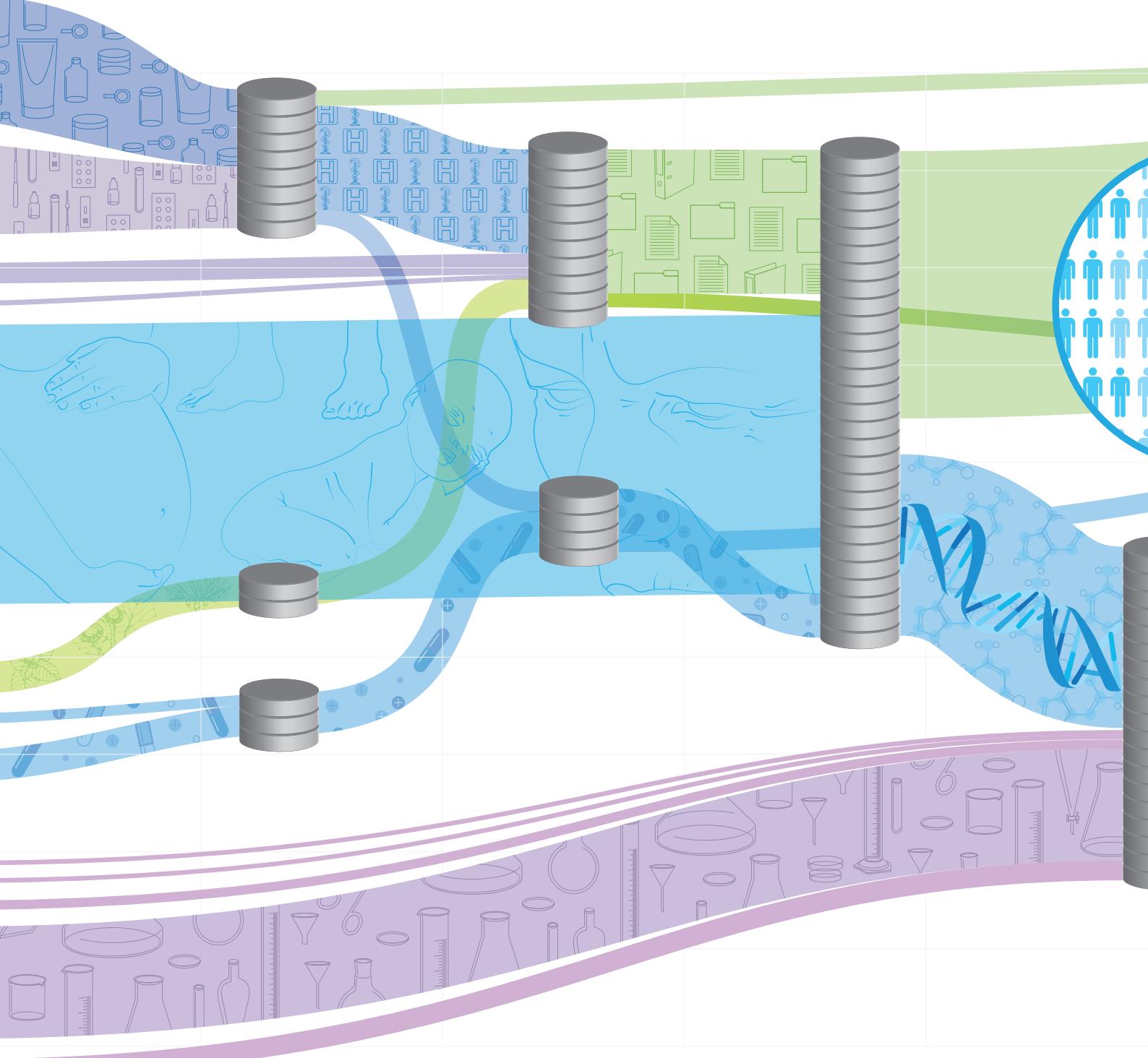
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