



A4L_ACTIONS

Alliance for Life Sciences: From Strategies to Actions in Central and Eastern Europe

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D4.4 Success stories about relations with industry from Alliance4Life and CEE

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INTRODUCTION

The Alliance4Life aims to increase the local and regional impact of Health Research and Innovation in Central and Eastern Europe (CEE). To accomplish this mission, the objectives of the A4L_ACTIONS project (No. 964997) are to promote the best-performing and most positively perceived measures to boost the translation of health research results into practice, thus bridging the gap between the industry and academia. To achieve this, we collected success stories from A4L_ACTIONS experience in terms of relationships with the industry.

D4.2 Success stories about relations with industry from Alliance4Life and CEE is a public deliverable of the A4L_ACTIONS project. It falls under the work package **WP4 – Competencies in Innovation for Human Health** (Lead: LIOS). The core of this WP is to bring together industry and academia, outline challenges, and expectations, and share the best practices in terms of future collaboration, co-creation, and co-innovation. This deliverable is the outcome of the **Task 4.2 Industry Relationship Platform of Alliance4Life (Lead: SU, Partners: all, M1-M36)**, which aims to foster relationships between A4L_ACTIONS Consortium member institutions and industry representatives.

Stories showcase entrepreneurs who succeeded in translating their innovations into practice, promote creative guidelines for education programs, and serve as motivation and inspiration for establishing and sustaining relationships with industry for academic institutions across CEE and beyond. Examples range from success stories about academic partner collaboration with industry (Semmelweis University, SU; Latvian Institute of Organic Synthesis, LIOS; Biomedical Research Center of the Slovak Academy of Sciences, BMC; Medical University Of Lodz; University of Zagreb School of Medicine), start-ups (CEITEC, Masaryk University, Latvian Institute of Organic Synthesis, Vilnius University), and a cooperative doctoral study program with industry (Semmelweis University, University of Tarty). The stories should serve as creative guidelines, motivation, and inspiration for establishing and sustaining relationships with industry for academic institutions across CEE.

A4L_ACTIONS project partners and Alliance4Life consortium FG7 *Science Communication* will ensure the dissemination of D4.2 contents. The stories will be placed on the Alliance4Life website and linked with social media sites according to the communication strategy of Focus Group 7 *Science Communication*.

EXAMPLE 1: SEMMELWEIS UNIVERSITY

HUNGARIAN BEST PRACTICES IN INDUSTRY-UNIVERSITY COOPERATION: NATIONAL CARDIOVASCULAR LABORATORY

With a revolutionary approach, the Hungarian National Cardiovascular Laboratory aims to explore the pathophysiological mechanism responsible for age-associated cardiovascular disease to develop innovative tools for the diagnosis, prevention, and therapy of such diseases. Its main professional pillars are clinical-epidemiological programs, innovative drug and biotechnology developments, and the development of innovative medical and diagnostic tools and databases.

The Laboratory is operated by a consortium. The leader of the consortium is the Semmelweis University, the partners of the consortium are the University of Szeged and the following three companies: Neumann Medical Ltd, [Pharmahungary](#) Ltd, 3DHISTECH Ltd.

Main research areas of the Laboratory:

1. Clinical-epidemiological programs for the study of ischemic heart disease and heart failure.
2. New drug targets and repositioning of existing drugs.
3. Biomarkers and measurement methods for extracellular vesicle-based diagnostic and therapeutic approaches.
4. Elucidate the potential medium- and long-term cardiovascular consequences of COVID-19 infection.
5. The development of in vitro cardiovascular platforms based on human induced pluripotent stem cells.
6. Innovative drug and biotechnology developments.

Benefits to be expected from laboratory research:

- The research results of the National Cardiovascular Laboratory will represent a decisive contribution to the development of evidence-based cardiovascular health promotion and disease prevention programs, helping to achieve the goal of living a longer and healthier life for the population of the country.
- The interdisciplinary and translational nature of the program ensures that it successfully implements the development of evidence-based innovative disease prevention, screening, diagnostic and therapeutic procedures to reduce the incidence and mortality of cardiovascular diseases and supports their translation into medical and public health practice.
- The results of the program contribute to access to international markets for innovative high economic value-added products and services, thus helping the development of the domestic pharmaceutical biotechnology industry.

EXAMPLE 2: SEMMELWEIS UNIVERSITY

COOPERATIVE DOCTORAL PROGRAMME FOR DOCTORAL SCHOLARSHIPS

The Cooperative Doctoral Programme, which was first announced in the academic year of 2020/2021, has been re-launched in the academic years 2021/2022 and 2023/2024, due to its extraordinary popularity among doctoral students.

The Cooperative Doctoral Programme aims to further increase the number of employees working in the RDI segment, primarily in the broader STEM fields (science, technology, engineering, mathematics, agriculture, medicine, health, and arts), who want to enrich their professional knowledge with the latest scientific research and are committed to the social and economic exploitation of their knowledge. To this end, the doctoral students participating in the programme will do their doctoral research at the doctoral school but in collaboration with the business sector.

The expected number of grantees is about 100-150. Grantees will receive a net HUF 400,000 scholarship grant per month. The mentors and experts who assist the grantee and contribute to the implementation of the project will also be rewarded. The gross value of such support is HUF 120,000 per month. The host doctoral school will also receive a grant of HUF 600,000 per semester. The latter may be spent primarily on research, development, and innovation activities or related infrastructure development, international networking, knowledge transfer, or related services.

Applications may be submitted by doctoral students who started their doctoral studies and have not yet completed the complex examination by the beginning of the academic year, or by those who will start their doctoral studies in the academic year of the call. It is also important to note that during the period of the Cooperative Doctoral Programme scholarship, grantees must have an employment or other work relationship with the partner organisation of their choice for which they are entitled to remuneration.

The submitted applications will be assessed by the Cooperative Doctoral Panel of nine members, in which both the higher education sector and the business sector are represented to ensure a balance of interests and the selection of the best applications.

The Hungarian Ministry of Culture and Innovation is the professional coordinator of the programme, while the Hungarian National Research, Development, and Innovation Office is the operational manager. The programme is financed by the Hungarian National Research, Development, and Innovation Fund.

EXAMPLE 3: CEITEC MASARYK UNIVERSITY

CZECH BEST PRACTICES IN INDUSTRY-UNIVERSITY COOPERATION

Licence to IVF patent sold to startup Fetus, IVF a.s.

Infertility affects over 48 million couples worldwide annually, and the IVF (in-vitro fertilisation) method remains the most effective solution. The secret to its success lies in the prediction of the right time for fertilisation, and the selection of suitable embryos.

Cross-border cooperation involving three universities and a start-up company FETUS, IVF a.s. and financial contribution of Czech holding group FABA Capital has brought Masaryk University significant success in the field of technology transfer. In a contract valued at 441,000 euros, this collaboration will enable the commercialization of a new technology that significantly increases the success rate of artificial insemination.

As an expert on high-throughput analysis of miRNA molecules in clinical material, prof. Ondrej Slaby, leader of the research group „Molecular Oncology – Solid Cancer“ at CEITEC Masaryk University (Brno, Czech Republic), was invited into the collaborative research with Pavol Jozef Safarik University in Kosice and Comenius University in Bratislava (Slovak Republic). This collaboration resulted in the patent application in 2020. This patent-protected technology involves two independent steps: i) diagnostic test that predicts a woman's current readiness for the artificial insemination procedure, and ii) test for miRNA biomarkers obtained from the embryo by a method that does not destroy the embryo. Combining the results of these two tests will increase the probability of a successful pregnancy.

In December 2022, the parties signed an agreement on the transfer of intellectual property to the start-up company FETUS, IVF a.s. The task of the new start-up is now the commercialization of the project. They will try to reduce the number of miscarriages after IVF because the failure has major adverse effects on any further attempts. As part of our effort to commercialize academic and university projects, a new incubator called FABAINCUBE has been established.

According to the analysis from market research and the business plan, FETUS will have a valuation of one hundred million euros within four years.

IVF embryo transfer technology caught the public's attention for the first time at the Transfera Technology Day 2020. Now, in 2023, this technology won the competition Prize for Technology Transfer in Slovakia in the category “Action in the field of technology transfer”.

This collaboration underscores the importance of seeking and seizing opportunities for academic and industry collaboration. Technology transfer centres and incubators play a pivotal role in facilitating this process. The technology is now ready to make a significant impact in practice, thanks to the collaborative efforts of these universities and their commercial partner.

EXAMPLE 4: LATVIAN INSTITUTE OF ORGANIC SYNTHESIS

SPINNING OUT SPIDER SILK TECHNOLOGY WITH A STARTUP PRINTYMED

The Latvian Institute of Organic Synthesis (LIOS) has developed a novel method for producing high-performance recombinant spider silk. The research, led by Prof. Kristaps Jaudzems, uses bioconjugation to produce chemically modified artificial spider silk, allowing for tailoring and introducing new properties into designed spider silk proteins. This material is 100% biodegradable, biocompatible, and environmentally friendly (Figure 1).

To assess the market potential, Dr. Kristaps Jaudzems participated in the Commercialisation Reactor – a startup organization that trains scientists and entrepreneurs in startup formation for science commercialization. Dr. Kristaps Jaudzems participated in an Ignition event in November 2022, where he met entrepreneurs to discuss and cooperate on potential company creation. At the event, the spider silk technology ignited not one, but three teams, who started the difficult startup journey in the fields of transport, defense, and medicine.

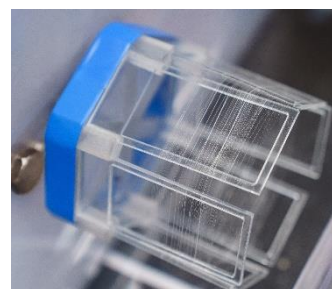


Figure 1 Artificial spider silk around a spool



Currently, only one of the original teams remains operational— [PrintyMed](#) - led by the fearless Jekaterina Romanova as their CEO. She has co-founded 3 startups, which have attracted funding, and have successfully launched products on the market. PrintyMed has acquired a license from LIOS and is on a mission to develop the technology for 3D-printed living tissue. Here, the spider silk would be used as a scaffolding material, onto which cells would be seeded paving the way for tissue regeneration or generation of artificial organs. In this journey, Jekaterina Romanova is accompanied by Prof. Kristaps Jaudzems, Sandra Treide, who provides expertise in medicine and medical technologies, and Dr. Gints Šmits, who works on cosmetics applications.

PrintyMed is actively engaging with experts and investors to secure funding, build partnerships, and develop technology. So far, they have joined several business incubators including the Health Founders based in Estonia, where they met their mentor David Yakobi – a heart surgeon with 18 years of experience, who helped to design an Artificial Heart Valve prototype and conduct ex-vivo tests. PrintyMed has also generated interest from several cosmetic and medical device companies, attracted investment, and is taking part in two Horizon Europe project applications for 6M aimed at developing artificial spider silk bioprinting and its biomaterial applications in regenerative medicine and tissue rejuvenation.

As for LIOS, PrintyMed is the first startup aiming to commercialize LIOS academic research and is also proving to be a valuable experience and inspiration to other researchers and entrepreneurs to consider commercialization as a way to create more impact from their academic research.



Figure 2 PrintyMed founders, from the right: Sandra Treide, CMO; Kristaps Jaudzems, CTO; Jekaterina Romanova, CEO

EXAMPLE 5: LATVIAN INSTITUTE OF ORGANIC SYNTHESIS

LIOS – A TRUSTED PARTNER FOR PHARMACEUTICAL AND BIOTECHNOLOGY INDUSTRIES

Latvian Institute of Organic Synthesis (LIOS) is a state research institute specializing in organic chemistry, pharmaceutical research, molecular biology, and bioorganic chemistry. For its 66 years of history, LIOS has become the leading drug discovery and development centre in the Baltics. A reputation that is consistently maintained through collaboration and contract research with both local and international members of the pharmaceutical and biotechnology industry.

LIOS generates about 25-33% of its annual budget by collaboration projects with industry partners (Figure 1), primarily, collaborating with EU and USA-based pharmaceutical companies. This success is underpinned by cultivating a determined and long-term mindset of providing the best of academia (i.e., scientific creativity, depth of knowledge, skills, and problem-solving) together with the convenience of industry-like service provision.

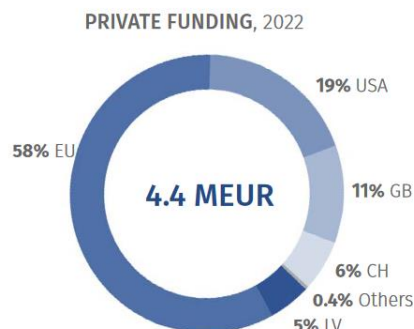


Figure 1 Breakdown of LIOS revenues from private funding 2022

LIOS builds on its world-class academic expertise (Figure 2) from how to synthesize difficult chemical compounds, to understanding their interaction with biological targets (e.g., structural biology, receptor binding), and how these compounds behave in pre-clinical test environments (e.g., pharmacological property, stability, and safety testing). Over the years these capabilities have been supported by investing in both state-of-the-art laboratory equipment and upskilling of LIOS researchers.

For the service provision, LIOS has created an internal work organisation that allows it to maintain both strict confidentiality and thorough reporting with its industrial partners. All researchers working on the project are bound by employment and non-disclosure contracts, respect industrial needs to work fast, and efficiently, and provide thorough and useful solutions to the problem posed to them.

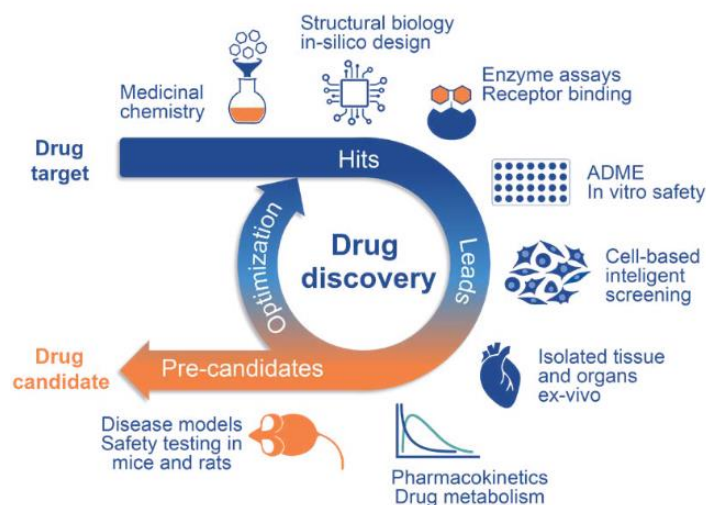


Figure 2 LIOS service offer

In return, industry partners appreciate LIOS's ability to deliver knowledge faster and more effectively than elsewhere, and most of these partners return to LIOS in the future. 75% of customers work with LIOS for more than 5 years. Industrial partner retention is also promoted by negotiating preferred long-term contracts and loyalty discounts.

EXAMPLE 6: BIOMEDICAL RESEARCH CENTER OF THE SLOVAK ACADEMY OF SCIENCES BMC

SUCCESS STORY ABOUT RELATION WITH INDUSTRY

The COVID-19 pandemic brought the Biomedical Center of the SAS (hereinafter referred to as BMC SAS) many challenging and stressful situations and undoubtedly negatively affected its scientific activity. On the other hand, it was also an opportunity to be directly involved in solving several societal problems from the very beginning and to highlight the importance of biomedical research for the country. The partnership between a private biotechnological company MultiplexDX, s.r.o., with BMC SAS on the development and clinical validation of diagnostic tests for the detection of SARS-CoV-2, was particularly important for this mission.

In July 2020 BMC SAS and MultiplexDX, s. r. o. entered into a Memorandum of Cooperation, the aim of which was to regulate the cooperation and mutual synergy of both parties in the development and validation of tests for the detection of viruses and in research on infectious pathogens. Following this Memorandum of Cooperation, in February 2021, the Parties signed a Framework Agreement on Scientific Cooperation, where they specified their rights and obligations in more detail and also agreed on the amount of the remuneration for BMC SAS, which was 10% of the difference between the amount of invoiced deliveries of the product and the amount spent on the costs associated with the production, distribution, and marketing of the product.

The General Director of BMC SAS, Prof. RNDr. Silvia Pastoreková, DrSc., evaluated the mutual cooperation of both parties as follows: "*The joint efforts of the academic and private sectors have resulted in diagnostic tests, several of which have been certified and used abroad. This cooperation is an example of a mutually beneficial activity that also helps society*".

EXAMPLE 7: THE MEDICAL UNIVERSITY OF LODZ MUL

COMMERCIALIZATION OF DIAGNOSTIC TESTS FOR CIVILIZATION DISEASES

Biotechnology implementation - markers for early detection of ovarian cancer

The Medical University of Lodz, within the Department of Biostatistics and Translational Medicine – led by professor Wojciech Fendler, has been collaborating with US entities including Dana-Farber Cancer Institute (DFCI), Brigham and Women's Hospital since 2016. Together with the Partners, the Department is engaged in early detection of cancer.

It was through joint research that an algorithm for early detection of ovarian cancer was developed. The solution is protected under application number EP3565903A1.

Ovarian cancer accounts for more deaths than any other cancer of the female reproductive system. Unfortunately, most ovarian cancers are diagnosed at a later stage due to the lack of an effective screening tool.

The topic has attracted the interest of an American company - a bioanalytical-based women's health company - Aspira Women's Health of Austin (Texas). After numerous discussions and negotiations, in 2023, AWH has entered into an agreement with Dana-Farber Cancer Institute (DFCI), Brigham and Women's Hospital, and Medical University Lodz to evaluate their novel microRNA (miRNA) technology in combination with current AWH technologies, for the development of a highly sensitive and specific high-risk early detection test for ovarian cancer. This is the second such Polish-American biotechnology technology transfer collaboration in Poland. The test will soon be registered with the FDA, and we look forward to its availability on the market.

Multiple sclerosis - diagnostic test

Multiple sclerosis is one of the most common diseases of the immune system in the world population. It affects 2.8 million people worldwide; in Poland, the patient population is estimated at about 45-50 thousand people (underestimated data). MS is called a disease of young adults because the diagnosis is made most often among people in the 20-40 age range. The scientific team of the Medical University of Lodz, led by Professor Przemyslaw Lewkowicz - has made the discovery of a specific subpopulation of cells of the immune system, in patients with multiple sclerosis. This inspired the team, to begin work related to the characterization of these cells.

The results became the basis for a patent application, and a SCImmune spin-off company was established for commercialization (April 2023). The Center for Innovation and Technology Transfer was also tasked with attracting an investor. The first money was invested by Farmabol, a manufacturer of innovative self-diagnostic tests.

The product is a diagnostic test useful in the early diagnosis of multiple sclerosis "MS-test". The test is based on the highly specific response of the immune system of MS patients to the autoantigen myelin proteins (MBP, PLP, MOG). The test involves assessing the "expansion" of a subpopulation of lymphocytes with the CD49d+CD154+ phenotype from the total population of peripheral blood mononuclear cells (PBMC) isolated from patients with suspected MS in vitro. Quantitative analysis of CD49d+CD154+ lymphocytes that are autoreactive to myelin proteins allows us to make the claim that the subject is developing an immune response that may eventually lead to the development of the disease. This is because the 'appearance' of autoreactive lymphocytes is an indispensable and critical condition for the development of the disease.

EXAMPLE 8: VILNIUS UNIVERSITY

EVERY CELL MATTERS: SUCCESS STORY OF ATRANDI BIOSCIENCES

[Atrandi Biosciences](#) is at the forefront of microfluidic innovation, offering the most versatile and ease-of-use technologies that meet the increasing demand for better tools to study complex biological systems at single-cell resolution.

Start-up *Atrandi Biosciences* was founded in 2016 by Vilnius University (Lithuania) researchers and led by Vilnius University and Harvard University alumni. The company operates at the intersection between life sciences, engineering, and machine learning. *Atrandi Biosciences* has joint patents and license agreements with Vilnius University. Start-up develops and manufactures all the necessary tools for both academic and business research laboratories that use microfluidic technologies in their activities. Since the beginning, the company has commercialized microfluidic technology, which replaces test-tube testing with droplets and can be applied to fundamental research or new drug discovery.



In recent years, the founders, together with Vilnius University scientists, have been looking for ways to perform high-throughput research more efficiently, and have developed an alternative capsule technology. In 2023, the startup raised EUR 4.5 million in late seed-stage investment and intends to accelerate its development by establishing a team in the US and continuing to commercialize its technologies for droplet microfluidics and single-cell research.

Atrandi Biosciences offers three unique solutions: droplet generator, droplet sorting, and multi-step analysis. *ONYX* droplet generator integrates pumps, a microscope, a high-speed camera, and a high-voltage power source into a user-friendly package

Figure 3 Photo by Atrandi Biosciences team

that is a complete solution for any lab.

The droplet sorting platform combines fluorescence analysis, droplet manipulation, and easy-to-use software, making it an ideal solution for functional screening workflows.

Multi-step analysis with semi-permeable capsules is a breakthrough technology transforming microfluidics-based multi-step workflows. The capsule technology developed and commercialized by the *Atrandi Biosciences* team solves existing analytical problems and will provide researchers with the tools needed to conduct next-generation research, along with breakthroughs in sequencing, artificial intelligence, and personalized medicine.

Atrandi Biosciences' systems have already been deployed in over 50 leading academic and commercial laboratories worldwide. In the long term, the company hopes to significantly contribute to breakthroughs in personalized medicine and cell therapy research.

EXAMPLE 9: UNIVERSITY OF ZAGREB SCHOOL OF MEDICINE

SUCCESS STORY ABOUT RELATION WITH INDUSTRY

A multicENter, randomized, open-label, parallel group, pilot study to evaluate the use of sacubitril/valsartan in HeartMate 3 LVAD recipients (ENVAD-HF)

ENVAD-HF is a prospective, randomized clinical trial investigating the use of sacubitril/valsartan in a specific subpopulation of patients with heart failure with reduced ejection fraction – those carrying a heart pump – the HeartMate3 left ventricular assist device (HM3 LVAD). ENVAD-HF is an investigator-initiated trial (IIT), the sponsor of the study is the University of Zagreb School of Medicine, the primary investigator is associate professor Maja Čikeš, while the funders are industry partners, Novartis and Abbott. With a pragmatic approach and a focus on clinically relevant outcomes, the primary objective of the trial is to determine the safety and tolerability of sacubitril/valsartan, compared with standard of care used for treating blood pressure in patients implanted with the HM3 LVAD.

Worldwide, there is a growing tendency towards a shift in clinical trial sponsorship from the industry towards academic and research institutions. The funding for such trials is mainly received from governmental funding institutions or from the industry. Investigator-initiated trials are a typical example of such studies. What is important to note in IITs is the difference between a sponsor and a funder. The sponsor is the institution that initiates, conducts and supervises the study (typically, the academic institution), while the funder is the institution that provides funding or the drug/device that will be used in the study (e.g. industry partners). Funding institutions should have no influence on research design, study conduct or data analysis. Sponsors, i.e. academic institutions, face many challenges in organizing such research: securing funding, creating and maintaining regulatory filings and approval, performing ongoing research oversight, purchases of study drug and collaboration with clinical trial monitors and pharmacovigilance providers. Some tasks that are also relevant, such as training research staff, data management, performing statistical analysis, and medical writing, are more inherent to their structure.

The idea for the ENVAD-HF project arose in 2019; the primary investigator and her team were aware of possible challenges in initiating and organizing the study due to the complexity of the project, but even more so the lack of experience of the UZSM with IITs. Permission to initiate the trial was sought from the parent institution (UZSM) and professor Čikeš gathered collaborators from six clinical centres across Europe that would serve as ENVAD-HF sites: University Hospital Centre Zagreb and University Hospital Dubrava (Croatia), Erasmus Medical Centre in Rotterdam and University Medical Centre Utrecht (The Netherlands), John Paul II Hospital in Krakow (Poland) and The Institute for Clinical and Experimental Medicine in Prague

(Czech Republic). She also assembled the steering committee consisting of distinguished colleagues from Columbia University, Harvard University and Montefiore Medical Center in the USA and the University Hospital of Zurich in Switzerland, as well as UZSM. Professor Čikeš secured funding in collaboration with Novartis (the producer of sacubitril/valsartan) and Abbott (the producer of HM3) – which is a rare example of pharma and tech industry collaboration. She also designed and wrote the research protocol, and together with her team obtained all necessary documentation, ranging from creating informed consent forms for the patients, through creating contracts between the Sponsor institution and clinical trial sites as well as obtaining approval of institutional ethics committees and regulatory bodies of each country where the project was to be conducted. The Centre for Translational and Clinical Research, Knowledge Transfer and Innovations Office of the UZSM, at that time led by Smiljka Vikić-Topić, M. Sc, aided in these tasks, predominantly those linked with contracting. Despite global scarceness of prospective randomized trials in LVAD carriers, ENVAD-HF succeeded in creating a strong international network of study centres and eminent Steering Committee members, as well as increased visibility of the Sponsor – UZSM. Currently, the trial is near the completion of enrolment (57 of 60 foreseen patients are enrolled) and should report its outcomes at one of the major international cardiology conferences.



EXAMPLE 10: UNIVERSITY OF ZAGREB SCHOOL OF MEDICINE

UZSM COLLABORATION WITH INDUSTRY – APPLIED RESEARCH

IRI project PROBITECT "Synergistic innovative combination of microbiota components as a basis for the development of innovative topical products for the treatment and prevention of inflammatory conditions of human skin" KK.01.2.1.02.0137.

The latest research points to the important role skin microbiota (all living microorganisms on the skin) plays in maintaining skin health. Atopic dermatitis (AD) and contact dermatitis (CD) are very common inflammatory conditions of the skin affecting more than 20% of global population. These conditions are chronic skin diseases characterized by inflamed, dry skin, intense itching as well as skin pain which seriously lowers the quality of life in these individuals. The basic therapy for any dermatitis is a good local therapy with moisturizers or emollients. During the acute disease phase, local corticosteroids are prescribed but when used for a long time can cause skin atrophy. The origins of AD and CD are multifactorial and largely unknown but recent research revealed that the disturbed composition and reduced diversity of the skin microbiota are found in individuals with AD and CD.

In order to respond to the needs of patients with these skin conditions, the experts from academia, clinics and industry joint efforts in order to develop new innovative formulations of topical preparations based on human microbiota and its derivatives designed to resolve the symptoms and improve the quality of life of patients. New, innovative scientific and technological solutions of topical preparations were tested in *in vitro* conditions in order to determine their properties and anti-inflammatory effects of active ingredients on skin cells. After the *in vitro* efficacy and safety were confirmed the final formulations were developed and tested for technological feasibility. Ultimately, one product for use in AD and one for use in KD subjects were developed and tested in two clinical studies. The studies evaluated the tolerability and efficacy in improving skin condition as well as the effects on the quality of life of participants during 4-6 weeks of use. The results demonstrated positive effects on skin condition as well as on patients' well-being confirming the technological readiness and potential for commercialization. As the products will eventually be used without a prescription and without a doctor's supervision, this may reduce the financial burden on health systems and improve patients' access to safe solutions for their conditions.

The project was conducted from 2021-2023 as part of the national initiative to support the development of new products and services resulting from research and development activities. The project partners include the company PROTEKO Ltd, Zagreb and Department for Intercellular Communication, Center for Translational and Clinical Research, University of Zagreb School of Medicine whose research teams together with clinical dermatologists joint forces to develop new innovative topical products for inflammatory skin conditions. The successful implementation of the project enabled fruitful collaboration of the academic, research and business sectors and increased their competitiveness, innovation potential and visibility as well as ensured education of young researchers in applied biomedical research.

EXAMPLE 11: UNIVERSITY OF TARTU

INDUSTRIAL DOCTORATE PROGRAMME – UNIVERSITY COLLABORATION WITH INDUSTRY

Since the academic year 2022/2023 the University of Tartu has launched the industrial doctorate programme. The programme is a cooperation between the university, the partner organisation and the doctoral student. In industrial doctorate, the student's research proceeds from the needs of the partner organisation (usually private companies but also public-sector bodies and R&D institutions), the student's studies are fully financed by the industry (or partner organisation), the academic degree is provided and defended in the university.

In general terms, the industrial PhD student acts and works on similar bases to other doctoral students. The student fills the curriculum of the studies and is ensured the same rights as other students (e.g. academic leave).

What is clearly different is the focus of the doctoral project as it addresses the need and problem in industry, the funding scheme and the supervision of the study. The student does not get the salary from the state and is not a junior researcher but is employed by industry as a researcher, the whole study is financed by the company. The supervisors are both from the company and the university.

Objectives of industrial doctorate:

- promoting the university's cooperation with businesses, public- and third-sector bodies;
- enriching the university's doctoral studies and training top-level professionals to meet labour market needs;
- increasing the applicability of research and its relevance to the needs of society;
- increasing the share and capacity of R&D in businesses and institutions;
- diversifying doctoral career paths and increasing the share of PhD holders in companies and institutions.

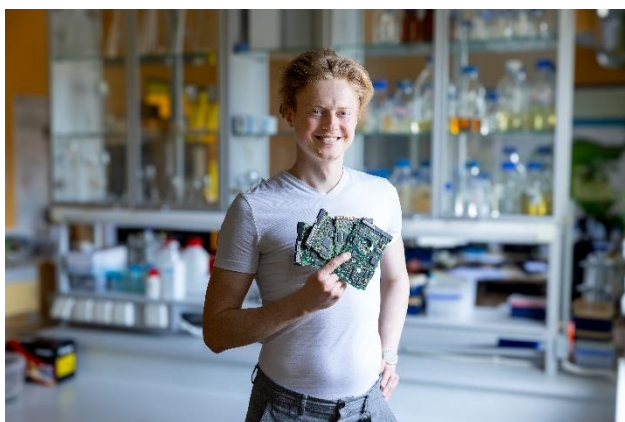
The university has worked out the support system for the industry to be engaged in the programme. The system includes expertise on supervision, funding, IP rights, cooperation agreement (industry, university, student), admission and study questions. The admission of the student can be both through public competition or through admission without public competition.

More about [industrial doctorate](#) in UT.

A success story of the industrial doctorate:

Estonian company [BiotaTec](#) is developing and licensing next-generation rapid biomining solutions for critical raw materials from low-grade ores, tailings and wastes. Critical raw materials are vital for the carbon-neutral future, as they are irreplaceable in solar panels, wind turbines, electric vehicles, and energy-efficient lighting.

In september 2022 the company opened two industrial doctorate places in collaboration with the University of Tartu, Institute of Molecular and Cell Biology.



[Jaan Vihalemm](#) is an industrial doctorate student at the University of Tartu, dividing his time between working as a researcher at BiotaTec and pursuing his doctoral studies. On a daily basis, he explores how to extract rare metals from electronic waste, such as microplates found in our computers, phones, or household appliances, to redirect them back into the production cycle.

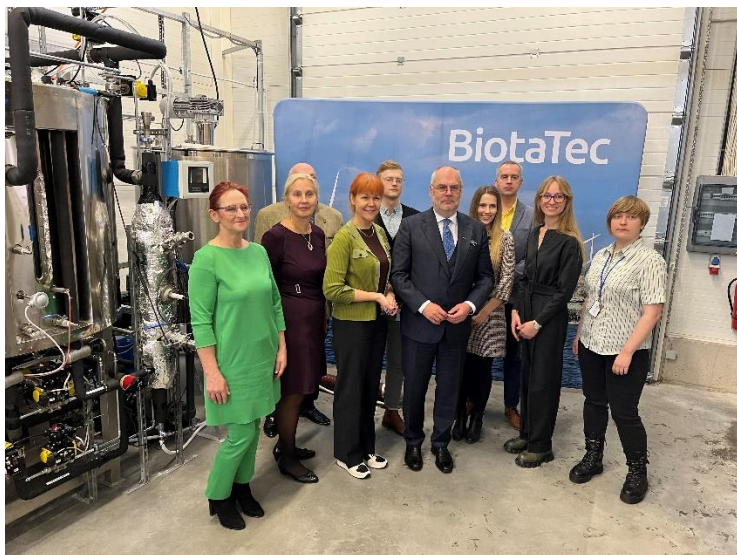
Jaan Vihalemm in BiotaTec

Holding pieces of electronic waste, the object of his research.

His PhD thesis topic is:

„Bioleaching of precious metals and critical raw materials from electronic waste“

If everything goes as planned, Jaan will receive his doctoral degree from the University of Tartu in 2026, and the company funding his doctoral studies will gain access to a top specialist with a doctoral degree, as well as valuable collaborative experience with academia. This collaboration will enhance the applicability of research and ensure its alignment with societal needs.



The President of the Republic of Estonia, Alar Karis (in center) visiting BiotaTec in 2023. Both industrial doctoral students are also on the photo.

CONCLUSION

Success stories from the A4L_ACTIONS Consortium show that institutions in Central and Eastern Europe have succeeded in activities bridging the innovation gap (new spin-offs, fruitful relations with industry, dedicated education programs). The prepared material will be promoted through the Alliance4Life web portal and social media in collaboration with A4L_ACTIONS Consortium member institutions and FG7 *Science Communication*.