



## Baltic Biomaterials Centre of Excellence

The Baltic Biomaterials Centre of Excellence (BBCE) project's main objective is to establish a joint Centre for development of advanced biomaterials based on the long-term strategic cooperation between AO Research Institute Davos, Switzerland (ARI) and Friedrich-Alexander University of Erlangen-Nuremberg, Germany (FAU) on the one hand and Riga Technical University Rudolfs Cimdins Riga Biomaterials Innovations and Development Centre (RTU RBIDC), Latvian Institute of Organic Synthesis (LIOS), Riga Stradins University (RSU) and Riga Stradins University Institute of Stomatology (RSU IS) on the other hand.

## Establishment of BBCE

### BBCE kick-off meeting

BBCE project was solemnly opened on January 29th, 2020 at the Faculty of Materials Science and Applied Chemistry of Riga Technical University. In the opening speech, the President of Latvia, Egils Levits stated, «Opening of the Excellence Centre will have positive impact on growth potential and socio-economic outreach of Latvia. According to current plans and estimates, total economic impact of the centre will be more than 74 million euro over the next 20-year period.»



«This Centre is a milestone for our scientific community, and I am personally proud of Latvian researchers who have demonstrated their scientific excellence and strong potential for cooperation on this scale,» the President of Latvia, Egils Levits stated at the opening of the BBCE.

### BBCE strategy

For the next seven years the newly established Centre will serve as the platform that will combine expertise and infrastructure of internationally recognized teams from Latvia, Germany and Switzerland. BBCE will strengthen the industry of biomaterials in the region, allow scientists to develop and commercialize new biomaterials for bone regeneration particularly in craniomaxillofacial surgery, orthopaedics and other areas. The project is aimed to acquire new knowledge that will allow increasing the efficiency and development of excellence in human resources, knowledge, research, technological development and infrastructure. Significant funds will be invested in the training of scientific and medical staff, in the development of scientific expertise and in the modernisation of research infrastructure.

### BBCE vision

In the next few years, BBCE headquarters will be established at RTU Kipsala Campus on the basis of RTU Rudolfs Cimdins Riga Biomaterials Innovation and Development Centre. LIOS, RSU and RSU IS research infrastructure will also be expanded. By increasing scientific excellence, it will be possible to provide more medical services of better quality, raise funding for research from the EU structural funds and other sources, and provide higher-level research services for medical device, cosmetic, pharmaceutical and other industries. By combining the forces of RTU, LIOS, RSU and RSU Institute of Stomatology over the next few years it is expected to reach critical mass for the development of medical device industry by promoting the entry of innovative products and services to the market, the growth of local businesses and the attraction of investment from foreign companies.



# The first year at a glance – Pandemic didn't stop us!

## Scientific Excellence (WP1)



Extensive trainings on implementation of quality systems, research metrics and ethics, 3D imaging – based planning and analysis was held by BBCE's advanced partner ARI (AO Research Institute Davos, Switzerland). BBCE team was also trained on controlled release technologies, leadership, project management, conflict management, negotiation, communication by BBCE's advanced partner FAU (Friedrich-Alexander University Erlangen-Nuremberg, Germany). In November 2020, BBCE's PhD students had the great opportunity to participate in FAU organized summer school on high impact scientific writing and presentation of scientific results.

## Technology Transfer (WP2)

To establish clear guidelines on the procedures and enable the transfer of BBCE research results to the industry in the form of innovative products and services, in the first year of the project implementation, the WP2 Technology Transfer Team designed the BBCE technology transfer policy which was approved by all partnering institutions. As a part of the WP2 Industry relations task, information about the BBCE infrastructure and services were advertised in the Baltic Sea Regions 3rd 5G Ecosystem Forum (5G TECHRITORY) and forwarded to potential collaborators in the Baltic region and in the EU.



## Recruitment & Infrastructure (WP3)

Open, international, merit-based job positions were advertised by all BBCE core partner institutions and on average, 6 members per each BBCE SFG were recruited in 2020 (57% female and 43% male). The recruitment procedures for the rest of the foreseen positions will continue in 2021. Upgrade of BBCE infrastructures is actively undergoing. In parallel to the installing of already delivered scientific equipment, construction of the new RSU building has started and the open tender for design and build for BBCE Headquarters building in RTU campus was announced.

## Quality Management (WP4)

The most significant achievements of the Quality Management Team (WP4) are related to the development of a Quality Management Plan (QMP), which foresees the active involvement of all consortium institutions. The elaborated QMP is intended to ensure that BBCE project processes, practices, actions, and measures carried out by the consortium are properly monitored and reported to ensure the quality and consistency of the BBCE project outcomes.



## Dissemination and Outreach (WP5)

Even though the worldwide restrictions affected various events, BBCE team members participated in online conferences (e.g. World Biomaterials Congress), trade shows (MedtecLIVE) and B2B events. On February 2020, before the pandemic restrictions, we welcomed in our laboratories more than 30 school children during the «Shadow days» and in September 2020 started the erudition game BIO-GO-Higher, in which teams from Latvia are currently competing in areas of physics, chemistry, biology and medicine.





# BBCE Team is growing

Six BBCE scientific focus groups were established in 2020 and new BBCE members enrolled in the BBCE core institutions (RTU RBIDC, LIOS LPP, RSU FDF, RSU IS):

**Group 1** – Calcium phosphates and composites (RTU RBIDC).

**Group 2** – Drug/ion/cell delivery (RTU RBIDC).

**Group 3** – Materials *in vitro* (RTU RBIDC).

**Group 4** – Kinetics and stability of drug delivery systems (RSU FDF).

**Group 5** – Preclinical biomaterial evaluation (LIOS LPP).

**Group 6** – Clinical evaluation of materials and personalized implant development (RSU IS).



## Two BBCE Scientific focus groups are still looking for their group leaders:

Group 1 and Group 2 leader positions are available. Job positions will be advertised through Euraxess and bbcentre.eu in Spring 2021. The recruitment procedure will be open, international and merit-based.

We are looking for a Group 1 leader with experience on **Materials and processes modelling** and Group 2 leader with experience in **organic chemistry and drug delivery**.

If you are open minded, ready for new challenges, have an experience in biomaterials research and/or drug delivery – **we invite you to apply!**

## Meet the new Group leaders

### Group 3 - Materials *In vitro*

Dr. Kristaps Klavins joined BBCE in October as a group leader for Group 3 – Materials *In vitro*. Before joining BBCE Dr. Klavins spend 10 years in Austria, where he obtained his PhD in biotechnology from the University of Natural Resources and Life Sciences, Vienna followed by a Senior Scientist position in the R&D Department at Biocrates Life Sciences and Deputy Head of the Proteomics and Metabolomics Facility position at the Research Center of Molecular Medicine – CeMM. The mission of Group 3 – Materials *in vitro* will be to provide *in vitro* tools to support the full cycle of biomaterials for bone regeneration development and pave the road for knowledge-based development of innovative biomaterials with desired properties to improve clinical outcomes. Moreover, established tools will be used to acquire in-depth knowledge about fundamental molecular mechanisms that govern cell-biomaterial and cell-cell interactions. In 2020, all major equipment for a new *in vitro* based laboratory has been purchased and delivered. Currently, the setup of *in vitro* laboratory at Riga Technical University is finalized. The group has successfully recruited a PhD student and a postdoctoral scientist, both will join BBCE in 2021.



### Group 4 - Kinetics and stability of drug delivery systems

Dr. Agnese Brangule joined the BBCE project as a Group 4 (Kinetics and stability of drug delivery systems) leader in January 2021. Agnese received her PhD in Chemical engineering at Riga Technical University. She conducted her research in the field of biomaterials, studying the properties of amorphous calcium phosphate, paying particular attention to the possibilities of using spectroscopic methods and statistical methods in forecasting and processing results. The new position's main challenges will be establishing the group and evaluating drug delivery systems based on calcium phosphates.



## Group 5 - Preclinical biomaterial evaluation

In September, the preclinical biomaterial evaluation group welcomed Dr. Antons Sizovs as a group leader. Dr. Sizovs joined BBCE project after spending 14 years in the United States where he obtained his PhD in chemistry from Virginia Tech, studied pharmacology of biomaterials at Baylor College of Medicine and developed drug-releasing medical implants at the Department of Nanomedicine of Houston Methodist. During 2020, preclinical biomaterial evaluation group secured funding from the Latvian Council of Science to study nano-biomaterials pharmacokinetics and biodistribution in cancer models. The group has finished the first stage of recruitment of a postdoctoral scientist to lead efforts in microscopy and histology and is actively looking for graduate students. It is also in the final stages of selecting the most suitable stimulated emission depletion (STED) super-resolution microscope to fulfil the needs of high-resolution imaging in studies of biomaterials interactions with cells. Together with the BBCE group headed by Dr. Kristaps Klavins, the preclinical biomaterials evaluation group has started to work on the elucidation of metabolic changes in osteoblasts in response to exposure to biomaterials for bone tissue regeneration developed at Riga Technical University.



## Group 6 - Clinical evaluation of materials and personalized implant development

In January 2021, Assoc. Professor Dr. Laura Neimane joined the clinical evaluation of materials and personalized implant development group situated at RSU Institute of Stomatology as a group leader. She has been Head of Maxillofacial Radiology department in RSU IS for last 10 years. Laura has been teaching undergraduate dental students, residents and giving courses and lectures for dentists for over 12 years. She has received dentist diploma at Dentistry Faculty at Karolinska Institute, Stockholm, Sweden, Master's Degree in Dentomaxillofacial Radiology in King's College, University of London, UK, Radiologist specialist diploma in University of Latvia and defended PhD theses on use of biomaterials in atrophic maxillary bone in Riga Stradins University. The group has finished the first stage of recruitment of PhD students to investigate the use of different biomaterials in bone regeneration of the maxillofacial region. All PhD students are working in the field of maxillofacial surgery. Group is actively looking for postdoctoral scientists and undergraduate students. Other members of the group include leading researcher Dr. Sergio Uribe, with expertise in scientific research models and statistical analysis; biomedical engineer M.Eng. Oskars Radzins and two technicians. The group is looking forward to obtain a 3D printer and software for surgeon pre-surgery training, planning and printing of personalized implants.



### What are we looking for:

- Cooperation with other institutions
- Cooperation with industry
- New project applications
- Staff mobility and training

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