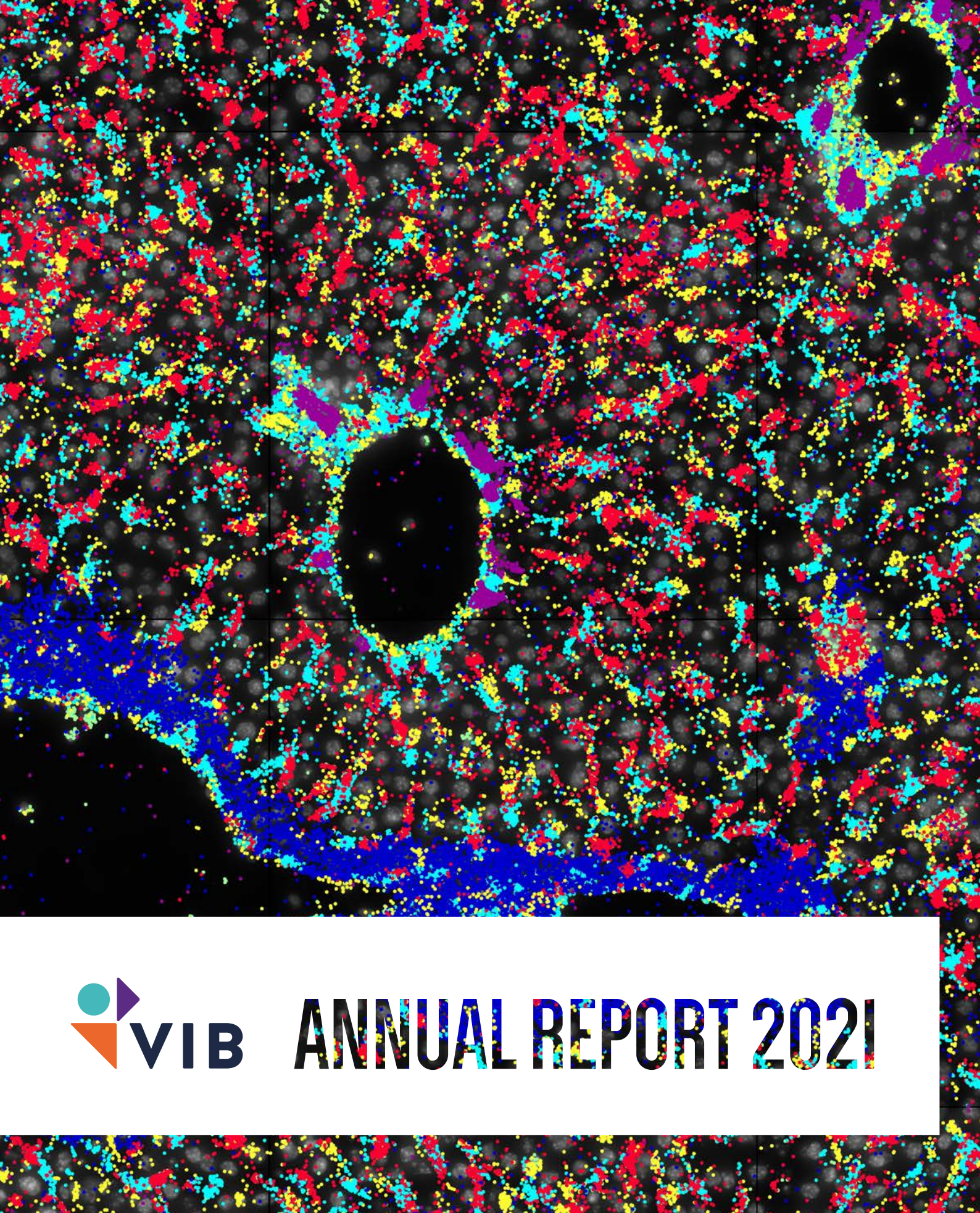


VIB

ANNUAL REPORT 2021

FACING DOWN CHALLENGES

For VIB 2021 was a special year in more than one way. The beginning of the year was marked by the five-year evaluation by the Flemish government and in October we celebrated 25 years of VIB with a festive event. VIB passed the evaluation with flying colors and as a result, we have secured the necessary funding for the next five years. VIB's 25th anniversary was highlighted with our 'origin of impact' campaign, illustrating the societal impact of the research conducted by VIB scientists.

The corona pandemic continued to have a major influence on daily life and the way we work. Depending on the level of contamination, the number of people working in the labs had to be limited, which meant that researchers often had to work in shifts. But nevertheless, 2021 was another fruitful year for top science at VIB. Further on in the annual report, you can find a selection of some important scientific publications. Some evocative examples are a single-cell atlas of tumors that may allow us to predict how breast cancer tumors will respond to immunotherapy, the discovery and refinement of a heavy chain-only antibody with strong anti-COVID activity, and a new approach to prevent Alzheimer's cognitive problems in mice by suppressing the expression of the protein Synaptogyrin-3.

The VIB Grand Challenges Program launched its first citizen science project 'Soy in 1,000 gardens' aimed at introducing soy as a sustainable crop in Flanders. More than 1,000 citizens contributed to the project by growing soy in their gardens.

In 2021, a new core facility was established: the VIB Single Cell Core. This new facility offers single-cell omics workflows to the entire VIB research community and beyond. Another important milestone on the technology front is the CAR-T initiative in collaboration with imec and UZGent to set up a spin-out company developing a device for high-throughput, multi-parameter characterization and selection of potent CAR-T cells.

Thanks to the work of VIB's Innovation & Business team two new start-ups were created: Muna Therapeutics and Protealis. Muna Therapeutics focuses on the discovery and development of therapies that slow or stop devastating neurodegenerative diseases including Alzheimer's, Frontotemporal Dementia, and Parkinson's. Protealis on the other hand develops superior seeds and seed technologies for legume crops that are adapted to our local environment.

VIB stays true to its mission to have a substantial, positive societal impact and will continue to do so for the years to come.

Ajit Shetty, Chairman of the Board of Directors
Jo Bury and Jérôme Van Biervliet, Managing Directors

SCIENCE
MEETS
LIFE

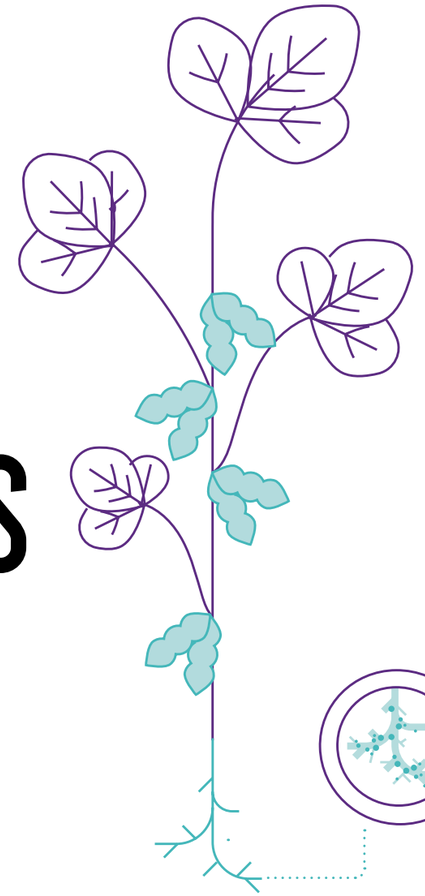
MISSION AND CORE VALUES

It’s our mission to create societal impact through breakthrough life sciences research in an inspiring and entrepreneurial work environment. This mission is inspired by two guiding principles: on the one hand, VIB researchers are dedicated to pushing the frontiers of our knowledge in specific fields of life sciences, and on the other hand, we want to translate scientific breakthroughs into real-world applications and, in doing so, create a substantial economic and societal ‘footprint’.

VIB’s core values create a framework that steers decision-making and establishes a set of standards for our conduct:

- Being ambitious, we aim for the highest standards in our scientific and translational goals and count on our collective creativity in curiosity-driven research.
- Although VIB is a multi-location institute, we aspire to be a single institute with a shared culture and outspoken identity. Teamwork and commitment are critical drivers of our success.
- We are an inclusive and vibrant community where everyone is appreciated, respected, and treated fairly. We value transparency and trust throughout the institution.
- Scientific integrity is a crucial component of VIB’s research. We make our work available to others in a way that enables its efficient use for additional innovation.

GRAND CHALLENGES



The VIB Grand Challenges Program (GCP), which was established as a new initiative in the management agreement 2017 – 2021, has now reached its cruising speed and will be continued over the coming years. The GCP enables VIB to enhance its mission to translate knowledge into impact, by producing new know-how in areas of big unmet needs and by improving outcomes at the individual and societal level. A key factor of success in the GCP is the collaboration with interdisciplinary experts and co-creation with different stakeholders is strived for. The approach of reverse translation, in which an unmet need is specified starting from an observation in humans and/or plants, allows researchers to apply the current molecular ‘toolbox’ of technologies to test potential solutions, and then work their way backward to validate new insights in the lab, and ultimately for further translation and implementation into practice. This interplay of basic and more applied research enables to envisage and implement truly unique and specific solutions with societal impact potential.

So far, eight research projects have been selected in three calls; during the first weeks of the first COVID-19 lockdown, three additional clinical studies were selected for co-funding through an ad hoc selection procedure.

All projects are monitored during the course of their execution, the first projects passed midterm evaluations.

Based on the first outcomes, we can state that these projects have already delivered important data, which can be used for both diagnostic and predictive purposes. The results and first evidence within these research projects have already led to some landmark publications.

The two projects which were selected in 2020, Soy in 1,000 gardens and IBCORI, were rolled out in 2021. The ‘Soy in 1,000 gardens’ project is based on citizen participation. Thanks to a targeted media campaign, we were able to recruit 1,200 participants to participate. See the box for a more detailed story.

Soja in 1000 tuinen

Soybean is one of the most important plant-derived protein sources for food and feed. In addition, soybean cultivation also improves soil quality and reduces the need for fertilization with nitrogen, reducing nitrogen pollution which makes it a sustainable crop. Unfortunately, the majority of soybean cultivation takes place in South America. On an annual basis, Belgium imports approximately 800,000 tons of soy and soy-derived products. Latin America is expanding its soybean production to meet growing global demands, with devastating consequences for local biodiversity and deforestation. In addition, climate change necessitates Belgian farmers to grow alternative, subtropical crops. Consequently, Flanders, and to a lesser extent also Belgium, would benefit from sustainable, local soy production. It would not only reduce our dependency on imports but would also partially reduce our ecological footprint.

However, it is currently challenging to cultivate soy in Belgium with an acceptable yield, in part because soybean requires interaction with nitrogen-fixing bacteria in their root nodules. No commercially available bacterial inoculants are endemic, and therefore these nitrogen-fixing bacteria are not adapted to the Belgian soil and environmental conditions.

This is where VIB and its Grand Challenges Program come to the rescue... The 'Soy in 1,000 gardens' project is part of a larger project that aims to introduce soy as a crop in Flanders. The aim of this consortium is:

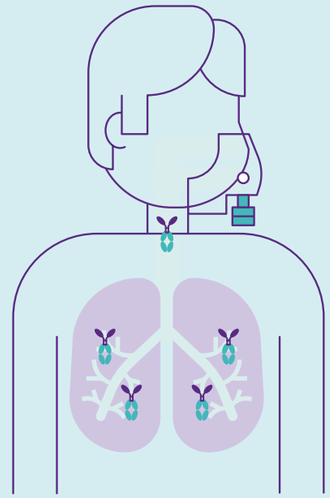
- To engage 1,000 citizens over Flanders to grow soy in their own garden.
- To isolate endogenous nitrogen-fixing Rhizobium bacteria from soy plants grown in Belgian soil.
- To integrate data regarding soil type, microorganisms, and soy variety for the development and implementation of guidelines on optimal cultivation methods for soy in our region.
- To improve public knowhow and awareness about the benefits of legumes for health, sustainable gardening, and agriculture.
- To produce tailor-made seeds inoculated with nitrogen-fixing bacteria that are adapted to local soil conditions and can improve yield to acceptable levels.

After an extensive media campaign leading to prime-time coverage on national television and a lot of local publicity, 1,200 citizens were successfully recruited in Flanders. All selected citizens received a participation package which included 60 seeds to plant in their garden. Over the course of six months, the participants could use a digital platform to report on plant parameters divided into 7 steps about plant growth and yield. Three questionnaires (2 in 2021, 1 in 2023) about sustainable garden practice and food consumption will complete the project.

This citizen science project, with 1,200 participants including farmers, proved to be a challenge for three main reasons. First of all, the data quality as reported by the citizens needs to be assured. A straightforward website was set up, allowing citizens to fill in data in a digital grid, accompanied by an animated video with instructions. Second, dropouts need to be avoided during the course of the project as much as possible. Therefore, regular communication with the citizens (whenever a new step opened and right before it closed) was essential. To keep the wider community informed, an additional press moment was organized during the summer when the cultivated plants were returned to the lab and the downstream analyses started. Finally, the logistics to collect soil samples and retrieve cultivated plants from the gardens of the citizens over Flanders proved challenging and was organized together with citizens, e.g. via drop-off points. The lessons learned on the set-up and organization of a citizen science project are being summarized in a dedicated overview article.

While the citizen science part of the soy in Flanders project has come to an end, the data analysis has just begun involving scientists from a wide range of disciplines and different institutes and universities.

72,000 seeds were planted in gardens all over Flanders, of which 4,436 plants were returned to the lab by 907 citizens. 918 plants have root nodules that potentially contain nitrogen-fixing bacteria. The best bacteria will be developed into seed coating useful for farmers to grow soy in Flanders with an acceptable yield. All data about the plant parameters, together with data regarding soil type and microbial context, allows us to develop and implement guidelines for optimal cultivation methods for soy in our region. In the long-term, this should help to produce tailor-made seeds inoculated with nitrogen-fixing bacteria that are adapted to local soil conditions and improved soy yields.



IBCORI

The main goal of the IBCORI project is to develop a radically different approach to control influenza. Influenza is a contagious respiratory illness caused by influenza viruses that infect the upper, and sometimes lower, respiratory tract. It can cause mild to severe illness, and at times can lead to death. The World Health Organization estimates that worldwide, annual influenza epidemics result in about 3-5 million cases of severe illness and about 250,000 to 500,000 deaths.

In addition to these seasonal outbreaks, global pandemics can also hit the population. The focus of influenza treatment is prevention rather than curation. The main aim of this GCP project is to create biologicals with broad-neutralizing capacity that target conserved regions of the virus. These biologicals can be administered through a nebulizer to treat and/or prevent current influenza strains, but should also be useful against future pandemic strains. Additionally, the study also looks into the cost-effectiveness of the proposed biological-based solution, focusing on prophylactic treatment in the elderly. Purification of conserved regions followed by immunization of lamas has just been completed, while panning of broadly neutralizing nanobodies is ongoing.

SCIENCE

812 PUBLICATIONS

97 PHD GRADUATIONS

279 PUBLICATIONS IN TIER 5% JOURNALS

TECHNOLOGIES

CORE FACILITIES **10**

TECH WATCH PROJECT APPLICATIONS APPROVED **32**

5 PARTNER UNIVERSITIES → 90 RESEARCH GROUPS

1 INSTITUTE

77 NATIONALITIES ← 1,800 COLLABORATORS

TOTAL INCOME

%46 FLEMISH GOVERNMENT

%54 OTHER INCOME

TECH TRANSFER

29 M € TOTAL INDUSTRIAL INCOME

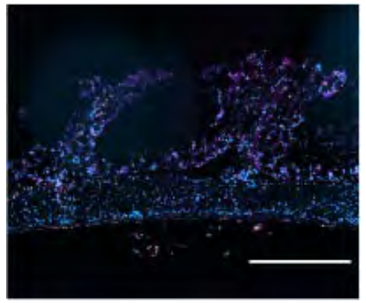
2 NEW SPIN-OFFS

SCIENCE MEETS SCIENCE

SCIENCE WITH IMPACT

VIB researchers explore the basic molecular mechanisms of life, from microorganisms to plants and human beings. Our entrepreneurial approach ensures that scientific discoveries are turned into tangible innovations that benefit society. Scientists at VIB conduct pioneering research across a wide spectrum of disciplines ranging from cancer, inflammation, and neuroscience to plant biology. Our scientists are world leaders in their fields, their work is highly regarded internationally. The following selection of publications that appeared in leading scientific journals gives a glimpse of the impactful research conducted throughout the institute.

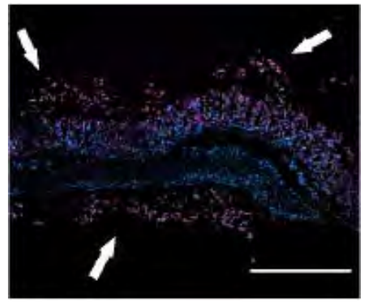
IMMUNOLOGY & INFLAMMATION



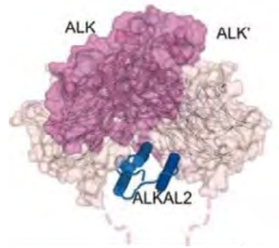
DYING CELLS IN THE GUT MAKE BACTERIA GROW

Although there has been a longstanding relationship between cell death in the gastrointestinal tract and microbial pathologies, the underlying mechanisms remained elusive. This study explored if there is a direct link between dying mammalian cells and bacterial outgrowth. The researchers found that the soluble factors released by dying cells not only act as signal molecules between mammalian cells but also provide direct fuel for bacterial growth. These results open possibilities to develop therapeutics against gut inflammation in general or to restrain bacterial growth in patients undergoing cytotoxic treatments like chemotherapy.

Anderson C. *et al.*, Microbes exploit death-induced nutrient release by gut epithelial cells, Nature



MESSAGE FROM THE OUTSIDE



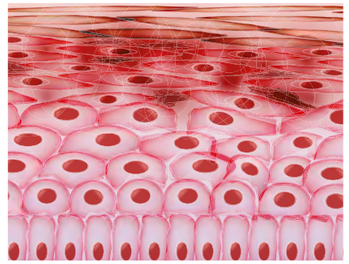
Cells communicate with their environment via receptors on their surface. When a specific protein signal is received by these receptors, they can communicate a message to the inside of the cell, such as the instruction to grow, which can lead to tumor formation. New research by the team of prof. Savvas Savvides and international partners reveals the 3D structure of the ALK receptor, which is involved in various cancers and other diseases. These insights can lead to the understanding of the function of these receptors, the first important step towards therapeutic approaches

De Munck S. *et al.*, Structural basis of cytokine-mediated activation of ALK family receptors, Nature

NATURAL SKINCARE

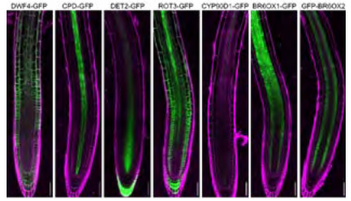
The skin represents the largest organ of the human body and protects us against external threats and dehydration. To maintain skin homeostasis, damaged cells are replaced through the action of keratinocyte stem cells in a tightly regulated process. Esther Hoste and colleagues showed in this publication that linear deubiquitination of proteins by OTULIN is essential for the maintenance of skin stem cell homeostasis and the prevention of skin inflammation caused by keratinocyte death.

Hoste E. *et al.*, OTULIN maintains skin homeostasis by controlling keratinocyte death and stem cell identity, Nature Communications



PLANT SYSTEMS BIOLOGY

NO LIMIT? PLANT HORMONE LEVELS DEFINE ROOT GROWTH



Plant roots can grow without limit. To do so, they need to balance the production of new cells via cell division and elongation. Brassinosteroids are plant hormones that play a key role in this balancing act. This work by the team of Jenny Russinova unravels how brassinosteroid production is confined in plant roots for optimal growth patterns.

Vukašinovic N. *et al.*, Local brassinosteroid biosynthesis enables optimal root growth, Nature Plants

KEEPING STEM CELLS ALIVE IN A TOXIC ENVIRONMENT

Root growth in plants is strongly affected by environmental stress. Together, aluminum toxicity and shortage of inorganic phosphate (Pi) enhance stress responses that lead to severely reduced crop yields. Both types of stress inhibit root growth by progressive exhaustion of the root stem cell niche. In this paper, researchers identified a role for the DNA damage response pathway to maintain a functional root stem cell niche. These findings reveal important physiological mechanisms for plants to cope with agriculturally limiting growth conditions, such as Pi starvation, and to increase their tolerance towards aluminum toxicity.

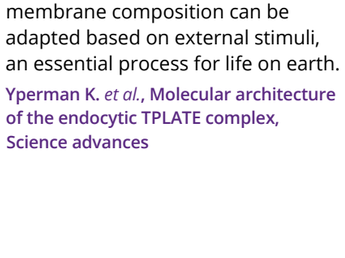
Wei P. *et al.*, Arabidopsis casein kinase 2 triggers stem cell exhaustion under Al toxicity and phosphate deficiency through activating the DNA damage response pathway, Plant Cell

HOW PLANTS COPE WITH RISING TEMPERATURES

A study by the labs of Kris Gevaert and Ive De Smet, together with colleagues from Utrecht University (the Netherlands), the North Carolina State University (US), and the John Innes Centre (UK), reveals fundamental molecular insights into the ways that plants respond to high temperatures. The researchers have identified the protein kinase MAP4K4/TOT3 as a light signaling-independent regulator of this process. The results of the study are especially relevant in the context of climate change, where the development of temperature-resilient crops will be key to ensuring food security.

Vu L. *et al.*, The membrane-localized protein kinase MAP4K4/TOT3 regulates thermomorphogenesis, Nature Communications

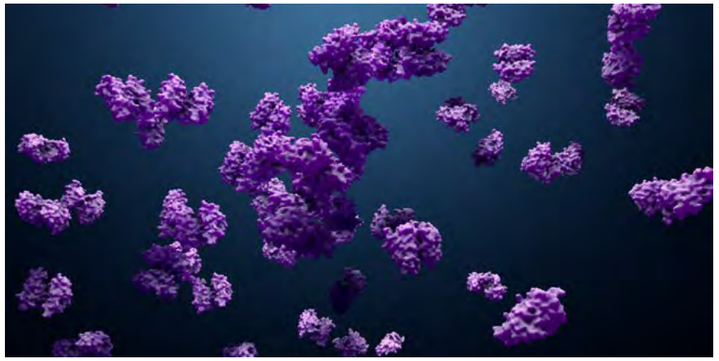
CHANGING MEMBRANE COMPOSITION TO SURVIVE



Cells rely on membranes to protect themselves from the outside world. But these membranes can't be fully closed because nutrients and other molecules have to be able to pass through. To achieve this, cell membranes have many types of channels and pores. Also, the receptors embedded in the membrane continuously monitor the outside world and signal to the cell interior. Extensive collaboration between five VIB groups resulted in a better understanding of the machinery that plants use to regulate the protein composition of their outer membrane. This discovery enhances our basic knowledge of how the plasma membrane composition can be adapted based on external stimuli, an essential process for life on earth.

Yperman K. *et al.*, Molecular architecture of the endocytic TPLATE complex, Science advances

MEDICAL BIOTECHNOLOGY



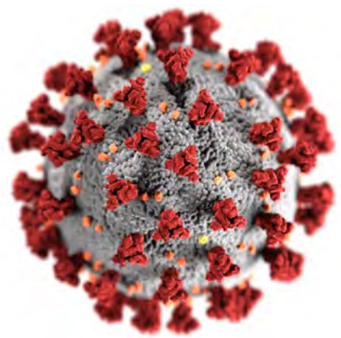
PEPTIDE PREDICTIONS

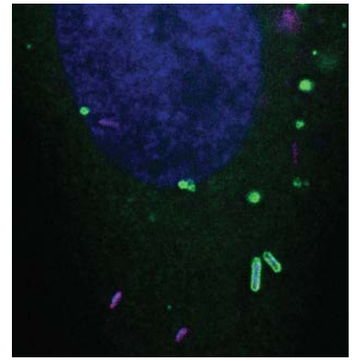
It remains challenging to identify certain small proteins – peptides – with traditional methods. In this study, a new computational method called DeepLC is presented that can account for the retention time of peptides in complex identification workflows. By predicting how long specific peptides, including modified ones, take to go through the identification steps, ambiguities can be removed. This allows a more accurate way to figure out which small proteins are present in a sample, which is becoming increasingly important with the development of so-called proteome data.

Bouwmeester R. *et al.*, DeepLC can predict retention times for peptides that carry as-yet-unseen modifications, Nature Methods

COVID ANTIBODIES

Vaccines are and will remain a cornerstone in controlling SARS-CoV-2. However, their protection is not absolute. Some people will still face severe infections. To help these people overcome their infections, broadly neutralizing antibodies will be crucial. Here, researchers refine and improve VHH72, a previously identified camelid-derived antibody. This new antibody version neutralizes SARS-CoV-1 and SARS-CoV-2 and binds to a region of the spike protein that is difficult for larger human antibodies to access. XVR011, the clinical product that was developed through the enhancement of VHH72, is now being tested in the clinic.





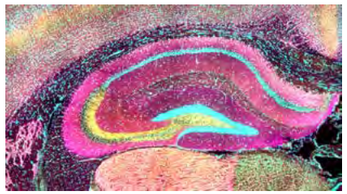
Schepens B. *et al.*, An affinity-enhanced, broadly neutralizing heavy chain-only antibody protects against SARS-CoV-2 infection in animal models, Science Translational Medicine

ANTIMICROBIAL RING FINGER

Our bodies have many mechanisms to counteract microbial infections. One of those mechanisms involves a protein called ISG15. How that protein does its anti-microbial job, however, remains a mystery. Until now, that is. This work reveals how a large protein (Ring Finger Protein 213 or RNF213) can act as a sensor to support the work of ISG15. Tests show that this RFN213 has broad antimicrobial activity, for example against herpes and listeria. This observation uncovers a key process in our immune system to fight against infections.

Thery F. *et al.*, Ring finger protein 213 assembles into a sensor for ISGylated proteins with antimicrobial activity, Nature Communications

TARGETING TAU TO KEEP NEURONS CONNECTED

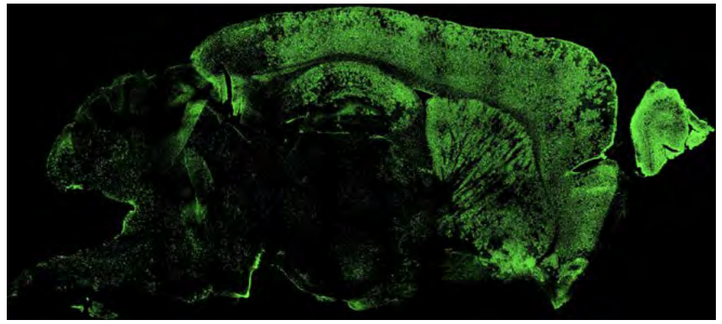


The Tau protein is implicated in numerous neurodegenerative disorders including Alzheimer's disease and other types of dementia. In all these diseases, Tau causes havoc by aggregating within neurons. An international team led by Patrik Verstreken at VIB-KU Leuven has now succeeded in reversing the effects of Tau by eliminating Synpatogyrin-3 in a mouse model. The researchers could prevent the loss of neuronal connections that Tau would normally induce and found that the working memory of the mice didn't decline. The promising findings are an important first step in the exploration of a new therapeutic avenue targeting cognitive decline.

Largo-Barrientos P. *et al.*, Lowering Synaptogyrin-3 expression rescues Tau-induced memory defects and synaptic loss in the presence of microglial activation, Neuron

TRANSPLANTING HUMAN MICROGLIA

A team of scientists led by Bart De Strooper and Renzo Mancuso (VIB-KU Leuven and VIB-UAntwerp) published a protocol to study human microglia in the context of the mouse brain. Microglia



are the immune cells of the brain, and they play a crucial role in neurodegenerative disease processes. With their protocol called MIGRATE, they provide a step-by-step workflow that includes *in vitro* microglia differentiation from human pluripotent stem cells, followed by transplantation into the mouse brain and subsequent quantitative analysis of the engraftment. The entire protocol takes approx. 40 days.

Fattorelli N. *et al.*, Stem-cell-derived human microglia transplanted into mouse brain to study human disease, Nature Protocols

MICROFLUIDIC MODEL OF 'NEUROMUSCULAR JUNCTIONS' SPEEDS UP ALS RESEARCH

Neuromuscular junctions ensure communication between our motor neurons and our muscles—connections that are lost in disorders such as ALS. A research team led by Ludo Van Den Bosch (VIB-KU Leuven) has now established a versatile and reproducible *in vitro* model of this so-called 'human motor unit' to investigate the effects of ALS-causing mutations.

Thanks to a close collaboration with the Neuromuscular Reference Center at the University Hospitals Leuven, the model immediately proved useful to study motor neurons derived from patient material, as the team found more evidence for HDAC6 inhibition as a potential therapeutic strategy for ALS.

Stoklund Dittlau *et al.*, Human motor units in microfluidic devices are impaired by FUS mutations and improved by HDAC6 inhibition, Stem Cell Reports

COMMON PATHWAYS IN FRONTOTEMPORAL LOBAR DEGENERATION

Frontotemporal lobar degeneration is the second most common early-onset neurodegenerative disorder, but it is very heterogeneous and poorly understood. A definite diagnosis can only be obtained after brain autopsy. Some forms of the disease are caused by mutations in the GRN gene, and often characteristic TDP-43 protein aggregates are found in the brain. Exploring gene expression patterns in brain tissue with TDP inclusions, obtained from people with and without GRN mutations, a research team led by Rosa Rademakers (VIB-UAntwerp) found a shared signature, regardless of GRN mutation, and identified several new potentially druggable pathways.

Pottier C. *et al.*, Shared brain transcriptomic signature in TDP-43 type A FTLD patients with or without GRN mutations, Brain

UNCOVERING THE ROLE OF RARE MUTATIONS IN ALZHEIMER'S DISEASE

Matrix metalloproteinases (MMPs) are a family of proteins that break down other proteins into smaller parts or building blocks. As such, they regulate key signaling and scaffolding molecules involved in a wide range of cellular processes. Since MMPs have also been associated with multiple neurological conditions, a team led by Rita Cacace and Christine Van Broeckhoven (VIB-UAntwerp) investigated the role of five different MMPs in the genetics of Alzheimer's disease. Analyzing DNA of over 1,000 patients, the researchers identified six ultra-rare mutations in the gene encoding MMP13. Further research needs to pinpoint how these mutations affect the disease process.

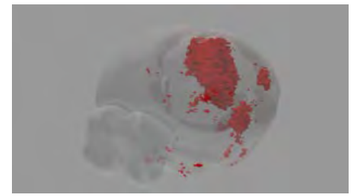
Hoogmartens J. *et al.*, Investigation of the role of matrix metalloproteinases in the genetic etiology of Alzheimer's disease, Neurobiology of Aging

NEUROPIXELS 2.0 CAN TRACK NEURONS OVER WEEKS

A new generation of miniature recording probes can track the same neurons inside tiny mouse brains over weeks — and even months. Developed by an international consortium including the Haesler lab at NERF, the new probes build on the success of the original Neuropixels probes released in 2017 and currently used in more than 400 labs. Neuropixels 2.0 are much smaller — about a third the size of their predecessors. They're designed to record the electrical activity from more individual neurons and have the unique ability to track this activity over extended time periods. That makes them especially useful for studying long-term phenomena like learning and memory in small animals such as mice.

Steinmetz N. *et al.*, Neuropixels 2.0: A miniaturized high-density probe for stable, long-term brain recordings, Science

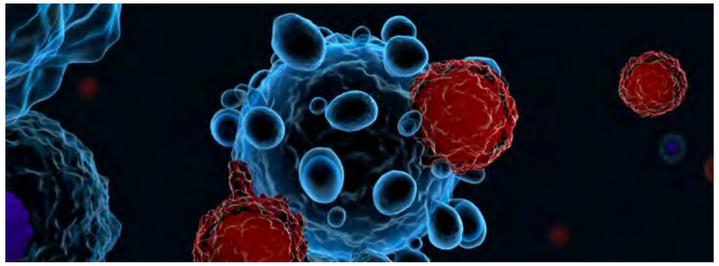
OPTO-FUSI: EMBRACING THE COMPLEXITY OF THE BRAIN



When you spot danger, you better act—fast! A team of researchers led by Karl Farrow and Alan Urban from NERF sheds new light on how the brain processes visual information to guide behavior. By combining optogenetics with functional ultrasound imaging in a so-called opto-fUSI method, they were able to reveal the networks in the brain that are active when animals try to avoid danger. The results indicate that the neural pathways involved in mediating defensive behaviors are far more widely distributed than previously reported.

Sans-Dublanc A. *et al.*, Optogenetic fUSI for brain-wide mapping of neural activity mediating collicular-dependent behaviors, Neuron

CANCER BIOLOGY



IMMUNOTHERAPY IN DETAIL

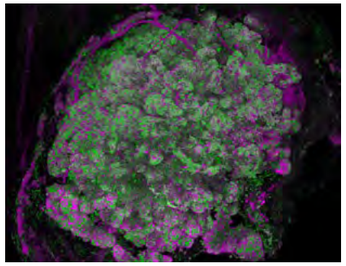
Cancer immunotherapy using immune-checkpoint blockade (ICB) has created a paradigm shift in the treatment of advanced-stage cancer. There is increasing evidence that ICB is also effective in the neoadjuvant setting. However, the mechanisms underlying response to ICB in this setting are poorly understood and it is unclear why only a fraction of patients responds to the therapy. In this study, single-cell RNA sequencing technologies were applied to tumor biopsies of 40 early breast cancer patients before and after one dose of ICB (anti-PD1) therapy. This detailed analysis of every single cell of the tumor allowed the researchers to identify the most important immune cells to drive the response to therapy and to uncover the changes within the tumor. They observed only in 30% of patients that tumor-infiltrating T-cells undergo rapid expansion when exposed to ICB and characterized the gene expression programs underlying this expansion at single-cell level.

Bassez A. *et al.*, A single-cell map of intratumoral changes during anti-PD1 treatment of patients with breast cancer, Nature Medicine

TWO WAYS TO CANCER RESISTANCE

Cancer cells can develop resistance to therapy through both genetic and non-genetic mechanisms. But it is unclear how and why one of these routes to resistance prevails. Here, the researchers establish that nongenetic mechanisms contribute to resistance to therapy in melanoma (in up to 20% of cases). They show that the presence of a specific group of cells group of melanoma cells bearing a transcriptional neural crest stem cell identity leads to non-genetic rather than genetic drug resistance in melanoma. These cells literally reprogram themselves to evade the therapeutic pressure. This observation is the key to predicting potential resistance routes in patients and developing personalized therapies.

Marin-Bejar O. *et al.*, Evolutionary predictability of genetic versus nongenetic resistance to anticancer drugs in melanoma, Cancer Cell



KEY LEUKEMIA MUTATIONS

T-cell acute lymphoblastic leukemia (T-ALL) is an aggressive form of leukemia that is most frequent in children and is characterized by several mutations. To gain insight into why some tumors are more aggressive than others, researchers used single-cell sequencing to study individual tumor cells. This allowed them to identify certain key mutations that can predispose tumor cells to grow into larger malignant tumors. Such single-cell analysis can be very useful to evaluate the response to therapy and the development of relapse.

Albertí-Servera L., Single-cell DNA amplicon sequencing reveals clonal heterogeneity and evolution in T-cell acute lymphoblastic leukemia, Blood

MICROBIOLOGY

GUT BACTERIA FROM YOUR GRANDMOTHER

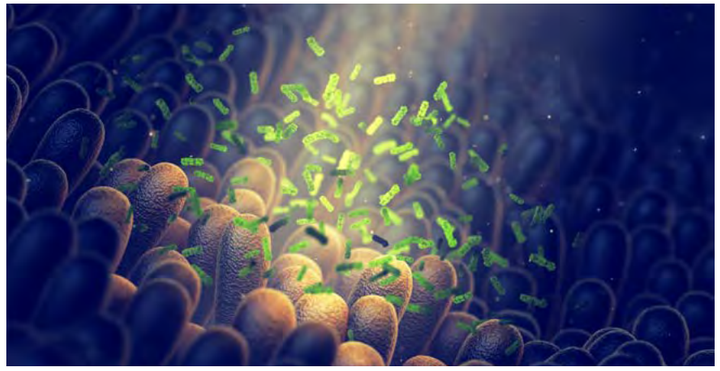
A wide range of factors determines your gut microbiota, including maternal transmission at birth and early age. In this study, the gut microbiome of healthy women was analyzed over three to five generations over the female bloodline. Strong family effects were detected, and both relatedness and cohabitation affected the similarity of the microbiome between (great)(grand)mothers and (great)(grand)daughters. Surprisingly, transmission events conserved over multiple generations were detected, showing the importance of vertical transmission in shaping the gut microbiota.

Valles-Colomer M., *et al.*, Variation and transmission of the human gut microbiota across multiple familial generations, Nature Microbiology

POOP MOISTURE INFLUENCES THE GUT MICROBIOME

The gut microbiome and its composition become increasingly important in clinical research and diagnostic applications. Therefore it remains important to expand our knowledge about the parameters that drive microbiome variation between but also within healthy subjects. Here, the authors show considerable temporal variation for most major gut genera, diversity, and evenness indicators. Significant parameters that coincide with these temporal fluctuations are stool moisture and, to a lesser extent, diet. Altogether, the results presented in this publication should be taken into account for clinical study design and diagnostics.

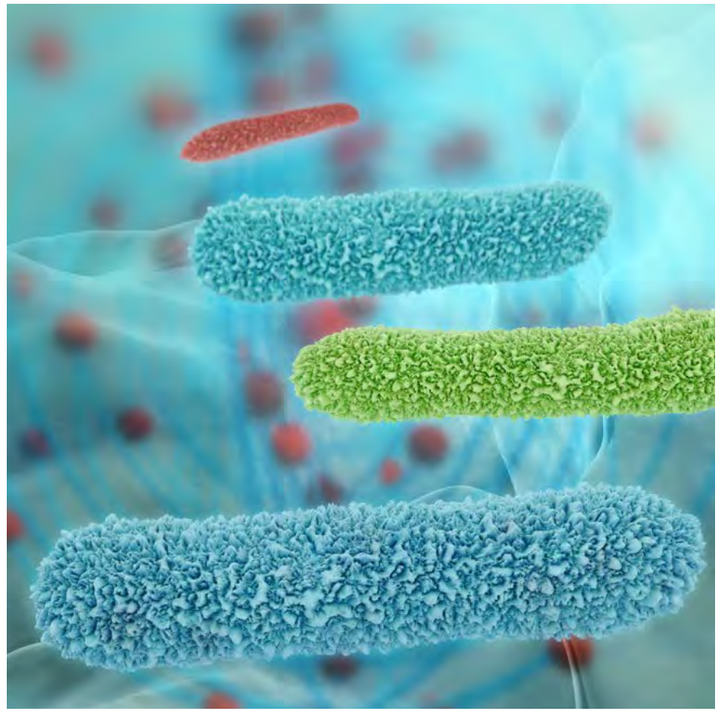
Vandeputte D. *et al.*, Temporal variability in quantitative human gut microbiome profiles and implications for clinical research, Nature Communications

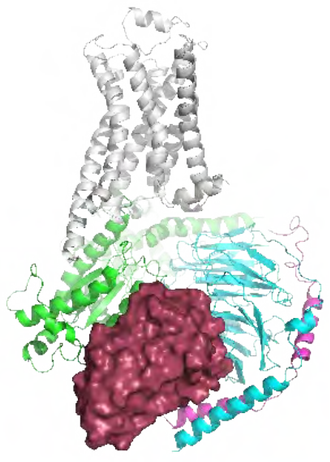


MEGABODIES STABILIZE PROTEINS

Single-particle cryogenic electron microscopy (cryo-EM) is a microscopy technique that has become the go-to for determining the structure of proteins. However, some proteins and protein complexes are difficult to stabilize. Here, researchers present a new technique to do so based on Megabodies. These megabodies are made out of a small antibody (a nanobody) that binds to the protein of interest. That nanobody is attached to a scaffold protein. The nanobody and scaffold protein – together the megabody – bind to selected proteins and stabilize them long enough to use single-particle cryo-EM.

Uchanski T. *et al.*, Megabodies expand the nanobody toolkit for protein structure determination by single-particle cryo-EM, Nature Methods





ENERGY ENZYME

In our cells, units called mitochondria are essential for energy generation. An important player in this process is an enzyme with the name respiratory complex I. Bacteria also make use of respiratory complex I for their energy generation, but the structure of this essential enzyme is not fully known. In this study, scientists describe the structures of the E. coli respiratory complex I obtained via single-particle cryo-EM. This reveals unique structural features as well as an evolutionary strategy specific to a certain group of bacteria for stabilizing their respiratory complex I.

Kolata, P. & Efremov, R.G., Structure of Escherichia coli respiratory complex I reconstituted into lipid nanodiscs reveals an uncoupled conformation, Elife

SCIENTIFIC IMPACT 2021

533 PUBLICATIONS, IN TIER 25% JOURNALS

279 PUBLICATIONS IN TIER 5% JOURNALS (BREAKTHROUGH PAPERS)

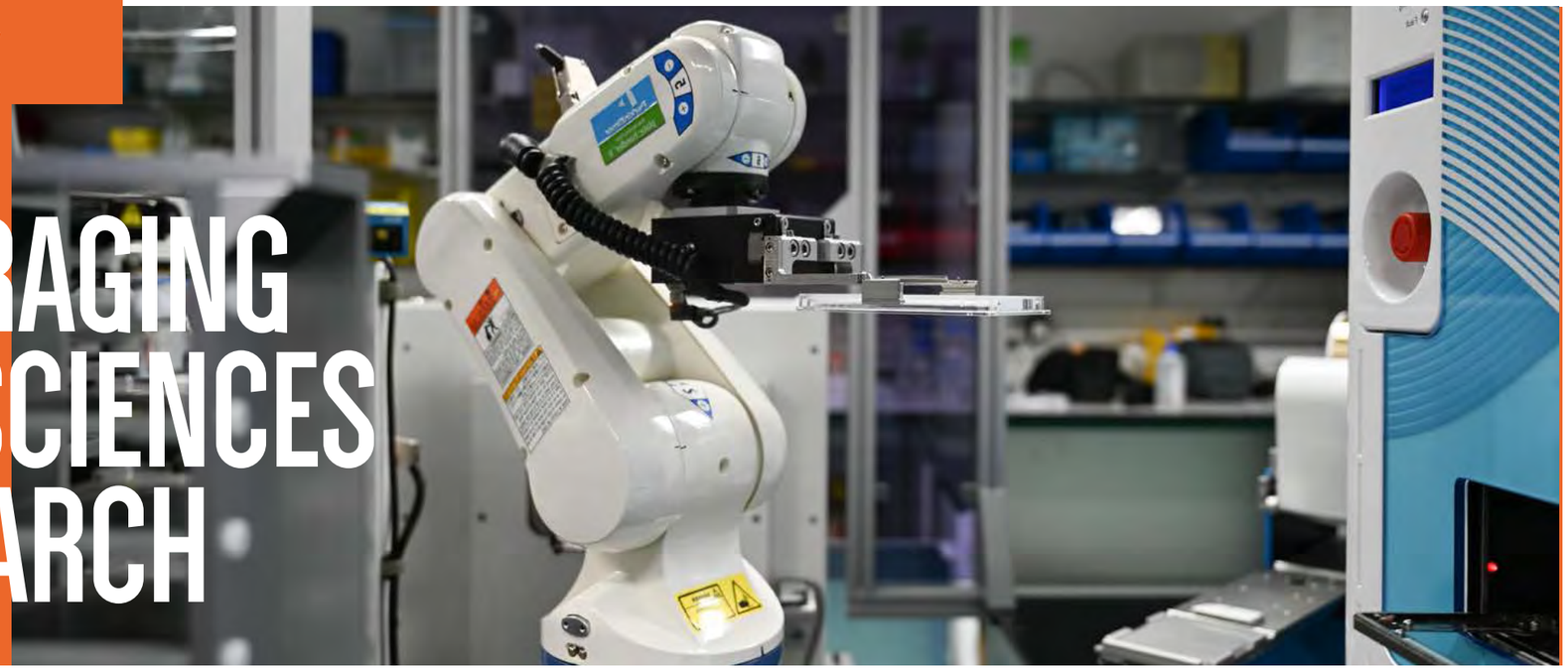
97
PhD GRADUATIONS
RUNNING MSCA IF - **13**
RUNNING MSCA ITN - **5**

RUNNING ERC GRANTS
5 STARTING GRANTS
10 CONSOLIDATOR GRANTS
8 ADVANCED GRANTS
4 PROOF OF CONCEPT

A SELECTION OF INTERNATIONAL RECOGNITIONS

- LAUREATE OF THE ACADEMY (KVAB) – NATURAL SCIENCES
- REMDIS CARO ALMELA PRIZE
- ROYAL MICROSCOPICAL SOCIETY, AWARD FOR FLOW CYTOMETRY
- INTERNATIONAL ACADEMY OF CARDIOVASCULAR SCIENCES – 2022 ACADEMY FELLOWSHIP AWARD
- EUGENIO MORELLI FOUNDATION – PNEUMOLOGY

LEVERAGING LIFE SCIENCES RESEARCH



Technological innovations are an integral part of modern life sciences research. VIB has always harnessed emerging technology trends and navigated the everchanging technology landscape by identifying opportunities and embedding these innovative solutions throughout its community. Being an early adopter of disruptive technologies has enabled our scientists to push the boundaries of their research.

FACILITATING CONNECTION TO DISRUPTIVE TECHNOLOGIES

In 2021, VIB has established new websites for the Core Facilities and Tech Watch Program. The websites showcase what VIB can offer in both programs, such as all-in-services, training, equipment usage, and research collaborations. This allows researchers to obtain an overview of the Core Facilities' service portfolio. Via the websites, the users are able to access the online platform to book equipment for the current walk-in facilities. Core Connect alleviates the administrative burden for the cores, by bundling the user interactions, thereby automating financial administration to a large extent. Core Connect is currently updated to use as a tool for all Core Facilities needs so that VIB scientists can easily access devices, register for training for specific devices, and request services and even off-the-shelf products.

SINGLE CELL CORE

The importance of single-cell research has grown rapidly over the past years with single-cell analysis becoming a central tool in many VIB research lines. While several VIB cores and expertise units already touched upon single-cell services, it became apparent that a more centralized and integrated approach – spanning the multi-disciplinary nature of single-cell experiments – would be more beneficial to the research community. The Single Cell Core (SCC) was established to provide state-of-the-art services and expertise to researchers who are interested to implement single-cell omics workflows into their daily research. Researchers will have access to a full range of pipelines and highly-specialized equipment and will receive support and coordination in every step of their project.

ASSESSING THE TECHNOLOGY LANDSCAPE

The Tech Watch (TW) initiative is an established and widely recognized technology evaluation and implementation program at VIB where breakthrough technologies are identified, enabled, and de-risked. A notable selection of last year's project includes the Levicell platform for gentle cell sorting and purification, MacSIMA for multiplexed immunohistochemistry, Evorion CellCity for multiparametric analysis of single cells, etc.

The Technology Innovation Lab (TIL), which was set up in 2018, has successfully optimized and validated promising technologies at VIB. In the past, TIL has been operating in a virtual setup in which technology experts collaborate with VIB scientists to get these technologies launched. To further enhance its efficiency, TIL has been setting up a 'physical' lab space next to some cores in one of the new research buildings of Campus Gasthuisberg, thereby integrating into the existing VIB research- and tech environment. This new hub will act as an innovation hotspot to strengthen the research infrastructure and modalities at the institute by maturing early-stage technologies to a user-ready level.

LOWERING THE THRESHOLD FOR ADOPTING NEW TECHNOLOGIES

Adopting and implementing new technologies often also require new skills. In 2021, the Technology Innovation, the Bioinformatics- and Single Cell Cores have worked out a series of hands-on training to guide scientists in using single-cell technologies such as Single-Nuclei Sequencing and Cite-Seq. Dedicated video recordings will be made available on VIB's e-learning platform to further increase the knowledge dissemination at VIB.

CAR-T INITIATIVE

The TW and New Ventures team at VIB have engaged in a collaboration with imec to set up a spin-out company for single-cell analysis. In this project, the teams are developing a new 'Electrowetting on Dielectric' (EWOD) platform for screening CAR-T cells in cancer immunotherapies. This project secured funding to support development via imec's Innovation Program, VIB's Proof-of-Concept, and Tech Watch's Technology Development funds. The platform will continue to establish Flanders as a hotspot for CAR-T biology given the recent interest of JNJ in setting up Europe's first CAR-T production site in Zwijnaarde.

SCIENCE MEETS BUSINESS

SCIENCE – FROM BENCH TO MARKETPLACE

Research discoveries form the basis of many new products and processes that benefit people at large. Scientific research is vital to boost a knowledge economy and contributes to productivity growth. VIB's Innovation & Business team helps researchers to translate their scientific findings into innovative products and solutions.
In 2021, the team negotiated several business deals, industrial collaborations, and licensing agreements, to transform scientific inventions into concrete opportunities. Additionally, two start-up companies were established.

DEVELOPING ACADEMIC RESEARCH INTO LIFE-CHANGING INNOVATIONS

Translating scientific findings into concrete products can be a long and tedious process requiring a multi-disciplinary approach across the different steps. A perfect example of this approach is the collaboration with Springworks Therapeutics, a clinical-stage biopharmaceutical company focused on developing life-changing medicines for patients with severe rare diseases and cancer, which came about thanks to the complementary expertise of the research group of Georg Halder at the VIB-KU Leuven Center for Cancer Biology, VIB Discovery Sciences and the KU Leuven Center for Drug Design and Discovery (CD3). This license and collaboration agreement aims to build a portfolio of small molecule TEAD inhibitors that have already shown impressive anti-cancer activity in animal models. In 2022, the collaboration will continue to develop the portfolio with the ultimate goal of helping a large number of cancer patients.

Almost 20 years ago, the research group of Georg Halder (VIB-KU Leuven Center for Cancer Biology) discovered that the so-called Hippo pathway plays a crucial role in cell proliferation and organ growth. Given that the Hippo pathway is genetically altered in up to 10% of cancers, TEAD inhibition holds great promise as a therapeutic approach. Ultimately, this pathway activates so-called transcriptional enhanced associate domain (TEAD) transcription factors. The Hippo pathway is a sequence of molecules and signals. These molecules bind to the DNA in the cell and thus influence the activity of several genes that regulate cell growth and division.

By establishing a collaboration in 2021 with SpringWorks Therapeutics, KU Leuven, and CD3, VIB has now taken an important step in therapeutically approaching the Hippo pathway in solid tumors. The collaboration aims to build a portfolio of small molecule TEAD inhibitors that have already shown impressive anti-cancer activity in animal models. The collaboration with Springworks Therapeutics is based on compelling *in vitro* and *in vivo* data generated to date, which convinced them that the CD3 and VIB teams have created a unique and differentiated chemical matter that lays the foundation to advance potentially best-in-class targeted oncology therapies for patients with devastating cancers.

This license and collaboration agreement is a good example of how capable and persistent collaboration between VIB research groups, VIB Discovery Sciences, and strategic partners can lead to significant social and economic added value starting from innovative fundamental research.

SECURING FUNDS FOR CONTINUED GROWTH

Biotalys is an AgTech company focused on addressing food protection challenges with proprietary protein-based biocontrol solutions and aiming to provide alternatives to conventional chemical pesticides for a more sustainable and safer food supply and was founded in 2013 as a spin-off from VIB. In July 2021, they announced a successful IPO with which they managed to raise a capital of 54.6 M€. This result demonstrates the confidence and support of investors across the globe in the company's mission to shape the future of sustainable and safe food supply. Biotalys has already has submitted its first protein-based biocontrol, Evoca™, to the Environmental Protection Agency (EPA) in the United States for approval. Pending EPA registration, this product will offer fruit and vegetable growers a new way to combat major diseases to maximize yields and extend the shelf life after the harvest of produce with substantially lower residues. Biotalys expects approval to launch the product in 2022 in the US, the launch in Europe is expected two years later.

Orionis Biosciences, established by VIB in 2015 is an early-stage drug discovery and development biotech company focusing on oncology and immunotherapies. In October 2021, they successfully closed a 55 M$ Series B 2 round with significant participation from several investment funds in Europe and the US. This additional funding should allow Orionis to further develop their rich pipeline and test the first AcTakine products in the clinic. Orionis operates from Boston (US) and Zwijnaarde (BE) and recently significantly expanded its facilities in Belgium.

START-UPS: ADDING VALUE TO THE BIOTECH ECOSYSTEM

Spinning out a company, based on the results of many years of scientific research is the cherry on the cake.

When two become one

In June 2021, Muna Therapeutics was launched with 60 M€ to advance novel small molecule therapeutics for neurodegenerative diseases. Muna is the result of the merger between two innovative European start-ups: K5 Therapeutics, a VIB-Droia spin-off, and Muna, an Aarhus University-Novo Holdings start-up.

The combined work of Bart De Strooper, VIB-KU Leuven Center for Brain and Disease Research, and the Glerup laboratories has led to an innovative all-in-human target discovery and validation platform based on proprietary insights into molecular pathways in different human brain cell types that underlie disease pathology and resilience to neurodegeneration. Muna has built a cutting-edge small molecule drug discovery engine that leverages high-resolution target structural approaches, AI-driven computational chemistry, and cell-based screening. Muna will operate from Copenhagen and Leuven.

Supporting sustainable plant protein productions

Protealis, a new spin-off from VIB and ILVO, made its debut in the plant breeding industry in April 2021. Inspired by the mission to

grow more sustainable plant-based proteins locally, Protealis aims to harvest the full potential of legume crops. With innovative breeding technologies and proprietary seed coatings, Protealis will create new opportunities for European farmers to help overcome Europe's protein deficit. The initial focus is to develop high-yielding, high-protein soybean varieties. Protealis has successfully concluded a 6 M€ seed financing round which will enable them to further develop their proprietary technology, expand their crop portfolio and bring the first soy varieties adapted to local needs to the market by 2022.

Read the full success story on the next page.

Incubating projects stemming from plant research

In October 2021, VIB inaugurated its Agro-Incubator, in the presence of Flemish Minister of Innovation and Agriculture Hilde Crevits. The VIB Agro-Incubator will be instrumental to develop innovative agricultural solutions meeting climate adaptation and mitigation. VIB has joined forces with like-minded partners such as SESVanderHave and Inari, to develop methods to improve sugar beet and maize cultivation respectively. In another collaboration with the Meise Botanic Garden, the drought tolerance of 200 wild bean varieties will be evaluated. When scientists understand the molecular mechanisms underlying plant growth during extended periods of drought, these findings can be translated to feed crops such as maize or soy and overall contribute to climate-resilient solutions.

The incubator operates at the interface between academia and industry, implementing vibrant ideas combining plant research, technological engineering, and computational developments towards a green and sustainable future.

Protealis

The global demand from the feed and food industry for vegetable protein sources such as soy increases year after year. Since Europe cannot meet its own needs, it is highly dependent on imports with all the associated risks (such as international trade conflicts and sharp price fluctuations). Therefore, Europe wants to become less dependent on imported protein sources in time and has committed to a more sustainable, resilient agriculture focusing on the local cultivation of protein crops.

However, market research shows that several factors still need to be optimized before protein crops such as soy can grow into a profitable agricultural crop in Flanders/ Western Europe:

- The yield must be increased to approximately 4.5 tons of soy per ha;
- In addition, the protein content of the beans must be at least 42% for the soy to be suitable for human consumption;
- Since soy is a subtropical crop that cannot be grown naturally in our region, breeders also have to look for high-performance, early-ripening soy varieties that can thrive in our area;
- Soy can fix nitrogen from the air and use it for its metabolism by forming a symbiotic relationship with nitrogen-fixing soil bacteria (*Bradyrhizobium japonicum*). Since these bacteria are not naturally present in our agricultural soils, soya seeds must be inoculated with Rhizobium bacteria before sowing. Currently, there are no performing inoculants available that are adapted to the temperate, Western European climate.

To respond to the trends mentioned above and meet these challenges, VIB and ILVO joined forces at the end of 2018 to develop soy varieties suitable for local cultivation in Northwestern Europe. ILVO has developed a program to breed high-performance, early-ripening soy varieties. ILVO also developed a unique 'speed breeding' protocol in collaboration with VIB. This protocol allows to speed up the breeding process drastically. In combination with Genomic Selection, this unique know-how allows a quick response to changing market demands and can accelerate the introduction of new varieties to

the market. Effective inoculation with *Bradyrhizobium japonicum* strains is essential to ensure a good yield and high protein content. Within VIB, Jan Michiels (VIB – KU Leuven; Center for Microbiology) conducted research into the survival of N-fixing Rhizobium bacteria in seed coatings. He developed a unique technology to coat live N-fixing bacteria on soybean seeds. By pre-coating the seeds, sub-optimal inoculation by the farmer can be avoided. In addition, Sofie Goormachtig (VIB – UGent Center for Plant Systems Biology) searched for N-fixing Rhizobium bacteria that remained biologically active even at lower temperatures and created a unique collection of N-fixing bacteria that can be used to inoculate soy plants. (See the 'Soy in 1,000 gardens' project earlier in this report).

Ultimately, in early 2021, the very successful collaboration between VIB and ILVO resulted in the establishment of Protealis, a local soy breeding and seed company with a focus on the Northwest European market. By offering quality seeds coated with optimized Bradyrhizobium strains, the company aims to meet the increasing demand for productive soy varieties suitable for the local market. The business concept immediately caught on with several national and international investors who, together with some business angels, invested 11.7 M€ in this new startup led by Benjamin Laga (ex-Managing Director BASF Agricultural Solutions, Ghent; VP Global Head of Trait Research at BASF) and Jonas Asper (ILVO breeder and 'father' of the soy breeding program). The Protealis team now consists of about ten people. The company is located in the Ghent bio-incubator and uses ILVO's greenhouse and test field facilities. There are also ongoing joint R&D projects with VIB.

ECONOMIC IMPACT 2021

29 START-UPS
- **2** NEW SPIN-OFFS IN 2021
- **1.6B** € CAPITAL INVESTMENT IN TOTAL
- **950** DIRECT EMPLOYEES

VIB

INTELLECTUAL PROPERTY
- **719** TOTAL NUMBER OF PATENT APPLICATIONS
- **259** TOTAL NUMBER OF ACTIVE PATENT FAMILIES

INDUSTRIAL INCOME
- **157M** € OVER THE LAST 5 YEARS

INWARD INVESTMENTS
- **19** INWARD INVESTMENTS IN 25 YEARS
- **2.6B** € CAPITAL INVESTMENT IN TOTAL
- **+1000** DIRECT EMPLOYEES

SCIENCE MEETS PEOPLE

It goes without saying that our people are our most important asset; their motivation, engagement, and commitment are at the heart of our success. VIB's HR policy clearly reflects all the efforts that are made to create a stimulating work environment where everyone is treated with respect and understanding.

WELL-BEING AT VIB

VIB attaches great value to genuine people-oriented leadership, with attention to communication, feedback, career guidance, and coaching. We want to create an inspiring employee journey in which everyone is supported every step of the way. We invest in well-being at work, to make sure that our employees develop their potential, can be creative and productive, build positive and meaningful relationships and collaborations. In 2021, a well-being survey was conducted and employee feedback captured in this survey will be used to finetune our well-being program. Several HR policies relating to employee satisfaction, diversity, bullying & harassment, etc. have been developed to guide decision-making.

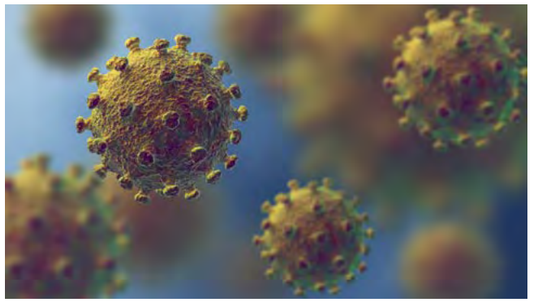
The COVID-pandemic was also still a major hurdle in 2021 and demanded flexibility from all our employees to adjust to a hybrid way of working. Several online workshops and coaching sessions were organized to provide support and practical guidance on how to cope with these challenges.

TRAINING AT VIB

Learning and development are of the utmost importance in any high-demanding work environment. VIB has since long invested in 'Training at VIB' focusing on both scientific and personal development courses. The training needs of the VIB community are developed in consultation with the various stakeholders across all functional levels and the quality is continuously monitored by means of participant satisfaction surveys. As a result, VIB's training offering is tailored to the career path and personal ambition of each individual.

In 2021, most training courses were given online due to the corona pandemic. A total of 2,411 participants registered for our scientific, skills, coaching, and bioinformatics training. The e-learning offering was also expanded and several bioinformatics courses can be viewed for free on our YouTube channel, reaching 48,000 views in 2021.

COMMUNICATING IN TIMES OF COVID-19



In addition to science and tech transfer, communication is VIB's third pillar. Not only to put VIB's scientists in the spotlight but also to inform the general public on the latest developments in our research and how these research results can contribute to a better future.

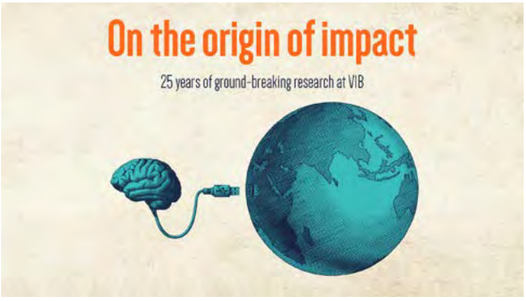
For the past two years, COVID-19 has dominated the news. Our scientists have contributed greatly with their research to the medical and scientific challenges posed by the SARS-CoV-2 virus. To highlight these efforts, a website was launched to give an overview of all COVID-19-related activities undertaken by VIB.

To help the scientific community pool their expertise and knowledge, VIB supported the interdisciplinary symposium on COVID-19 on 24 June 2021. This conference gave medical and academic researchers the opportunity to keep abreast of the latest developments.

In 2021, with the large-scale roll-out of vaccination campaigns, we were confronted with many questions

about the functioning and safety of the available vaccines. To meet this information need, the communication team developed a campaign for the Flemish citizens dubbed 'Vaccins verklaard'. The team developed various communication tools based on the VIB Facts Series edition on vaccines. A Dutch website was launched, educational posters on vaccines were distributed to all pharmacies and general practitioners in Flanders, a podcast series was developed, and finally, an Edubox was made in collaboration with several partners such vrt and imec targeting youngsters. Various platforms were used to target specific stakeholder groups (social media, podcast platforms, website, direct e-mailing, etc.). The social media campaign (reaching ~200,000 people) generated more than 4,800 visitors to the website.

25 YEARS OF RESEARCH WITH IMPACT



2021 was also the year of VIB's 25th anniversary. To substantiate the celebrations a campaign was developed focusing on the 'origin of impact', an interpretation of VIB's influence on research, innovation, the economy, and society over the entire existence of the institute, but also with a specific focus on the last five years. To create maximum impact, 25 'origin stories' were written. In addition to a campaign website that served as a central hub, the origin stories were launched step-by-step, linked to an event, conference, etc.

A first analysis shows a clear increase in the number of followers of our different communication channels (an 84% increase in the total audience reached across different channels). The Dutch-language version of the campaign was partnered with EOS Science – Belgium's leading popular science magazine.

VIB CONFERENCES SERIES

Over the years, the VIB Conference series program has developed into a strong brand with an excellent international reputation. Despite the COVID-19 pandemic, the 2021 VIB Conference series program was completed very successfully. To adapt to a changing reality, the conference team needed to make continuous adjustments, both in terms of scheduling and logistics. Live, hybrid and virtual events alternated, depending on the circumstances and the measures that needed to be applied. All conferences up to the summer of 2021 were organized as virtual events. From September onwards hybrid events were held to meet the wishes of the participants and the organizing committees. The hybrid events were attended by both live and virtual audiences. All the different aspects of a conference – the presentations as well as the posters, the sponsor booths, and tools for interaction are offered both on-site and virtually. In 2021, 3.928 scientists attended a VIB conference, either live or virtually. This is a significant increase (+95%) compared to 2019. This increase can mainly be explained by the organization of virtual and hybrid events where the threshold to register is lower.

This trend is also illustrated by the representation of the different countries at the conferences, 85 in 2021 compared to 49 in 2019. The virtual aspect clearly has a positive impact on audience reach. However, the value and impact of live events on interactions and collaborations should not be underestimated. The idea is therefore to continue to focus on live events for the VIB conferences and events program with a streaming option when possible.

2021 VIB CONFERENCES & SCIENCE EVENTS

Revolutionizing Next-Generation Sequencing (4th edition)
11-12 March — Virtual

Tumor Heterogeneity, Plasticity and Therapy
5-6 May — Virtual

Plant Science for Climate Emergency
7-9 June — Virtual

Interdisciplinary Symposium on COVID-19
24 June — Virtual

GCC2021
28 June-10 July — Virtual

Nanobodies (Hybrid 2nd edition)
8-10 September — Brussels & virtual

The 4th International TRP Meeting (Hybrid)
15-17 September — Leuven & virtual

Genome Engineering and Synthetic Biology (4th edition)
22-24 September — Virtual

New Horizons in Alzheimer's Disease (Hybrid)
27-28 October — Leuven & virtual

Translational Immunology
22-23 November — Ghent

GOOD GOVERNANCE

VIB has established a 'Good Governance Charter'. The full text of the charter is public and can be consulted on our website (vib.be). Our principles of good governance are regularly tested and adjusted.

This means that we are able to capitalize on local and international developments in this context and meet the needs of all our stakeholders.

BALANCE SHEET

(€ THOUSANDS)

ASSETS	31.12.2021	31.12.2020	31.12.2019	2021-2012 %
Intangible fixed assets	2 812	1 925	1 091	46%
Tangible fixed assets	33 900	33 970	32 466	0%
Financial fixed assets	53 929	46 686	35 882	16%
Contracts in progress	10 596	14 265	14 090	-26%
Amounts receivable within one year	21 497	19 942	20 698	8%
Investments	100 970	90 418	83 715	12%
Cash at bank and in hand	27 797	35 373	37 911	-21%
Deferred charges	3 280	2 730	4 009	20%
TOTAL ASSETS	254 781	245 309	229 862	4%

LIABILITIES

Allocated funds	120 963	115 184	108 475	5%
Investment grants	35 837	34 438	31 517	4%
Amounts payable after one year	16 010	15 120	10 232	6%
Amounts payable within one year	46 286	51 918	50 361	-11%
Accrued charges and deferred income	35 685	28 649	29 277	25%
TOTAL LIABILITIES	254 781	245 309	229 862	4%

PROFIT AND LOSS STATEMENT

(€ THOUSANDS)

OPERATING INCOME	124 611	120 464	114 405	3%
Turnover (from contract research)	47 760	34 313	32 243	28%
Contracts in progress (+/-)	-3 670	175	2 599	-2 197%
Grants and subsidies	84 436	84 248	76 769	-2%
Other income	2 085	1 728	2 794	21%
OPERATING EXPENSES	**-120 421**	**-117 550**	**-109 138**	**2%**
Raw materials and consumables	-12 467	-12 160	-12 066	3%
Services and other goods	-29 987	-30 802	-26 592	-3%
Remuneration, social security costs and pensions	-65 139	-63 730	-60 301	2%
Depreciation	-11 040	-9 961	-9 333	11%
Other operating expenditures	-1 788	-897	-846	99%
Financial income	**1 628**	**506**	**970**	**222%**
Financial charges	**-631**	**-848**	**-9**	**-26%**
Extraordinary income	**92 398**	**9 796**	**2 359**	**-76%**
Extraordinary expenditure	**-1 806**	**-5 659**	**-3 873**	**-68%**
PROFIT/LOSS FOR THE FINANCIAL YEAR	5 779	6 709	4 714	-14%

VIB

Basic research in life sciences is VIB's raison d'être. VIB is an independent research institute where some 1,800 top scientists from Belgium and abroad conduct pioneering basic research. As such, they are pushing the boundaries of what we know about molecular mechanisms and how they rule living organisms such as human beings, animals, plants and microorganisms.

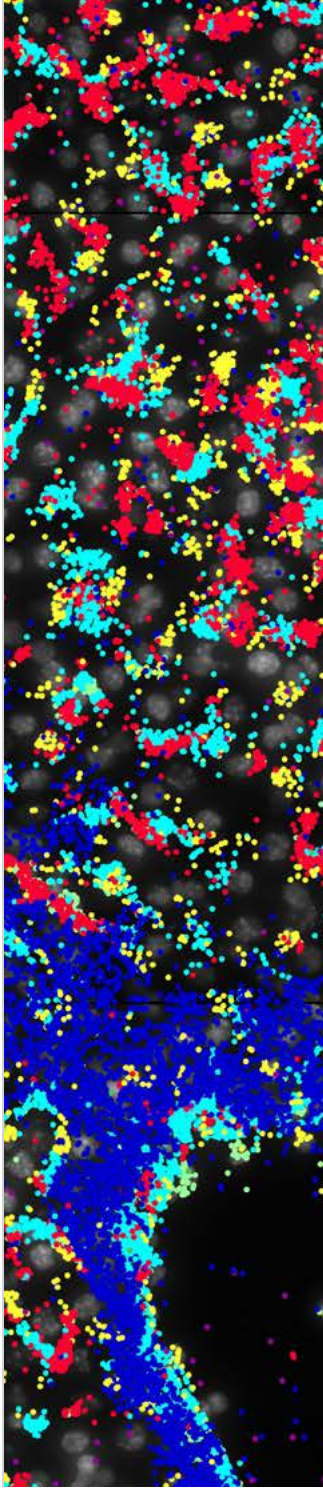
Based on a close partnership with five Flemish universities – Ghent University, KU Leuven, University of Antwerp, Vrije Universiteit Brussel and Hasselt University – and supported by a solid funding program, VIB unites the expertise of all its collaborators and research groups in a single institute.

VIB's technology transfer activities translate research results into concrete benefits for society, such as new diagnostics and therapies and agricultural innovations. These applications are often developed by young start-ups from VIB or through collaborations with other companies. This also leads to additional employment and bridges the gap between scientific research and entrepreneurship.

VIB also engages actively in the public debate on biotechnology by developing and disseminating a wide range of science-based information. More information can be found at www.vib.be

VIB
Rijvisschestraat 120
9052 Ghent
Belgium
Tel. +32 9 244 66 11
Fax +32 9 244 66 10
info@vib.be
www.vib.be

R.E. Jo Bury, Rijvisschestraat 120, 9052 Ghent, Belgium - D/2022/12.267/1



The cover image shows a healthy mouse liver imaged with the Resolve Technology.

Image: Scott Lab, VIB-UGent Center for Inflammation Research