Annual Report 2023

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At VIB, we are focused on advancing scientific research. Our scientists are dedicated to exploring the molecular mechanisms of life to gain insights into disease processes and plant systems, aiming to develop new treatments and agricultural methods.

In the past year, our research has led to several key findings across all VIB disciplines. We identified a potential key player in brain cell loss and the role of necroptosis in Alzheimer's disease. We also used AI (Artificial Intelligence) to design synthetic DNA and discovered how understanding certain compounds in plants can lead to developing more resilient crops. Furthermore, we have made remarkable progress in developing a new brain-machine interface, which holds great potential for research and clinical applications. These and many other highlights are outlined in our 2023 Annual Report.

The work of our Innovation & Business team is crucial in translating these discoveries into practical applications. Through strategic partnerships, licensing agreements, and the launch of spin-offs, we actively contribute to a better future. New start-ups such as Tanai Therapeutics and our collaborations with industry leaders underscore our role as a catalyst in the life sciences ecosystem, driving economic growth and improving lives.

Creating a supportive and inclusive research environment for our researchers is a priority. Through the VIB Technologies and Training programs, we provide them with the necessary tools and opportunities for professional growth. We nurture innovation and diversity to inspire the next generation of scientists.

Our commitment to sustainability is reflected both in our operations and research. Whether it's developing resilient crops or fostering sustainable business practices, VIB strives to make a meaningful difference to the planet and its people.

Looking ahead, our dedication to scientific excellence and collaborative efforts will continue to empower us to explore innovative solutions, face future challenges, and seize new opportunities.

We invite you to read our 2023 Annual Report for more details on our achievements and goals for a healthier and more sustainable world.

Ajit Shetty, Chairman of the Board of Directors
Christine Durinx and Jérôme Van Biervliet, Managing Directors

VIB at a glance

2023 in numbers

5
partner
universities

98
research
groups

1,920
FTEs

78
nationalities

Science

728 publications,
293 in Tier 5 journals
95 PhD graduations

Technologies

11 core facilities
Technology scouting program
1 new core facility established

Research budget

29% base grant Flemish government
71% competitive funding

Tech Transfer

27.2 M€ total industrial income
1 new spin-off

As an independent and entrepreneurial life sciences research institute, VIB is leading the way in pioneering basic research. VIB hosts over 1,900 top scientists from Belgium and abroad who are dedicated to exploring the molecular foundations of life, shedding light on the mechanisms governing humans, animals, plants, and microorganisms. VIB's mission is to positively impact society through scientific advancements and practical applications.

VIB is committed to innovation, and its research results have led to significant breakthroughs including new diagnostics, drugs, and agricultural methods. These innovations often spring from collaborations with young start-ups and established companies alike, driving employment and seamlessly bridging the gap between scientific discovery and entrepreneurship.

VIB's success relies on a solid funding strategy and close collaborations with Flanders' leading universities: Ghent University, KU Leuven, University of Antwerp, Vrije Universiteit Brussel, and Hasselt University. Together, they create a vibrant research community that nurtures scientific excellence and makes a measurable impact on human and environmental health.

Transforming life sciences

VIB is committed to creating significant impact by advancing scientific understanding and, in particular, contributing to society. VIB researchers engage in groundbreaking work across diverse fields, including cancer, inflammation, neuroscience, and plant biology, with the goal of transforming their discoveries into practical benefits for society. VIB comprises 10 specialized research centers, each dedicated to a particular area of study.

Cancer biology

The VIB-KU Leuven Center for Cancer Biology (CCB) is dedicated to advancing our understanding of cancer initiation, progression, and the mechanisms of metastatic dissemination. Its researchers are focused on studying the complex interactions between cancer cells and the tumor microenvironment (TME), which can influence metastasis, immune evasion, angiogenesis, and tumor response to therapies. This approach acknowledges the significance of the TME in contributing to intra-tumor heterogeneity.

They aim to uncover new biomarkers for early detection and monitoring of cancer, as well as the development of more effective treatments.

Science directors

Diether Lambrechts

Jean-Christophe Marine

13 research groups

231 staff members

With a growing number of therapies targeting both tumor cells and the TME, including anti-angiogenic treatments and immune checkpoint inhibitors, CCB's research is highly relevant for developing combined therapeutic strategies.

Beyond scientific excellence, CCB aims to generate societal benefits through translational research, technology transfer, and spin-off initiatives, emphasizing the link between innovative research and its application in the real world.

Science director

Bart Lambrecht

17 research groups

344 staff members

Inflammation research

The VIB Center for Inflammation Research (IRC) focuses on exploring the fundamental mechanisms of immunity and inflammation to enhance disease prevention and therapies. Inflammation is crucial for the immune system's defense against infections and injuries, yet chronic inflammation can lead to various diseases. IRC scientists study the molecular and cellular dynamics of inflammation, especially its disease-related aspects. They examine how cells within the immune system communicate and interact, and study the barrier functions of cells in critical organs like the skin, lungs, gut, and brain.

IRC's ability to translate fundamental research findings into clinical applications is enhanced by its use of advanced techniques across multiple scientific disciplines, coupled with the fact that some of its principal investigators hold clinical positions and operate translational research labs. This approach, underpinned by a commitment to technology transfer, seeks to push novel treatments from the laboratory to clinical trials and eventually to the market.

Medical biotechnology

The VIB-UGent Center for Medical Biotechnology (CMB) is a pioneer in biomolecular analytics and biopharmaceutical engineering research, with a key focus on protein technology. Its research focus is inspired by solving selected biomedical research, diagnostics, and therapeutic challenges where specific technological innovations are believed to have the largest impact.

With expertise in protein engineering, interactomics, proteomics, glycomics, and bioinformatics, CMB adopts a comprehensive, interdisciplinary approach. The center excels in decoding life's molecular complexities and developing technologies to modify living cells for tailored pharmaceuticals and vaccines. CMB is also committed to technology transfer, ensuring that breakthroughs lead to tangible products. Actively engaged in collaborative projects, often with biotech and pharmaceutical companies, CMB's efforts have led to clinical trials and formed the foundation for VIB start-ups, underscoring their crucial role in advancing medical science and industry collaboration.

Science director

Nico Callewaert

8 research groups

131 staff members

Neuroscience

No less than three research centers at VIB focus on neuroscience. No wonder, as the brain is by far the most complex organ. Together with the nervous system, it controls every aspect of the body and performs all the functions that make us human.

VIB scientists are involved in a wide scope of disciplines in the domains of neurobiology, systems neuroscience, and neurogenetics.

Science director

Rosa Rademakers

8 research groups

88 staff members

The VIB-UAntwerp Center for Molecular Neurology is committed to understanding and improving treatments for complex neurodegenerative diseases affecting the central and peripheral nervous system. Their approach, named 'Translational Integrative Neuroscience,' focuses on studying patients and their families to gain insights into the genetic, transcriptomic, proteomic, and metabolomic bases of these diseases.

Informed by molecular biology, bioinformatics, and clinical insights, their goal is to map disease progression and inform therapeutic targeting using advanced biosampling and biometric testing.

Science director

Sebastian Haesler

6 research groups

61 staff members

Neuro-Electronics Research Flanders (NERF) is a collaboration between imec, KU Leuven, and VIB. The center is dedicated to forming a thorough understanding of brain function at multiple levels of detail, ranging from its cells and circuits to its impact on behaviors.

They achieve this by combining neurobiology and nano-scale engineering to develop cutting-edge electronic, chemical, and optical tools and techniques. NERF is at the forefront of applying large-scale recording and imaging techniques, such as Neuropixels recordings and optical and functional ultrasound imaging, to closely analyze and manipulate brain circuits with unprecedented spatial and temporal resolution. They also develop and apply machine learning methods to study neural data, design neural system models, and analyze theoretical neural systems.

The VIB-KU Leuven Center for Brain & Disease Research (CBD) aims to unravel the basic biological mechanisms of neuro-biology and understand brain diseases such as Alzheimer's, Amyotrophic Lateral Sclerosis (ALS), and Parkinson's. This work is defined by five multidisciplinary research lines, on which its labs collaborate and interact: neuronal and neurodegenerative disease, brain development and repair, synapse connections and behavior, toxic protein assemblies, and the brain at single-cell resolution.

CBD's objective is to make lasting contribu-tions with societal impact and to transform their fundamental research findings into therapeutic strategies, which is achieved through close collaboration with techno-logy transfer teams. CBD is committed to building a vibrant and diverse neuroscience community, whose work is defined by collaboration and interaction at every level of the organization.

Science director

Patrik Verstreken

14 research groups

269 staff members

Microbiology

At the VIB-KU Leuven Center for Microbiology, scientists dive into the world of microorganisms. Microbes are not only key to producing fermented foods, biofuels, pharmaceuticals, and bioplastics but also serve as models for understanding cellular mechanisms in higher organisms. Research at the center encompasses the use of microorganisms in biotechnology for food and beverage production, antimicrobial treatments, and the development of industrial yeast strains for various biotechnological products, including bioethanol and beer. Additionally, the center's researchers' focuses on harnessing microbes to identify medically important genes and to study microbial pathogenicity, evolution, and antibiotic resistance.

The center's commitment to innovation has led to microbial applications in medicine, industry, and environmental management, leading to long-term industry partnerships and the launch of several spin-offs.

Science director

Kevin Verstrepen

5 research groups

106 staff members

Structural biology

The VIB-VUB Center for Structural Biology (CSB) studies the structure and dynamics of macromolecular complexes, focusing on their role and mode of action in health and disease.

A variety of technologies, including X-ray crystallography, nuclear magnetic resonance (NMR) spectroscopy, cryo-electron microscopy, and biophysical techniques, are used to push the boundaries of cellular and molecular biology. The development by CSB scientists of a technique that uses small camelid antibodies (nanobodies®) to stabilize the most challenging target proteins for structural investigation, positioned VIB as a leader in the field.

Science directors

Jan Steyaert
Han Remaut

105 staff members

10 research groups

CSB has a strong tradition of translating groundbreaking fundamental research into value for society in the form of spin-off companies and industry-licensed technologies. Prime examples include Nanobody® technology, structure-based drug development projects, nanopore technology used in DNA/RNA sequencing, and the development of novel bio-based materials.

Plant systems biology

The VIB-UGent Center for Plant Systems Biology tackles agricultural challenges through research in sustainable bioenergy, climate-resilient crops, plant diversity, innovative crop care, and the impact of plants on human health. Its research includes improving crop productivity and stress tolerance, analyzing plant genomes, studying the rhizosphere, and developing biomaterials and precision agriculture techniques, alongside exploring plant-based pharmaceuticals. Advancements in understanding plant genomes and molecular processes, coupled with novel gene editing technologies, allow researchers to unlock and utilize the full potential of plants.

The field of systems biology provides a comprehensive approach to understanding the intricate interactions within plants, paving the way for enhanced growth understanding. With the global demand for plant-derived products set to surge, plants are not only crucial for food security but also for renewable energy and industrial resources. PSB innovations have already led to several start-ups and industrial partnerships.

Science director

Yves Van de Peer

19 research groups

271 staff members

Computational biology

Inaugurated in 2023, the VIB.AI Center for AI & Computational Biology is spearheading AI-based investigations, tackling biological queries and challenges through cutting-edge computational and AI methodologies. VIB.AI researchers adeptly merge *in silico* techniques with hands-on technology and laboratory experiments, fostering a 'humid' research environment that integrates computational and experimental sciences.

The center explores a vast range of biological dimensions, from genomic intricacies to cellular functions, tissue dynamics, and broader organismal and population studies. Its computational methodology is concentrated on advancing representation learning, enhancing AI explainability, and developing hybrid models to deepen our understanding of biological systems.

VIB.AI has a unique approach with co-affiliated group leaders from the different VIB research centers. This approach allows them to cover all the VIB life sciences domains spanning from microbiology, plant science, biodiversity, ecology, neuroscience, and cancer biology to immunology. Additionally, the center aims to leverage all of its expertise to push for advances in synthetic biology.

Science director

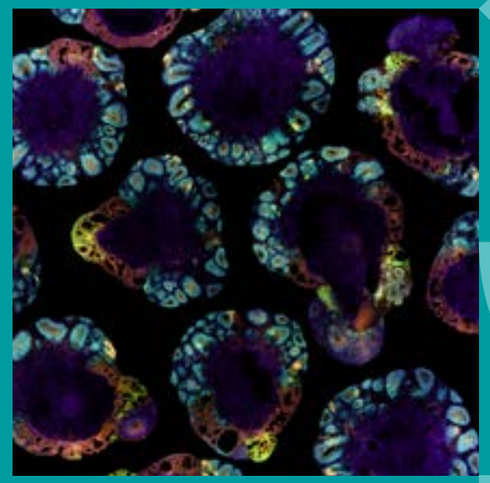
Stein Aerts

1 research group

8 staff members

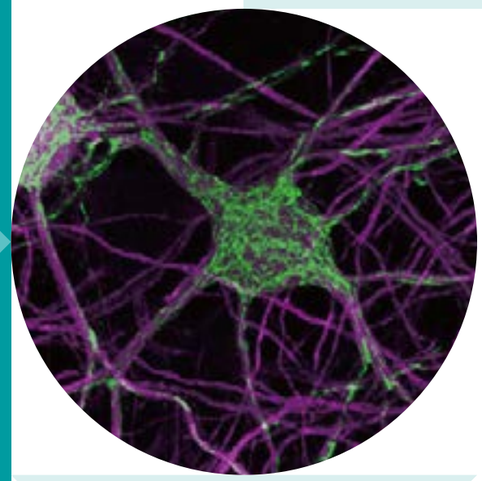
Delving into the science

Fueled by curiosity, VIB scientists are encouraged to challenge conventional thinking and venture beyond traditional boundaries. This approach has led to a series of remarkable findings in 2023, some of which are featured in this report. Please visit vib.be to discover more VIB publications.



Exploring life's building blocks

The following science stories aim to uncover the mechanisms behind biological processes, providing a deeper understanding of life's complexities and forming the foundation of new insights and treatments.



Deciphering the secret of slow human brain growth

The human brain takes several years to develop, which is much longer compared to all other species. This slow maturation is thought to be critical for brain function, by allowing prolonged critical periods of neural plasticity, but it was unknown what causes this. Now, scientists at the Stem Cell and Developmental Neurobiology Lab have discovered that mitochondria, the energy factory in the brain cells, regulate the development speed of the human brain. The study found that mitochondria control the pace of neuronal maturation and provide a cellular hourglass that neurons use to measure time. These findings shed light on human evolution and may have important implications for brain function and diseases.

Iwata R. *et al.*, Mitochondria metabolism sets the species-specific tempo of neuronal development, Science

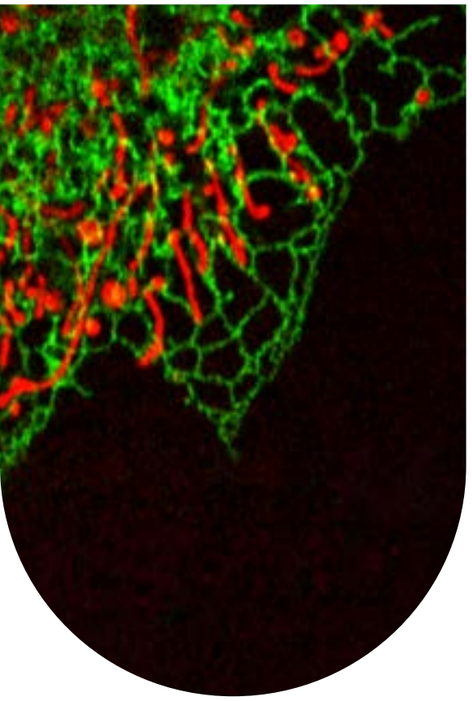
VIB Group Leader involved: Pierre Vanderhaeghen. VIB-KU Leuven Center for Brain & Disease Research and ULB

Other groups involved: labs from the KU Leuven, VIB-KU Leuven Center for Cancer Biology, and UZ Leuven

PERK-ing up mitochondrial health

In eukaryotic cells, organelles communicate with each other to integrate cellular signals in response to environmental and developmental changes. To do so, membranes of various organelles form close contacts, where specialized proteins organize themselves to funnel the transfer of ions and metabolites, which maintains cell homeostasis and the responses to stress signals.

Dysfunctions in organelle communication can lead to various pathologies, yet the molecular nature of the proteins involved, and their function remain elusive. Recent research at the Laboratory of Cell Death Research and Therapy reveals the molecular machinery that orchestrates the transfer phospholipids (PLs) between the endoplasmic reticulum (ER) and the mitochondria. The researchers found that the ER-associated protein kinase PERK, known to respond to stress signals involving the ER, unexpectedly engages in resting conditions in a complex with a lipid-binding protein capable of trafficking PLs where the ER and mitochondria come in close proximity. In doing so, this PERK complex ensures the efficient transfer of PLs between the ER and mitochondria, which is essential for maintaining mitochondrial lipid homeostasis, energetics and function. This discovery unveils potential therapeutic targets for addressing mitochondrial-related disorders.

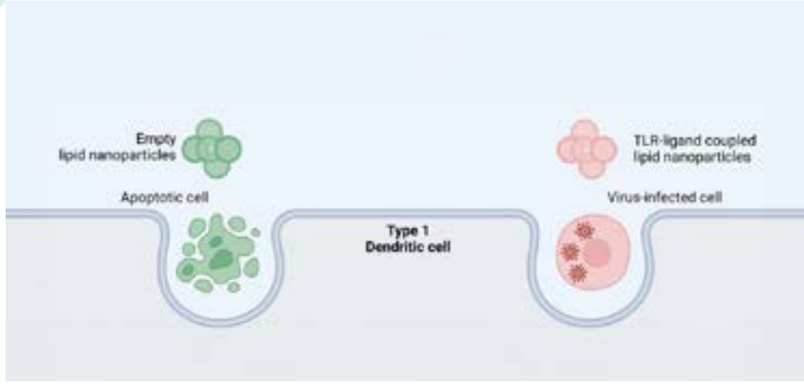


Sassano M. *et al.*, PERK recruits E-Syt1 at ER–mitochondria contacts for mitochondrial lipid transport and respiration, Journal of Cell Biology

Highlighted in The Year in Cell Biology: 2023, the annual collection highlighting some of the most outstanding articles published in the past year in the Journal of Cell Biology.

VIB Group Leader involved: Patrizia Agostinis, VIB-KU Leuven Center for Cancer Biology

Other research groups involved: labs from the Yale School of Medicine (US), KU Leuven, University of Ferrara (IT), and Marche Polytechnic University Ancona (IT)



Triggering dendritic cells

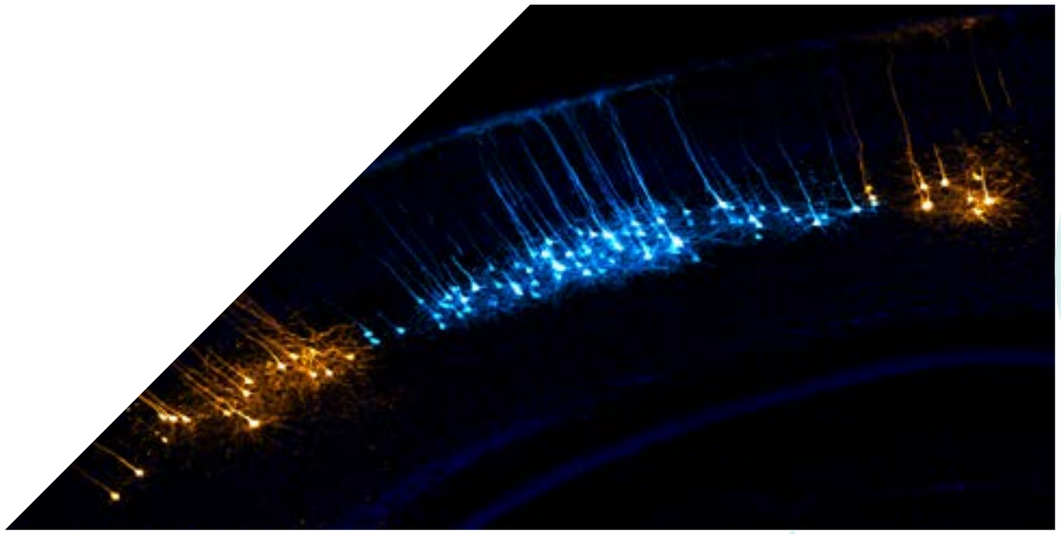
For our immune system to initiate a response to an infection, cells called dendritic cells have to present antigens to T cells, guiding them to the infection to clear it. In normal circumstances, however, it's crucial that dendritic cells do not activate the immune system or else autoimmune conditions arise.

Recent findings from researchers of the Endoplasmic Reticulum Stress and Inflammation Lab reveal how dendritic cells mature without initiating an immune response. They discovered that the engulfment of apoptotic cells – cells that die as a normal part of bodily maintenance– is both necessary and sufficient to trigger tolerogenic dendritic cell maturation. This research will lead to new insights into the role of dendritic cells in immune function, and to the development of new therapies for autoimmune diseases.

Bosteels V. *et al.*, LXR signaling controls homeostatic dendritic cell maturation, Science Immunology

VIB Group Leaders involved: Yvan Saeys, Kodi Ravichandran, Bart Lambrecht, and Sophie Janssens - VIB-UGent Center for Inflammation Research

Other groups involved: labs from UGent, UZ Gent, VIB Single Cell Core, Sorbonne Université (FR), Heidelberg University (DE), the University of Virginia (US), and Erasmus MC (NL)



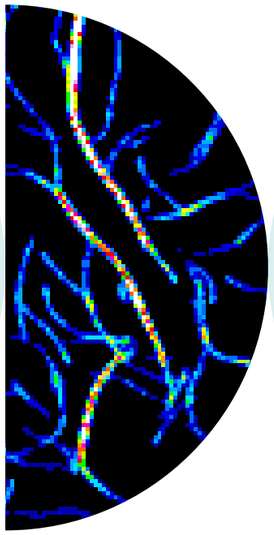
Fight or flight? It depends...

A region in the brain called the superior colliculus plays a crucial role in processing visual information and triggering instinctive behaviors, such as the fight-or-flight response. This region combines information from the senses with environmental cues to create a flexible, appropriate reaction to danger. The Lab of Neural Circuits of Vision discovered that there are two distinct groups of neurons in the superior colliculus, each responding to specific inputs. Both pathways receive similar visual input, but which one is selected is determined by the animal's activity, internal state, or surroundings. These findings provide insight into the complex circuitry behind our instinctive responses to danger.

Li C. *et al.*, Pathway-specific inputs to the superior colliculus support flexible responses to visual threat, Science Advances

VIB Group Leader involved: Karl Farrow. NERF, empowered by KU Leuven, imec, and VIB

Other groups involved: labs from the KU Leuven, the University of Antwerp, and Northeastern University Boston (US)



Unlocking the cause of neurological disease

Charcot-Marie-Tooth (CMT) disease is an inherited and incurable neurological disorder that affects the limb nerves. Previously, scientists showed that one class of proteins, tRNA synthetases, is associated with CMT, and defects in these proteins could cause nerve damage. Now, their latest research reveals how the proteins, which help build cells, are also capable of forming tight bundles of actin fibers within the cells. Improper functioning ofthese proteins can lead to nerve damage and the onset of CMT symptoms. This newly found biological function could explain the cause of CMT and other similar neurodegenerative disorders and may help in the development of new treatments.

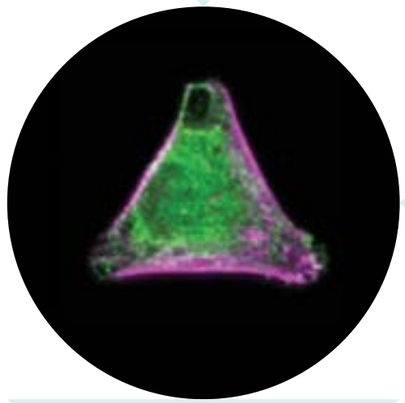
Ermanoska B. *et al.*, Tyrosyl-tRNA synthetase has a noncanonical function in actin bundling, Nature Communications

VIB Group Leader involved: Albena Jordanova. VIB-UAntwerp Center for Molecular Neurology.

Other groups involved: labs from the University of Antwerp, Brandeis University (US), the University of Cologne (DE), The Scripps Research Institute (US), Florida Atlantic University (US), Medical University-Sofia (BG), New Bulgarian University, KU Leuven, the Leuven Brain Institute, Mission Lucidity, and the VIB-KU Leuven Center for Brain & Disease Research

Unveiling the role of age and genetics in FTLD

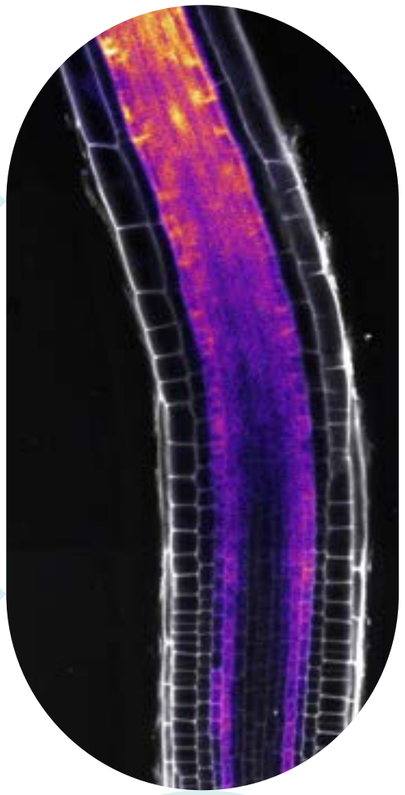
Frontotemporal lobar degeneration (FTLD) is a group of brain disorders characterized by gradual deterioration of the frontal and temporal lobes of the brain. Previous studies have shown that a protein called TMEM106B is associated with the development of FTLD and other related neurological disorders. A part of this protein can form clumps, called amyloid fibrils, in the brains of people with FTLD. Researchers now found that these clumps are more commonly present in older people and those with certain genetic differences in the gene that codes for TMEM106B. While more research is needed, these findings confirm the involvement of TMEM106B in FTLD. This discovery paves the way for further research into how this protein affects brain health and for the development of potential treatments.



Vicente C. *et al.*, C-terminal TMEM106B fragments in human brain correlate with disease-associated TMEM106B haplotypes, Brain.

VIB Group Leader involved: Rosa Rademakers. VIB-UAntwerp Center for Molecular Neurology.

Other groups involved: labs from the University of Antwerp, the Mayo Clinic (US), Vancouver Coastal Health (CA), and the University of British Columbia (CA)



Understanding plant growth in Arabidopsis

Hormones known as brassinosteroids affect many aspects of plant physiology. During the processes of growth and development, cells have two characteristic phases. One phase is proliferation, where the cell will divide and multiply. The other phase is elongation, where the cells will grow to full-size plant cells. Scientists from the Brassinosteroids Lab studied the role of these hormones in the developmental shift from cell proliferation to elongation in Arabidopsis roots. They analyzed the brassinosteroid-responsive gene expression at multiple points in time during development. By knowing the exact time and space in which brassinosteroids fulfill their function, scientists hope to precisely engineer plant growth and development.

Nolan T. *et al.*, Brassinosteroid gene regulatory networks at cellular resolution in the Arabidopsis root, Science

VIB Group Leader involved: Jenny Russinova. VIB-UGent Center for Plant Systems Biology

Other research groups involved: Duke University (US), UGent, University of British Colombia (CA), Iowa State University (US)

Finding the crack in the wall

Gram-negative bacteria are hard to treat due to their double membrane, with the outer membrane serving as an essential protective barrier. When cells experience stress that weakens this membrane, SlyB, a protein with a function previously unexplored, plays a critical role. A team of researchers at the Structural & Molecular Microbiology Lab described how SlyB activity protects the proteins and reinforces the weaker sections of the outer membrane. This mechanism ensures the health and survival of the bacteria. Without SlyB the membrane is prone to punctures, leading to cell leakage and lysis. Integrating this understanding, the researchers now aim to turn the bacteria's protection strategy into its Achilles heel. They are exploring innovative methods to combat Gram-negative bacteria.

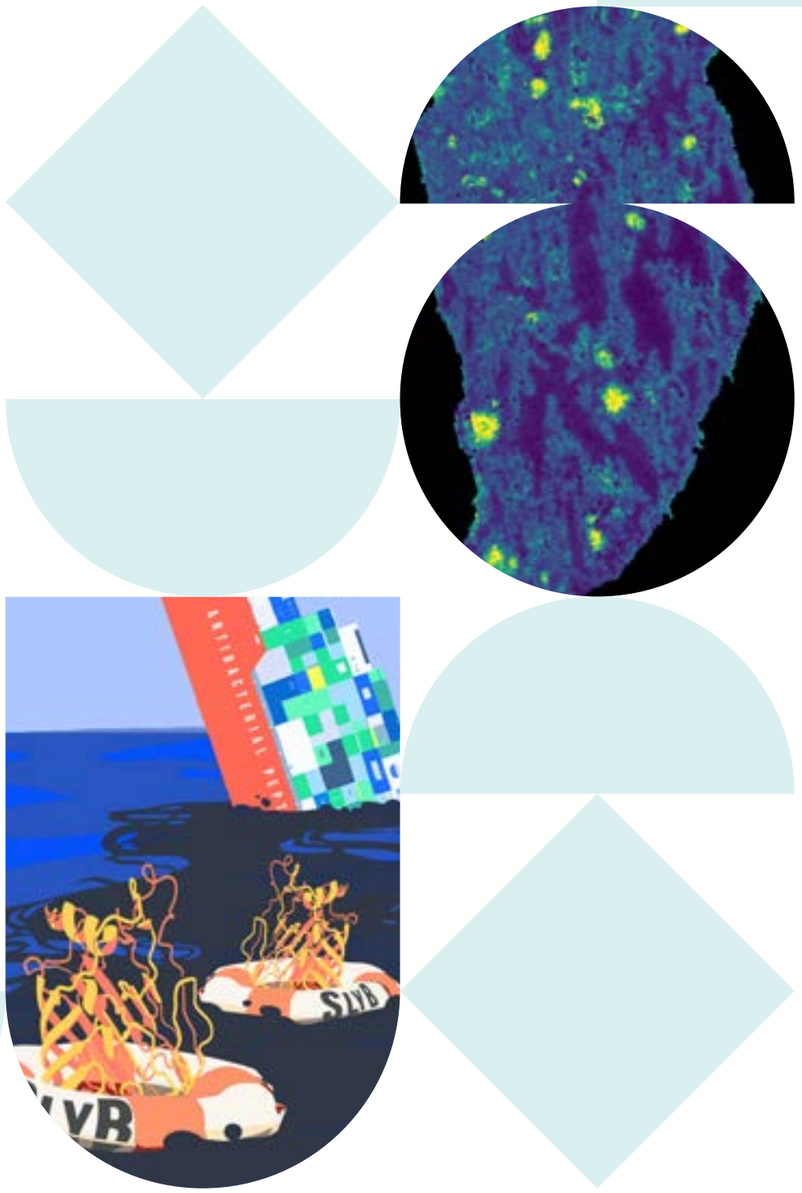
Janssens A. *et al.*, SlyB encapsulates outer membrane proteins in stress-induced lipid nanodomains, Nature

VIB Group Leader involved: Han Remaut. VIB-VUB Center for Structural Biology

Other research groups involved: labs from VUB, UGent, UCL Louvain-La-Neuve, and Colorado School of Mines (US), and VIB Proteomics Core

Advancing diagnostic and therapeutic innovation

These scientific advances can transform medical landscapes by improving diagnostics and therapies, offering person-alized treatments, and better patient outcomes.



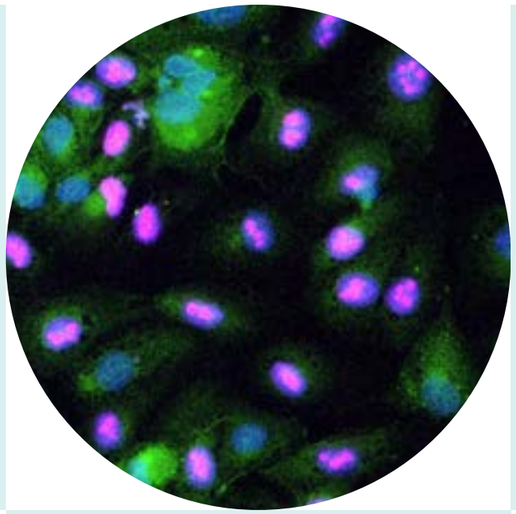
Unraveling the role of diet in cancer metastasis

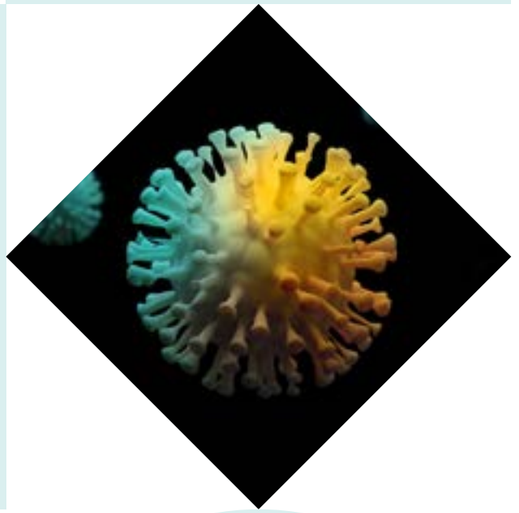
While early diagnosis offers hope in the fight against breast cancer, treating metastasis remains a big challenge. Emerging evidence shows that obesity, fueled by high-fat diets, plays a critical role in the spread of cancer to the liver or lungs. Researchers at the Laboratory of Cellular Metabolism and Metabolic Regulation discovered that a fatty acid called palmitate may be responsible for this. By initiating a series of signals in cancer cells, it equips them to grow into metastases. Fortunately, the team revealed that halting palmitate breakdown in cancer cells can stop cancer from spreading, presenting an exciting starting point for future therapies.

Altea-Manzano P. *et al.*, A palmitate-rich metastatic niche enables metastasis growth via p65 acetylation resulting in pro-metastatic NF-KB signaling, Nature Cancer

VIB Group Leader involved: Sarah-Maria Fendt, VIB-KU Leuven Center for Cancer Biology

Other research groups involved: labs from the KU Leuven, Leuven Cancer Institute, Francis Crick Institute (UK), Tel Aviv University (ISR), German Cancer Consortium, Université Paris Cité (FR), Cancer Research UK Beatson Institute, Karolinska Institute (SE) and University of Glasgow (UK)





Preventing metastasis by securing the blood vessels' border

When cancer cells enter the bloodstream, they spread to different parts of the body resulting in metastasis. Despite numerous successful advances in cancer treatment, metastasis remains a major hurdle in cancer therapy. Scientists have long agreed that the endothelium, the inner lining of blood vessels, is a crucial factor in this process. In a study conducted at the Laboratory of Tumor Inflammation and Angiogenesis, a protein called TRAIL emerged as an interesting focal point for a potential treatment. Researchers discovered that increasing the presence of TRAIL in the endothelium could reinforce the vascular barrier, effectively halting metastasis. Moreover, it provides evidence that reinforcing the expression of TRAIL, specifically in endothelial cells, could have therapeutic benefits against metastasis.

Riera-Domingo C. *et al.*, Breast tumors interfere with endothelial TRAIL at the premetastatic niche to promote cancer cell seeding, Science Advances

VIB Group Leader involved: Massimiliano Mazzone, VIB-KU Leuven Center for Cancer Biology

Other research groups involved: labs from the KU Leuven, Leuven Cancer Institute, University of Torino (IT) and University of Pennsylvania (US)

Decoding how the body's defenses worsen COVID-19 lung damage

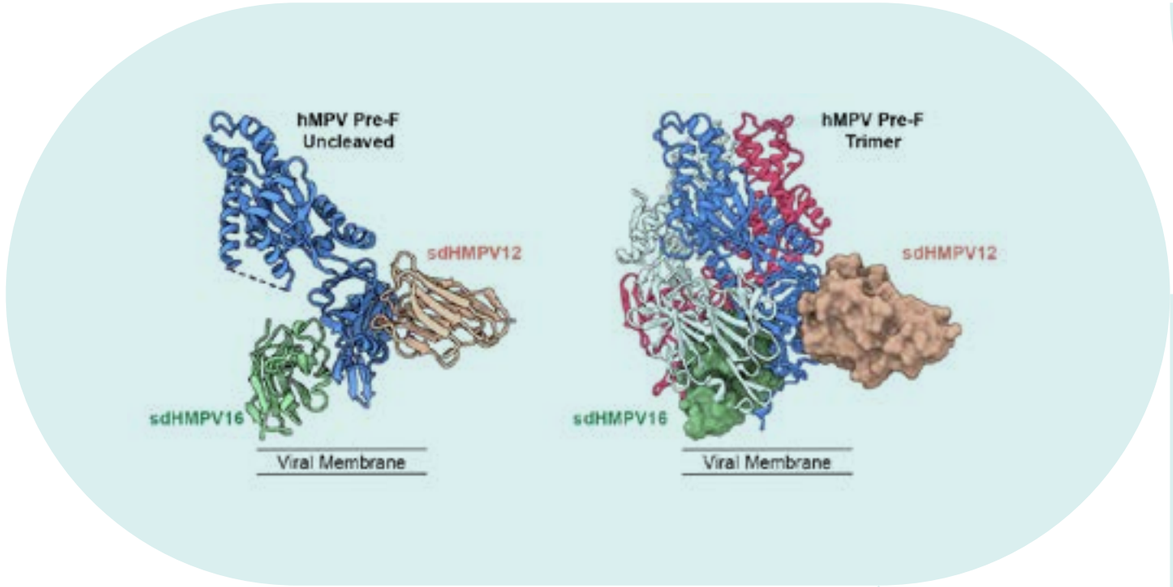
Researchers of the Immunoregulation and Mucosal Immunology Lab figured out how SARS-CoV-2, the virus that causes COVID-19, induces severe lung damage. A major culprit is the complement system, a part of our innate defense mechanism that helps our body efficiently eliminate pathogens and dead cells. The scientists noticed that infection leads to a high production of complement system proteins in the lungs, in response to elevated levels of the pro-inflammatory cytokine interleukin 6 (IL-6). The sustained and uncontrolled activity of these proteins in the lungs damages the alveoli during COVID-19 infection, hindering oxygen uptake.

This discovery opens the door for studies with existing drugs that interfere with complement activation or block its upstream driver IL-6.

Van Damme K. *et al.*, A complement atlas identifies interleukin-6-dependent alternative pathway dysregulation as a key druggable feature of COVID-19, Science Translational Medicine

VIB Group Leaders involved: Bart Lambrecht and Martin Guilliams - VIB-UGent Center for Inflammation Research

Other groups involved: labs from UGent and Erasmus MC (NL)



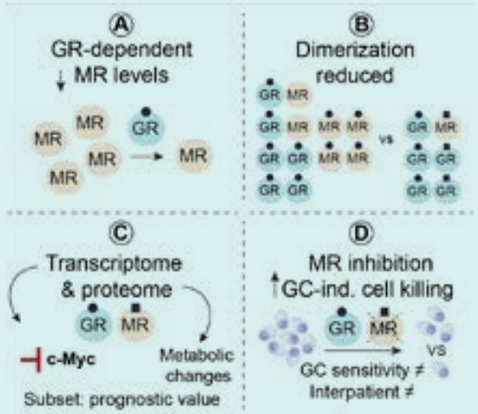
Searching for medicine to prevent new respiratory viruses

The Human metapneumovirus (hMPV) is a recently discovered respiratory virus for which no preventive medicine currently exists. Next to the more well-known RSV virus, hMPV is one of the leading causes of respiratory infections in children. A team at the Laboratory of Respiratory Virus Prevention and Treatment successfully isolated single-domain antibodies with enough potency to neutralize the two strains of hMPV. The antibodies have the potential to be further developed into a preventive treatment that restricts the replication of hMPV.

Ballegeer M. *et al.*, A neutralizing single-domain antibody that targets the trimer interface of the human metapneumovirus fusion protein, mBio

VIB Group Leader involved: Xavier Saelens, VIB-UGent Center for Medical Biotechnology

Other research groups involved: labs from the Instituto de Salud Carlos III (ES) and University of Texas (US)



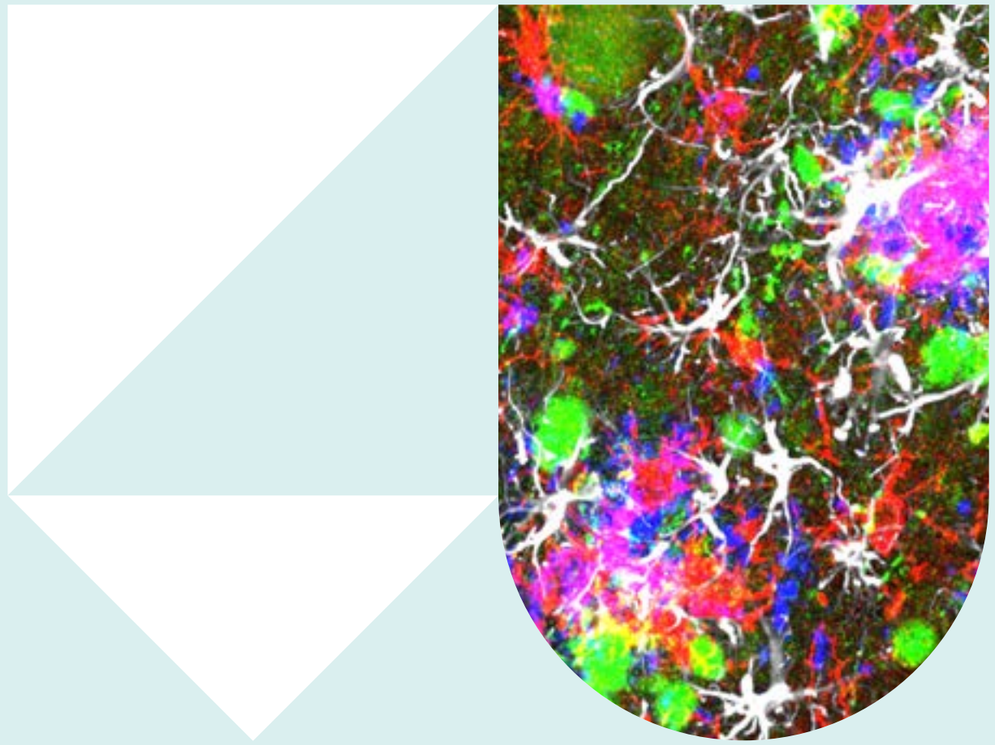
Studying the interplay between drug targets to reduce required dosages

The glucocorticoid receptor protein (GR) is an important drug target in the treatment of multiple myeloma, a type of blood cancer. Interaction with glucocorticoids can trigger myeloma cell death, effectively killing off the cancer. Unfortunately, drugs like dexamethasone that activate GR also have harmful side effects. Researchers at the Translational Nuclear Receptor Research Lab investigated strategies to lower the required dosage of dexamethasone. The team revealed that therapeutic approaches that target both the GR and the related mineralocorticoid receptor (MR) could be a promising strategy to reduce the required dexamethasone dosage for patients with multiple myeloma.

Clarisse D. *et al.*, Crosstalk between glucocorticoid and mineralocorticoid receptors boosts glucocorticoid-induced killing of multiple myeloma cells, Cellular & Molecular Life Sciences

VIB Group Leader involved: Karolien De Bosscher, VIB-UGent Center for Medical Biotechnology

Other research groups involved: labs from University Medical Center Utrecht (NL), UGent, The Netherlands Cancer Institute, Odisee University of Applied Sciences and Cancer Research Institute Ghent



IMPACT STORY

New study discovers how neurons die in Alzheimer's disease

Alzheimer's disease (AD) is a common form of dementia that poses a major emotional and psychological burden for patients and their families. Even though the past few years have seen some developments in treatments that slow down disease progression, there currently is no cure for AD, as the underlying cause of the disease is still not fully understood.

One of the key challenges in understanding AD has been connecting its defining hallmarks - amyloid plaques, tau tangles, and death of neurons - to each other. Most mouse models used in research couldn't naturally replicate these features, leaving scientists with unanswered questions about how they relate to disease progression. To bridge this gap, the Lab for the Research of Degenerative Diseases created a new model by implanting both healthy human and mouse neurons into the brains of AD mouse models.

Remarkably, only the human neurons, and not their rodent counterparts, displayed AD features seen in the brains of patients, including tau tangles and significant neuronal cell loss. This suggests that there may be human-specific factors at play in AD that standard mouse models can't replicate.

Using their new model, the team probed deeper, seeking answers on how neurons die in AD. The study revealed a critical breakthrough: a pathway known as necroptosis, a form of programmed cell death, was activated in the model, leading to the death of neurons. The researchers saw that levels of a molecule known as MEG3 were strongly increased in human neurons, as seen in AD patients. Strikingly, just the presence of MEG3 alone was enough to trigger the pathway of necroptosis in human neurons in a lab setting. The study also found that by reducing MEG3 and preventing necroptosis, researchers could, in turn, prevent the death of cells.

Balusu S. *et al.*, MEG3 activates necroptosis in human neuron xenografts modeling Alzheimer's disease, Science

VIB Group Leader involved: Bart De Strooper. VIB-KU Leuven Center for Brain & Disease Research

Other groups involved include labs from the Achucarro Basque Center for Neuroscience (ES), Sahlgrenska University Hospital (SE), and the Netherlands Institute for Neuroscience

Our study sheds light on the previously murky waters of Alzheimer's disease, revealing a potential key player in neuronal loss –MEG3, and the process of necroptosis. Necroptosis is already an active area of drug development in cancer and ALS and while there's much more to explore, our findings open up promising avenues for potential therapies targeting AD, alongside traditional approaches aimed at amyloid and tau.

Bart De Strooper
VIB Group Leader VIB-KU Leuven Center for Brain & Disease Research

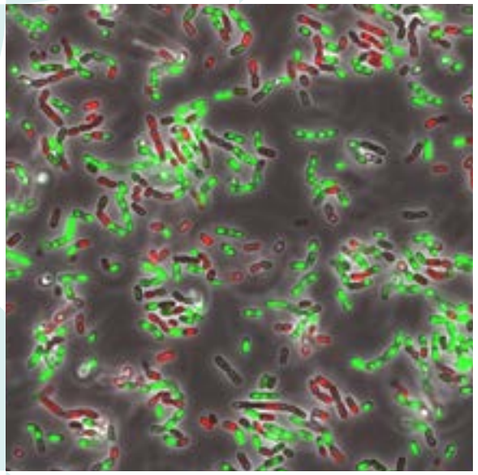
Transforming flatfish bacteria into new anticancer agents

Examination of the genome of *Pseudomonas baetica*, a strain found in diseased flatfish, by a team from the Biomolecular Discovery & Engineering Lab revealed genes responsible for constructing oximidines, a group of potent anticancer agents. These oximidines are produced by a molecular assembly line in a way never seen before in bacteria. By manipulating this unique assembly line, they created a structurally simpler oximidine that is more stable but maintains its strong anticancer activity. These findings open up new avenues for oximidine analogs that could fight cancer.

Vriens E. *et al.*, Polyketide Synthase-Mediated O-Methyloxime Formation in the Biosynthesis of the Oximidine Anticancer Agents, Angewandte Chemie, International Edition

VIB Group Leader involved: Joleen Masschelein. VIB-KU Leuven Center for Microbiology

Other research groups involved: labs from the KU Leuven, Rega Instituut and University of Bristol (UK)



Speeding up the development of antibiotics

Antibiotic resistance is one of the biggest threats to public health, making developing new antibiotics essential. Researchers from the Symbiotic and Pathogenic Interaction Lab used a novel technique called deep mutational scanning to uncover protein properties in *E. coli*. This powerful method simultaneously assesses the function and stability of thousands of protein variants. The technique can analyze the functional consequences of every possible amino acid change at each position in a protein. The findings from this research indicate that it is possible to predict the probability of resistance development against lead compounds, which aids the much-needed development of novel antibiotics.

Dewachter L *et al.*, Deep mutational scanning of essential bacterial proteins can guide antibiotic development, Nature Communications

VIB Group Leader involved: Jan Michiels. VIB-KU Leuven Center for Microbiology

Other research groups involved: VIB-VUB Center for Structural Biology and Inscripta (US)

Pushing the boundaries of technology

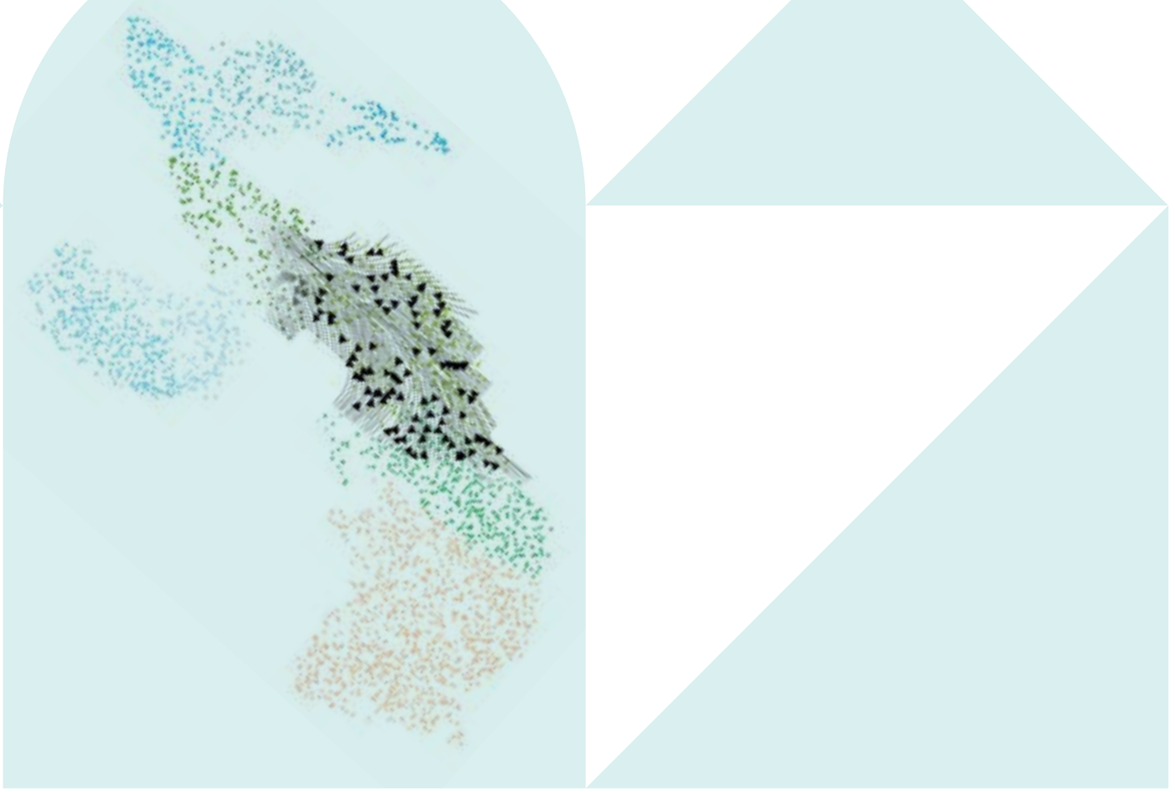
Innovative technologies are vital for uncovering new knowledge, developing new treatments, and solving complex biological challenges.

A team of scientists from VIB.AI has developed a new computational tool called SCENIC+ that helps decode gene regulatory mechanisms.

Decoding gene expression in cells with a powerful computational tool

Gene expression in cells is controlled by regulatory networks. This process determines the various forms and functions of cells, giving rise to a wide range of cell types in the human body. Understanding this mechanism in-depth is important for comprehending the biological mechanisms of development and disease. A team of scientists from VIB.AI has developed a new computational tool called SCENIC+ that helps decode these gene regulatory mechanisms. The team has made the tool available to the public, which will enable many researchers to carry out quicker and more accurate analyses to better understand how different genes are controlled in cells.

SCENIC+
Single-cell enhancer-gene regulatory networks



Bravo González-Blas C. *et al.*, SCENIC+: single-cell multiomic inference of enhancers and gene regulatory networks, Nature Methods

VIB group leader involved: Stein Aerts. VIB.AI: Center for AI & Computational Biology

IMPACT STORY

From code to control: scientists use AI to craft synthetic DNA

The cells in our body, from our eyes to our stomach, all have the same DNA. However, not all of this DNA is used in every cell type. The activity of genes is governed by a set of instructions within the DNA, called the regulatory code. Enhancers play a crucial role in this process by acting as control hubs dictating when and where certain genes are activated.

The logic behind the regulatory code has puzzled scientists for the past five decades. Now, the Lab of Computational Biology has been training a deep-learning model to crack it. This model was able to decipher the enhancer code, gaining unprecedented insight.

The team then used this model to create synthetic enhancers tailored to specific cell types in the fruit fly brain. This approach not only worked remarkably well but also allowed the creation of alternative types of enhancers, including "dual code" enhancers that target two different cell types and extremely compact enhancers. Because of their small size and straightforward genetic manipulation, fruit flies are the first model organism of choice for many geneticists, however, the team was able to successfully extend their new approach to design human enhancers as well.

Scientists can use our approach to design cell-type specific enhancers and express any desired gene in any cell type they want. I have high hopes that our work will serve as a valuable and essential component in the field of gene therapy.

Stein Aerts
VIB Group Leader VIB-KU Leuven Center for Brain & Disease Research

The study illustrates deep into the AI-guided design process of synthetic enhancers, offering a detailed understanding of their construction, nucleotide by nucleotide. This 'opening of the black box' provides unprecedented insight into the structure and composition of the enhancer code. The possibilities of these insights are numerous, ranging from basic biology to potential therapeutic interventions.

Understanding how enhancer activation is encoded in its DNA sequence is essential not only for modeling and predicting gene expression but also for the improvement of gene therapy.

Taskiran I. *et al.*, Cell type directed design of synthetic enhancers, Nature

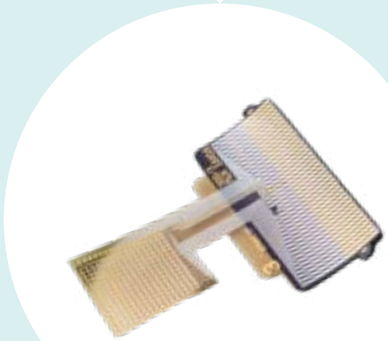
VIB Group Leader involved: Stein Aerts. VIB-KU Leuven Center for Brain & Disease Research and VIB.AI: Center for Computational Biology & AI

Other groups involved: UK Dementia Research Institute at Imperial College London

IMPACT STORY

A promising new device for brain research and diagnostics

Scientists at NERF (Neuro-Electronics Research Flanders, empowered by KU Leuven, imec, and VIB) have recently developed a new brain-machine interface device called Neurolayer with tremendous research and clinical potential.



Brain-machine interface (BMI) technologies are designed to record and decode brain signals, with the aim of controlling external devices such as robotic limbs or speech synthesizers. However, BMI development has been restricted due to the inability to record signals from a large number of neurons. Traditional electrocorticography (ECoG) devices, which are used to record neural activity from the surface, or cortex, of the brain, have electrode site sizes of roughly one centimeter in diameter. This limits the spatial resolution of neural recording and stimulation, as well as the number of electrodes that can be used.

The Neurolayer is a device that aims to overcome these limitations. Developed by scientists at NERF, it uses micro-scale electrodes with contact site diameters that are many orders of magnitude smaller than traditional ECoG electrode sites, which allows for greater spatial resolution of the measured signals. The device also has multiplexed electrodes and an adapted integrated circuit capable of multiplexed recording. This means that it can have thousands of electrode sites without the need for individual wires for each electrode.

The quality of the signals obtained from the Neurolayer is also much higher than those obtained from traditional ECoG devices.

When compared to alternative multiplexed µECoG technologies, this approach has the major advantage that it is based on an existing metal-oxide thin-film transistor process developed for flexible AMOLED displays, which allows for scalable manufacturing in semiconductor foundries.

Currently, the Neurolayer is being used as a research tool, with the hope to develop it further for clinical adaptation. With further testing, the device could be used for greater specificity, high resolution, and minimally invasive diagnoses of brain disorders in human-machine interfaces or wearable technologies.

Overall, the Neurolayer represents a major breakthrough in BMI technology. The device's high-density electrodes and non-invasive nature make it a promising tool for future research and clinical applications.

Londoño-Ramírez, *et al.*, Multiplexed Surface Electrode Arrays Based on Metal Oxide Thin Film Electronics for High Resolution Cortical Mapping, Advanced Science

*Londoño-Ramírez, **et al.**, Actively multiplexed µECoG brain implant system with incremental-ΔΣ ADCs employing bulk-DACs, IEEE J Solid-State Circuits*

VIB Group Leader involved: Sebastian Haesler, NERF

Other groups involved: labs from the Leuven Brain Institute and KU Leuven

IMPACT STORY

Tackling time-resolved Cryo-EM bottlenecks

The importance of proteins in living cells cannot be underestimated. They are responsible for nearly every cellular process. However, the study of complex protein functions and interactions is difficult.

Many processes in which proteins are involved happen in a very short time frame, making it challenging for scientists to observe the different stages of a process. Time-resolved cryo-electron microscopy (trEM) tries to solve this challenge. With this technique, a protein reaction is initiated by mixing samples, followed by stopping the protein reactions at sequential time points through plunge freezing. Although this method was pioneered in 1990, it never reached its full potential because of two bottlenecks: either the excessive consumption of proteins or the time resolution for plunge freezing is limited to 100 milliseconds (ms).

A team from the Structural Biology of Molecular Machines Lab have found a way to tackle these bottlenecks. The researchers developed a microfluid device that encapsulates proteins in small droplets in which the reaction is initiated. A laser then creates tiny bubbles to spray the samples onto the imaging grids.

Our new device makes trEM sample preparation potentially applicable for scarce proteins. We also envision that with further technical improvements to our setup, we will achieve a time resolution of below 1 ms.

Rouslan Efremov
VIB Group Leader VIB-VUB Center for Structural Biology

The researchers tested the device on a protein complex that plays an important role in the highly dynamic process of protein folding. With the help of their newly developed microfluid device, the team could successfully study the protein reaction with a time resolution of 5 ms while consuming less than 100 nanoliters of protein solution per EM grid. This is a massive, almost tenfold improvement over the earlier trEM technologies.

Rouslan Efremov, the group leader of the Molecular Machines lab, received an ERC PoC grant. These are awarded to scientists who want to explore the commercial or societal potential of their work, and it will allow the team to study how to make the methodology for time-resolved cryo-EM available to other scientists.

Torino S. *et al.*, Time-resolved cryo-EM using a combination of droplet microfluidics with on-demand jetting, Nature Methods

VIB Group Leader involved: Rouslan Efremov, VIB-VUB Center for Structural Biology

Other research groups involved: labs from VUB

Pioneering resilient crop development

Analyzing the systems biology of plant growth and development is becoming extremely important to tackle climate change and to accelerate the innovation cycle between lab and field.

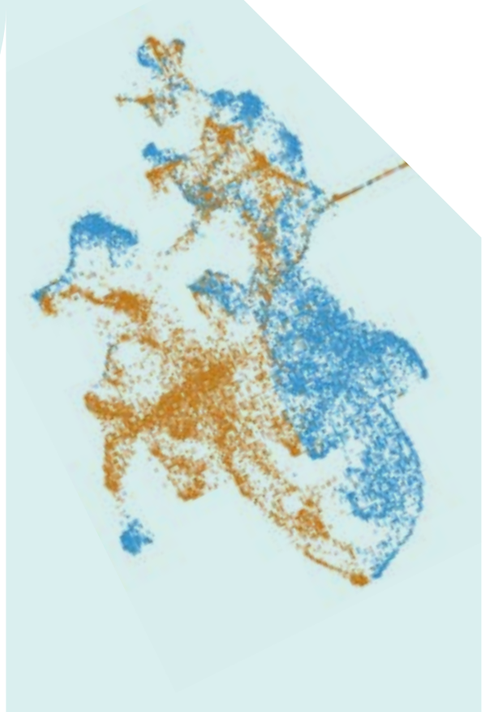
Shaping the future of bananas

Bananas are a major staple crop in (sub)tropical regions and one of the most productive fruits in the world. The Gros Michel cultivar was the most popular type until the emergence of the Race1 pathogen. The Cavendish variety, resistant to Race1, almost completely replaced the Gros Michel cultivar. However, Cavendish bananas are now threatened with extinction because of another pathogen, TR4. Research by the Bioinformatics and Evolutionary Genomics team helped to produce a high-quality genome reference to understand the ancestry of current triploid cultivars. This will be essential for selecting parents in banana breeding programs and developing disease-resistant, shelf-stable, and flavorful fruits.

Li X. *et al.*, Origin and evolution of the triploid cultivated banana genome, Nature Genetics

VIB Group Leader involved: Yves Van de Peer. VIB-UGent Center for Plant Systems Biology

Other research groups involved: Zhejiang University (CN), Fujian Agriculture and Forestry University (CN), Minjiang University (CN), Academy of Tropical Agricultural Sciences (CN), Saint Louis University (US), Université Paris-Saclay (FR), Yunnan Seed Laboratory (CN)



Finding new pieces in the triterpene synthesis puzzle

In Arabidopsis root tips, triterpenes are predominantly expressed in the outer cell layers. There, these compounds perform functions in root growth and development, and they also help to attract microbiota. Although the role of triterpenes in plants is well studied, the mechanisms determining their expression remain largely unknown. Researchers in the Specialized Metabolism Lab took on the challenge of unraveling the transcriptional regulatory network underlying the biosynthesis of triterpenes. A complete knowledge of the pathways of triterpene biosynthesis will contribute to engineering plants in a targeted way. For example, plants that produce more economically important compounds, or are more resilient to diseases and stress in a changing climate.

Nguyen T. H., *et al.*, A redundant transcription factor network steers spatiotemporal Arabidopsis triterpene synthesis, Nature plants

VIB Group Leader involved: Alain Goossens. VIB-UGent Center for Plant Systems Biology

Other research groups involved: UGent, ILVO, Fudan University (CN), VIB Single Cell Core, VIB Flow Core, John Innes Centre (UK), VIB-UGent Center for Inflammation Research

Scientific impact 2023

VIB greatly appreciates the financial support from a wide array of organizations that enabled this research. Contributors include:

- Alzheimer's Association
- Belgian Foundation Against Cancer
- Belgian Queen Elisabeth Foundation
- Chan Zuckerberg Initiative
- Fund Baillet Latour
- King Baudouin Foundation
- Kom op tegen Kanker
- Marie Skłodowska-Curie Actions
- Michael J. Fox Foundation
- National Sciences Foundation
- Generet Fund
- Wellcome Trust
- NIH
- VLAIO
- ERC
- FWO

Translating science into solutions

The VIB Innovation & Business team plays a pivotal role in transforming cutting-edge research discoveries and innovations into tangible applications that benefit society. This involves a variety of strategies, including licensing intellectual property to existing companies, launching new spin-offs, and forging dynamic partnerships and collaborations within the life sciences ecosystem. By equipping researchers with the necessary resources to commercialize their discoveries, VIB is catalyzing economic development, generating employment opportunities, and encouraging investment in the life sciences industry.

New VIB start-up · Tanai Therapeutics develops first-in-class treatments for obesity

2023 was, among many other things, also the year of obesity. Novo Nordisk's successful introduction of Wegovy® (semaglutide) on European markets marked a turning point, making weight-loss medicines the next big thing in the biopharmaceutical industry.

According to a recent report from the World Obesity Federation, over half the world's population will be either overweight or obese by 2035.

On a global scale, obesity and overweight conditions account for an estimated 4 million deaths annually. According to a recent report from the World Obesity Federation, over half the world's population will be either overweight or obese by 2035. As such, addressing obesity presents an unprecedented opportunity with societal impact.

Together with the Discovery Sciences team, VIB Principal Investigators were able to produce a proof of concept for an alternative to traditional weight loss therapies which was then successfully patented through the IP Office. Subsequently, the New Ventures team facilitated the incorporation of a new company under the name Tanai Therapeutics.

Entering the obesity treatment arena, Tanai Therapeutics has launched with initial seed financing from V-Bio Ventures, Qbic, and VIB, adopting an entirely new therapeutic approach. Unlike current treatments that replicate GLP-1 hormone effects, like semaglutide, Tanai Therapeutics is exploring targeted fat-loss methods that conserve muscle mass. With an exciting and genetically validated drug target, Tanai Therapeutics aims to develop orally administered medication with the promise of better outcomes for people living with obesity and obesity-related complications.

VIB spin-offs attract investments despite economic turbulence

Despite a challenging investor climate, VIB's spin-off companies navigated the waves of economic malaise and successfully closed several financing rounds in 2023.

Aphea.Bio

Developing biostimulants

Aphea.Bio secured 70 million euros in a Series C round, supported by the Bill & Melinda Gates Foundation, among others. The funding will allow the company to advance its research and development in biologicals, scale product launches, expand market reach, and commercialize product offerings. Additionally, the partnership with the Gates Foundation will support the development of biostimulants to address the needs of smallholder farmers in the foundation's priority geographies such as Sub-Saharan Africa and South Asia. Aphea.Bio is planning to submit its first biofungicide for regulatory approval in the United States and Europe in 2024.

Dualyx

Progressing autoimmune disease therapies

Dualyx raised 40 million euros in a Series A financing round, enabling the company to progress its lead autoimmune program as well as its pipeline of Treg candidates. To date, Dualyx has observed promising results on its DT-001 program, promising a game-changing treatment option for a broad range of autoimmune diseases.

MRM Health

Harnassing the full power of the gut microbiome

They attained additional financing from existing investors, while also welcoming the Belgian Sovereign Wealth Fund, SFPIM, to the table. To complement this, the company was also awarded two million euros in funding from the Flemish Agency for Innovation and Entrepreneurship, VLAIO. The funds will be allocated towards expanding their clinical and preclinical pipeline and to accelerating its preclinical program in Parkinson's Disease.

Support from the Flemish Government will help ExeVir's research into using powerful VHH technology to combat global health threats from infectious diseases.

ExeVir

Battling infectious diseases

ExeVir announced that it was awarded a two-year R&D grant of 1.6 million euros by VLAIO. The grant will allow the company to conduct preclinical research toward both preventive and therapeutic solutions for dengue.

ExeVir is using a special technology from llama antibodies (VHH) to create versatile antibodies that can prevent and treat infectious diseases such as dengue. Their technology allows these antibodies to work against all four types of the virus, act in two different ways, and can be used both to prevent the disease and to treat it after infection, with a wide time frame for treatment.

An increasingly attractive track record in industry collaboration

2023 represented a year of opportunities for VIB's business development activities. With 272 deals, it is the best year to date for collaboration with companies, further illustrating the catalyzing role of VIB in the life sciences ecosystem.

Skyline DX

Improving patient outcomes through advanced molecular diagnostics

In the context of the Pointillism 2.0 Grand Challenges Project, VIB announced a collaboration with Skyline DX. The collaboration will contribute to independently validating several promising biomarkers discovered in the Pointillism 1.0 project. These biomarkers were discovered through single-cell technologies identifying mechanisms of response to immune checkpoint blockade, first-line treatment of amelanotic malignant melanoma, and triple-negative breast cancer.

Mestag Therapeutics

Developing new therapies for patients with cancer and inflammatory disease

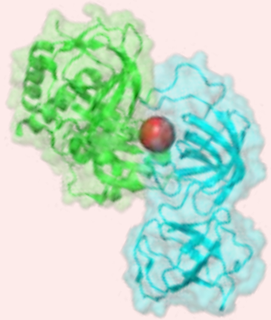
Mestag Therapeutics and VIB formed an exclusive partnership in oncology. Through a licensing agreement, Mestag acquired the rights to develop and commercialize a panel of single-domain antibodies with a focus on an undisclosed target that plays a vital role in anti-cancer immunity.

AB Biotek

Delivering customized fermentation-based solutions for the food industry

AB Biotek started a research collaboration with VIB with the aim of developing new yeast options for bioethanol production. The collaboration includes strain screening for relevant traits, improvement through breeding, evaluation of subsequent hybrids, and ultimately commercialization of selected strains.

Several VIB spin-off companies announced licensing deals and collaboration agreements.



Orionis Biosciences

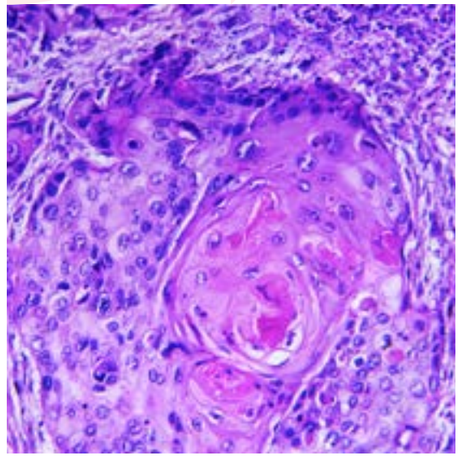
Advancing innovative medicines to treat diseases with high unmet need

Orionis established a partnership with biotech giant Genentech, leveraging their discovery platform for molecular glue at its disposal. In doing so, Orionis will develop molecular glues for disease targets in, among others, oncology. Genentech will oversee the late preclinical and clinical development, market authorization, and product commercialization.

Confo Therapeutics

Leading the discovery of GPCR modulating therapies

Confo Therapeuthics announced no less than two collaborations and one licensing deal. The company closed a licensing deal with analgesics expert Eli Lilly for the development of its treatment in neuropathic pain. Additionally, Confo Therapeutics will collaborate with Daiichi Sankyo to advance its GPCR-focused small molecule agonists in the CNS space. Lastly, AbCellera also initiated a collaboration with the company to work on antibody discovery for various GPCR targets.



Flamingo

Targeting undruggable cancer targets with RNA therapeutics

Lastly, Flamingo Therapeutics announced a merger with the French biotech company Dynacure. The combined company will continue under the name Flamingo Therapeutics and will further pursue their positioning as leading RNA therapeutics company in oncology, with drug targets in head and neck squamous cell carcinoma.

Biotope by VIB consolidates its international reputation

With biotope[by VIB], VIB sought to facilitate external biotech entrepreneurs and scientists to establish a start-up in Flanders. By providing a unique incubator program that includes intensive mentoring and seed investment, as well as connecting participants with the local life sciences actors, VIB aims to reinforce the ecosystem with international talent.

The need for a tailored incubator program could once again be illustrated by an impressive number of applications.

77
applications

37
different
countries

After a successful first year, the biotope[by VIB] program launched its third and fourth calls in 2023. The need for a tailored incubator program could once again be illustrated by an impressive number of applications. Both calls resulted in a total of 77 applications coming from 37 different countries, showing that the biotope[by VIB] model has garnered a solid reputation across borders. From these applications, six start-ups were selected to participate in the year-long program.

This year, selected programs ranged from seaweed-based packaging solutions (B'ZEOS), the development of fermented food ingredients (Probitat) and probiotic solutions for broiler producers (Elogium), to biosurfactants (AmphiStar), mushroom-based biopesticides (Pestevene) and platform technology for crop engineering (CDotBio).

Economic impact 2023

Incubator infrastructure

Bio-Incubator Leuven

14,900 m² years
29 companies

Bio-Incubator Gent

6,111 m²
13 companies

37 start-ups

1 new spin-off in 2023
1.84 B€ capital investment (total)
+920 direct employees (total)

Inward investments

23 inward investments in 25 years
2.6 B€ capital investment (total)
+1,000 direct employees (total)

Agro-Incubator Nevele

3,500 m² greenhouse
2 ha of fields
150 m² lab space

Intellectual property

795 total patent applications
283 total active patent families

Industrial income

138 M€ over last 5 years

Brand new

VIB Bio-Incubator NV

6,000 m²

Supporting excellent science

Creating a stimulating environment for scientists is crucial to attracting and retaining top talent, contributing to scientific advancements, and nurturing innovation. VIB continues to invest in key components that create a conducive research environment, ranging from emerging technologies, state-of-the-art facilities, professional development opportunities, to a supportive and dynamic research culture.

VIB Technologies · catalyzing science

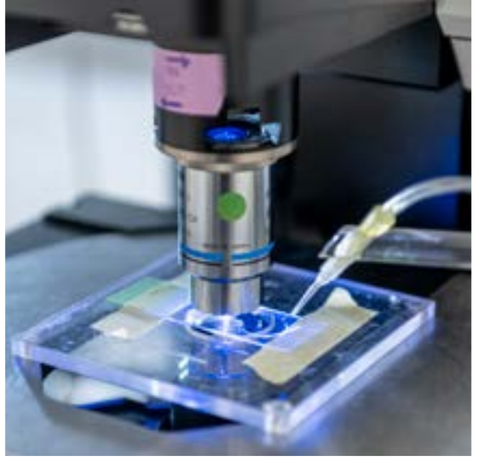
VIB Technologies has created a techno-scientific ecosystem for the research community. Its core facilities offer shared resources for scientists and provide access to cutting-edge technologies. The Expertise Units bring together experts who offer highly specialized guidance for advanced technologies, data analysis, and interpretation in the context of a specific life science niche. The Tech Watch team monitors emerging life sciences technologies and trends, and ensures relevant innovations are adopted early.

Imaging-based sorting takes off

Flow cytometry is a widely used technique that allows to analyze complex cell mixtures, like blood or tumor fragments, in which it can sort and prioritize different cell types.

To facilitate these discoveries, VIB has invested in the most advanced spectral flow cytometry sorter, the BD Biosciences FACSDiscover™ S8 Cell Sorter, with its installation in the VIB Flow Core Ghent being the first in the world. Not much later, the VIB Flow Core in Leuven followed suit.

This cell sorter introduces an innovative technology that combines imaging and spectral sorting, enabling image-based sorting decisions. It allows scientists to visualize and sort cells in real-time at an astounding speed of up to 15,000 images per second and helps them to delve deeper into cellular analysis and investigation.



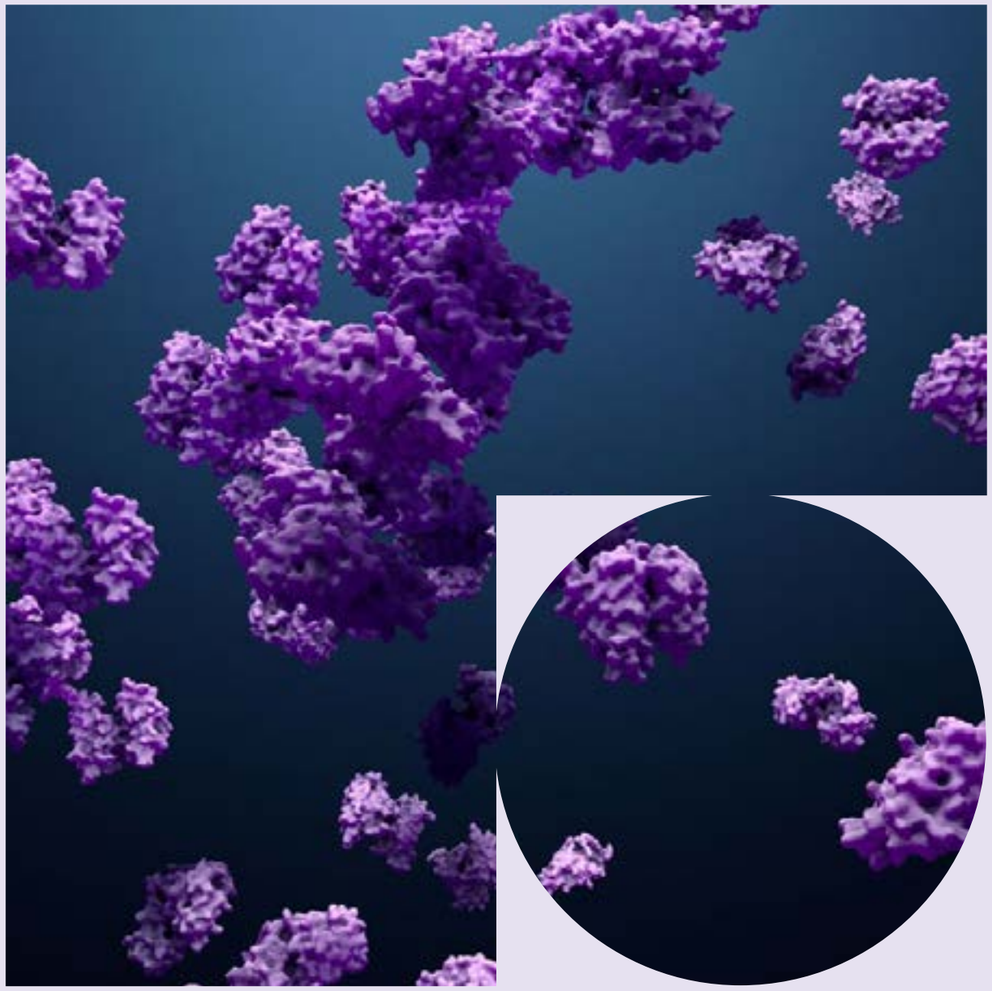
Spatial pioneers

VIB Technologies is pioneering the field of spatial omics, an emerging scientific discipline crucial in understanding cellular localization and cell-cell interactions. Spatial omics integrates data from various technologies, such as imaging and sequencing, to provide highly detailed visual representations of cellular processes.

VIB's Spatial Catalyst unit, set up in 2023, makes spatial technologies accessible to scientists across disciplines. By mapping individual cells with unprecedented resolution, researchers can anticipate cellular behavior, predict disease outcomes, and assess treatment responses. Drawing on VIB's longstanding expertise in omics technologies, experts from the Spatial Catalyst collaborate across research centers and VIB Technologies units to share expertise and facilitate the widespread utilization of spatial technologies in scientific research.

Collaboration is key

The VIB Technologies experts work hand-in-hand with researchers from diverse fields within the life sciences. This collaboration is at the heart of VIB's approach, bringing about practical innovations and significant scientific discoveries. In 2023, VIB Technology experts contributed to several publications in high-impact journals, two of which are highlighted here.



IMPACT STORY

Metabolomics leads to new disease insights

In an international collaboration, the VIB Metabolomics Core and the VIB-KU Leuven Center for Cancer Biology use a special technique called tracer metabolomics to address the challenges in treating patients with a rare genetic condition known as PMM2-congenital disorder of glycosylation.

PMM2-CDG is an inherited condition caused by mutations in the gene that codes for the enzyme phosphomannomutase-2 (PMM-2). This enzyme regulates a process called glycosylation, which is a metabolic process that is critical for optimal protein and fat function.

Bart Ghesquière
Head of VIB Metabolomics Core Leuven

The glycosylation problems experienced by patients with PMM2-CDG affect various body parts, including the nervous system, eyes, muscles, and liver with the first signs starting in infancy. Currently, the limited treatment options focus on easing the symptoms rather than addressing the root cause.

Tracer metabolomics is a powerful technology to study metabolomic alterations such as glycosylation with chemical tracers. By using this technology, a team of researchers revealed the accumulation of toxic sugars in individuals with PMM2-CDG. This finding led the researchers to test an existing diabetes drug against the disease, which resulted in improvements both *in vitro* and in human patients.

While representing a breakthrough, the researchers emphasize the need for further research and clinical trials to validate the treatment's effectiveness and safety. Nevertheless, this work hightlights the potential of metabolomics to identify crucial aspects of a disease process and to provide a rationale for drug repurposing, speeding up the development of new therapies and potentially improving life for people with metabolic diseases.

Radenkovic S., *et al.*, Tracer metabolomics reveals the role of aldose reductase in glycosylation, Cell Reports Medicine

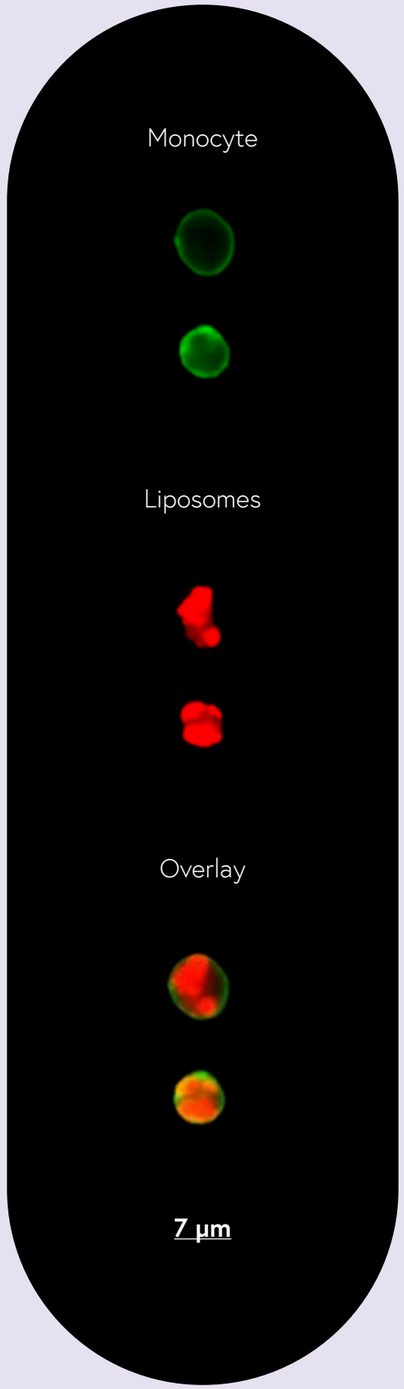
VIB Group Leader involved: Bart Ghesquière - Metabolomics Core Leuven

Other groups involved include labs from the KU Leuven and US groups from the Mayo Clinic, Greenwood Genetic Center, University of Missouri, University of Washington, School of Medicine – Seattle, Seattle Children's Research Institute, Children's Hospital of Philadelphia, University of Colorado School of Medicine

IMPACT STORY

Flow cytometry improves drug delivery in inflammatory conditions

Research by the VIB Flow Core, the VIB Center for Inflammation Research, and the Cancer Research Institute Ghent challenges the prevailing theory of liposome accumulation, which has implications for drug delivery in inflammatory conditions.



Liposomes are nanoscopic sphere-shaped structures with a lipid membrane that can be used to transport molecules. They are increasingly popular as a drug delivery mechanism, with the liposome-based mRNA anti-COVID vaccines as famous examples. For treating inflammatory conditions, it's crucial that these liposomes find their way to the most affected areas. It was previously believed that liposomes primarily accumulate in inflamed areas by passing through gaps in the blood vessel walls.

However, new research by a team of scientists from VIB and other institutes challenges this prevailing theory. By using flow cytometry – a technique to detect and measure the composition of a population of cells – in a mouse model of arthritis, the researchers found that specific immune cells (myeloid cells) play a key role in liposome transport. Myeloid cells engulf the liposomes and carry them to inflamed areas. The work also questions the effectiveness of using polyethylene glycol to coat liposomes, a method previously thought to help evade the body's immune system, including myeloid cells.

This insight into how drugs are transported in the body could significantly enhance the effectiveness of treatments for various inflammatory conditions, including rheumatoid arthritis, COVID-19, and even cancer, by improving how targeted therapies are delivered to where they are needed most.

Deprez J. *et al.*, Transport by circulating myeloid cells drives liposomal accumulation in inflamed synovium, Nature Nanotechnology, 2023.

VIB Group Leaders involved: Gert Van Isterdael - VIB Flow Core Gent, Dirk Elewaut – VIB-UGent Center for Inflammation Research

Other groups involved include labs from UGent, Tel Aviv University (ISR) and the Eindhoven University of Technology (NL)

Hi-tech infrastructure · facilitating the biotech ecosystem

Having access to cutting-edge facilities enables scientists to remain leaders in their areas of expertise. VIB supports emerging biotech ventures by investing in bioincubators and accelerators, creating an inspiring environment for these young companies to grow.

Welcoming 10 to 15 biotech companies, the VIB Bio-Incubator is a launchpad for local biotech start-ups and international biotech companies seeking a gateway into Europe.

To address the increasing demand for specialized infrastructure, VIB partnered with PMV to build a new incubator that was finished at the end of 2023 and is strategically located at Tech Lane Ghent Science Park campus 'Eiland'. The VIB Bio-Incubator will not only house VIB's headquarters but aims to be a beacon of growth and opportunity in the biotech sector. Welcoming 10 to 15 biotech companies, it's a launchpad for local biotech start-ups and international biotech companies seeking a gateway into Europe. Serving both biopharmaceutical and agro-biotech ventures, the Bio-Incubator isn't just a state-of-the-art facility, it's a cornerstone for discovery and innovation.

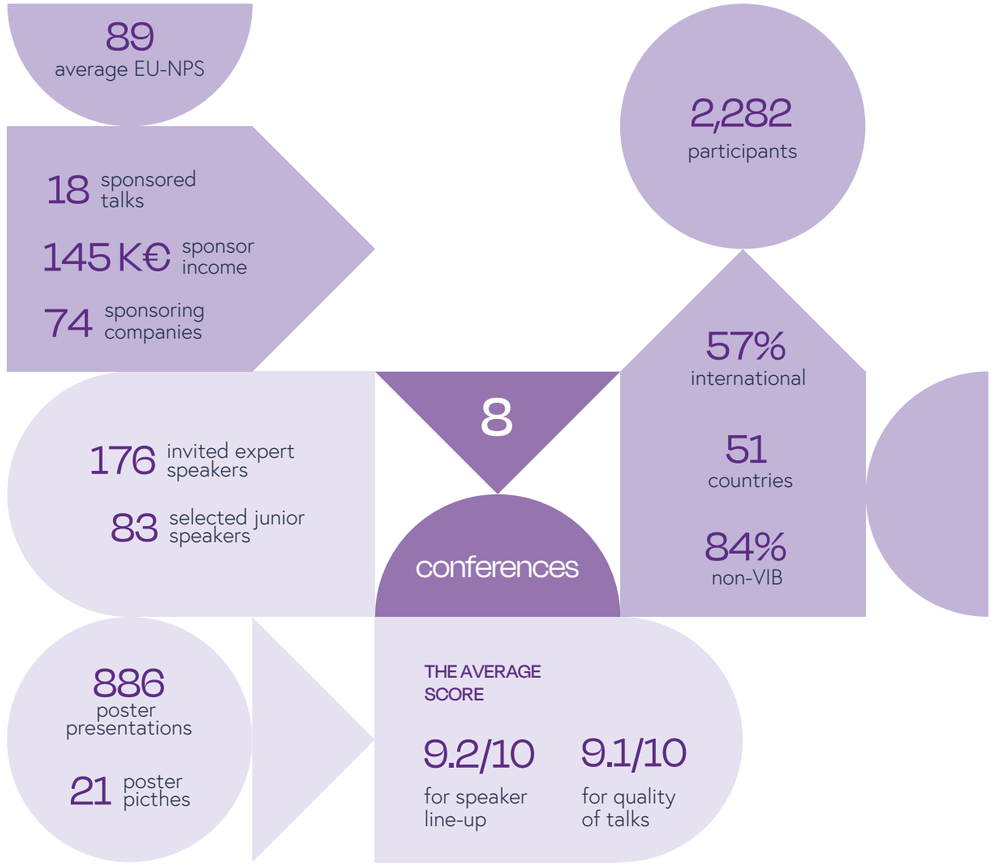
The existing accelerators in Ghent house companies such as Sanofi-Ablynx and Aphea Bio. The Bio-incubator in Leuven boasts a 95% occupancy rate. To meet structural demands, the construction of a fifth incubator (Incubator V) is underway, with units provisionally available from July 1, 2024. Finally, in Brussels, a joint venture with VUB is creating a bioincubator on the VUB Campus. The project is expected to be operational in September 2024.

VIB Conference Series · connecting minds

The VIB Conference Series has established itself as a strong international brand. A scientific organizing committee, with both internal and external experts, defines the program of each conference. The success of the conferences can be attributed to the comprehensive program, bringing together the best speakers with established and junior researchers in the field. Moreover, starting in 2023, the events' sustainability was enhanced by collaborating with eco-friendly caterers and reducing printed materials.

Notable events in 2023 included the 5th edition of Revolutionizing Next-Generation Sequencing, as well as conferences on translational research in crops, tumor heterogeneity, plasticity and therapy, EMDS2023@VIB (European Macrophage and Dendritic Cell Society), and periphery-brain interplay & CNS disease. The conferences received high praise, and participant evaluations yielded an impressive European Net Promoter Score (NPS) of 89, reflecting high customer satisfaction.

VIB Conference Series 2023



VIB Training
· building skills

The VIB training program offers courses and workshops, covering scientific knowledge, technical skills, and soft skills. In 2023, there was an increased focus on in-person training, complemented by synchronous online and asynchronous e-learning. Registrations totaled 2,292, similar to 2022, with 27% external participation.

VIB Training Series 2023

Science · Bioinformatics · Coaching · Skills

127 courses

1,894 participants in live courses

VIB TRAINING WEBSITE
39,214 unique visitors

91 NPS-EU for tech training

70% VIB participants
30% non-VIB

10% outside Flanders

YOUTUBE CHANNEL
bio-informatics
132,000 views
651 subscribers

20 e-learning courses

3,750 users
27 courses in TeSS

93% recommendation rate general training

Grant support • fueling scientific careers

The VIB International Grants Office focuses on pre-award phases and grant agreements, primarily for the European Research Council, Marie Skłodowska-Curie Actions, and National Institutes of Health (US). The Grants Office's custom grant application support includes concept brainstorming sessions, mock interviews, and proofreading. Feedback surveys indicate that these efforts are highly appreciated by VIB's research community. They are also engaged in RACE, an EU Twinning project with the IIMCB in Warsaw (PL).

The VIB International Grants Office focuses on pre-award phases and grant agreements, primarily for the European Research Council, Marie Skłodowska-Curie Actions, and National Institutes of Health (US).

Awards • recognizing VIB scientists

In 2023, several VIB scientists were individually recognized for their work, including: Sarah-Maria Fendt (VIB-KU Leuven Center for Cancer Biology) received the Francqui prize and Prix Fondation ARC Léopold Griffuel and Emanuela Pasciuto (VIB-UAntwerp Center for Molecular Neurology) was awarded the EFIS Acteria Prize. Ludo Van Den Bosch (VIB-KU Leuven Center for Brain and Disease Research) received the Generet Award for Rare Diseases and an award from the Geneeskundige Stichting Koningin Elisabeth. The latter also awarded Sarah Weckhuysen (VIB-UAntwerp Center for Molecular Neurology) and Hannah Bertels (NERF).

Sarah-Maria Fendt

Francqui prize
and Prix Fondation
ARC Léopold Griffuel

Emanuela Pasciuto

EFIS Acteria Prize

Ludo Van Den Bosch

Generet Award for Rare
Diseases and Geneeskundige
Stichting Koningin Elisabeth

Hannah Bertels

Geneeskundige Stichting
Koningin Elisabeth

Sarah Weckhuysen

Geneeskundige Stichting
Koningin Elisabeth

Diversity - creating an inclusive research community

VIB believes in creating a workplace that embraces and celebrates diversity. It cares for its people and strives to build a culture where everyone feels they can bring their whole selves to work at every stage of their careers.

My vision is simple - no one at VIB should ever feel the need to hide any part of themselves. Everyone should experience psychological safety, feel included, and have a voice. Achieving this requires accountability at all levels - it's a shared responsibility. To do this, I want to focus on three key areas: policies and initiatives, process review, and behavior change.

Agnes Uhereczky
DE&I Officer

VIB's dedication to institutional diversity, equity, and inclusion (DE&I) goes beyond ensuring representation at all levels of the organization. VIB has taken specific, measurable, and sustainable actions to counter systemic barriers, explicit and unconscious biases, and inequities. As part of this effort, it has hired a dedicated Diversity, Equity, and Inclusion officer in 2023 to lead its work in creating a more inclusive, diverse, and safe workplace.

Gender balance

VIB actively pursues diversity in its workforce to reflect the multifaceted society we live in. Achieving a balanced gender ratio is one of the top priorities, and various initiatives have been implemented over the past few years to achieve this. As a result, the number of women in leadership positions has increased by 14% since 2018. VIB's commitment to enhancing female representation in management roles remains strong and it will continue every effort to encourage women to step up.

Internationalization

VIB is an international life sciences hub with a workforce consisting of 78 different nationalities. VIB believes that a diverse research community fosters creativity and enhances problem-solving. It is committed to attracting international top talent and offers a welcoming environment for researchers from diverse backgrounds.

Gender balance & internationalization

	Female	Male	International
Group Leader	31%	69%	36%
Expert	50%	50%	25%
Staff Scientist	37%	63%	33%
Postdocs	51%	49%	70%
PhDs	61%	39%	54%

Scientists in the spotlight

VIB owes its success to the people driving scientific research and technology transfer. Find out what inspires them.

Looking back at twenty years at VIB

Eef Parthoens has been a familiar face at the VIB Bio-imaging Core, where she has worked for the past two decades. She loves working on diverse projects with different groups of people, which requires her to think creatively and acquire new knowledge. Eef feels that her working environment fosters genuine innovation and provides opportunities to take risks and explore new paths. The constantly evolving technology in her field and the translation of theories into practice are also significant motivators for her. In her words, "If possible, I'll be here for another 20 years!"

Honoring a 90th birthday

Professor Emeritus Marc Van Montagu celebrated his 90th birthday last year. On this joyful occasion, he reflected on his remarkable career. Despite his achievements, he remains humble, acknowledging that our ignorance is a constantly growing curve: as we gain more knowledge, more questions emerge. He also recognizes the increasing influence of artificial intelligence in handling Big Data and encourages us to embrace it. Moreover, Marc Van Montagu offers valuable advice to young researchers: "Think for yourself, but above all, talk to people. Especially people outside of science! You can find inspiration and original perspectives everywhere."

Think for yourself, but above all, talk to people. Especially people outside of science! You can find inspiration and original perspectives everywhere.

Marc Van Montagu
Emeritus Professor Ghent University
and Chairman of IPBO

Working together to fight ALS

Last year, the Leuven Center for ALS (LEUCALS) was established. This collective consists of top ALS research labs, including the VIB Van Den Bosch and Da Cruz labs, that are dedicated to advancing the understanding of ALS and finding new treatments for this devastating disease. In this context, the VIB-KU Leuven scientists will continue to work closely with professor Philip Van Damme at the UZ Leuven and the ALS patient organization ALS Liga België.

Using microbes as factories

The team at Joleen Masschelein's Laboratory for Biomolecular Discovery & Engineering is passionate about exploring the vast and untapped microbial world to uncover new compounds with therapeutic potential. Joleen thinks engineered microorganisms will soon play a significant role in agriculture, food and fuel production, medicine, and even space exploration. One of her projects, which received an ERC Starting grant, focuses on making beneficial human-associated bacteria for *in vivo* biotherapeutic applications. "Perhaps one day," Joleen says. "We'll all carry our personal pharmacy thanks to the microbes in our guts."

We'll all carry our personal pharmacy thanks to the microbes in our guts.

Joleen Masschelein
Group Leader at VIB-KU Leuven Center for Microbiology

And the 2023 Alumni Award goes to...

The VIB Alumni Award recognizes members of the VIB community who have gone on to make an extraordinary impact on society. Dr Melanie Matheu definitely meets that criterion: after a PhD and two postdocs at UC Irvine, VIB, and UCSF, she founded Prellis, a start-up developing ultrafast technology for high-resolution 3D bioprinting. In response to the COVID-19 pandemic, the company put its full weight behind developing human SARS-CoV-2 antibodies using their EXIS™ platform to create lymph node organoids. On receiving the award, Melanie says: "I am deeply honored. It reminds me of the importance of true incubator spaces, where ideas can grow, and people gain confidence to do new things. VIB has definitely been that type of environment for me."

I am deeply honored. It reminds me of the importance of true incubator spaces, where ideas can grow, and people gain confidence to do new things. VIB has definitely been that type of environment for me.

Melanie Matheu
Founder and CTO of Prellis Biologics

Shaping sustainable progress

VIB's mission of excellence in science and technology transfer is inspired by several of the UN's sustainable development goals. By fostering innovation, VIB strives to address global challenges and contribute to a better future for all by enhancing well-being and stimulating economic growth. VIB has several research programs and initiatives that focus specifically on social impact.

Considering the worldwide dilemmas of climate change, biodiversity loss, and resource depletion, VIB has an ethical obligation to minimize its environmental footprint.

To support its sustainability efforts, VIB appointed a sustainability officer. This role involves coordinating and maximizing social and environmental initiatives across the organization to guide the institute toward more sustainable operations and goals.

Minimizing VIB's footprint

A sustainable HQ

As mentioned earlier in this report, VIB has built an ultramodern headquarters and bioincubator in Ghent. The incubator is not only a launchpad for biotech ventures but is also a testament to sustainable practices, with its BREEAM certification and carbon-neutral operations.

Enhancing sustainable mobility

VIB encourages sustainable mobility and, for its new HQ, has taken measures to support almost half of its staff who bike to work regularly. The building offers ample in-house bicycle storage on the ground floor with all necessary sanitary and electrical facilities to promote sustainable commuting. Additionally, plans are underway to install charging stations for electric vehicles in the shared parking area to further enhance sustainable travel options.

We have made sustainability an integral part of the building's design. Our initial commitment was to select a location in a sustainable business park. The building is also energy-efficient, fossil-fuel-free, BREAAM-certified, and powered entirely by renewable energy. We use rainwater for sanitary purposes, reduce waste generation, and encourage recycling.

Christelle Verrue
Facilities & Operations Manager

Securing clean energy

At the Ardoyen Bio-incubator, 694 solar panels have been installed, generating up to 20% of the local electricity needs. As a result, they help to save up to 95 tons of CO2-equivalents per year and 2,706 tons over their lifespan. This is equivalent to the carbon emissions produced by a petrol car for 1,353 years.

Consolidating efforts

Eco-teams have been established at the VIB research centers for quite some time. With the appointment of a sustainability officer, VIB is set to enhance its initiatives by gathering these teams regularly to foster the exchange of information and best practices. The primary goal is to support and accelerate the implementation of existing sustainability measures.

Some best practices include specific measures to reduce energy and consumables alongside initiatives to boost biodiversity and well-being. Read more on vib.be/sustainability

Contributing to a better world

Life sciences research is at the forefront of solving global environmental and health challenges. VIB's scientists not only focus on scientific advancements but also on translating research results into practical applications with societal impact. Examples of such applications are highly conductive protein fibers conditioned to biobased material or inhalable biologics to control respiratory infections. Read more on vib.be/sustainability.

IMPACT STORY

Uniting expertise for sustainable agriculture

Global challenges like climate change and population growth put a strain on the world's food supply. Identifying superior crop varieties and understanding the genetics of agriculturally important traits is crucial to achieving food security and yield stability.

Plant phenotyping is an important tool in this search. It uses non-invasive imaging, sensing technologies, robotics, and AI to study and analyze various plant traits. The European Infrastructure for plant phenotyping, EMPHASIS, allows researchers across Europe to use high-end plant phenotyping facilities and services. With Belgium designated as the statutory seat and VIB chosen as the hosting institute, in close collaboration with ILVO, Flanders will take the lead in the coordination of a European research Infrastructure for the first time. This year, thanks to support from EWI and the Flemish Government, the Agro-Incubator inaugurated the Integrated Phenotyping for Sustainable Agriculture (IPSA) system for automated crop phenotyping. By making this new, high-tech infrastructure, one of the largest in Europe, available to both knowledge institutions and companies, VIB continues its role as a forerunner of the Belgian biotech ecosystem.

Thanks to a weighing and watering station, the plants are optimally monitored and cared for. The system also has an automated precision spraying cabinet, which can simulate foliar applications under field conditions.

The automated grow table system, combined with high-tech robotics and a capacity of over 16,000 plants, allows individual plants to be moved from the greenhouse to the analysis station. There, the plants are imaged individually with modern imaging techniques, mapping all relevant physiological and morphological parameters such as height, volume, coloration, symmetry, water content, and chlorophyll content. Thanks to a weighing and watering station, the plants are optimally monitored and cared for. The system also has an automated precision spraying cabinet, which can simulate foliar applications under field conditions.

Creating societal impact

VIB aims to have a positive impact on society by translating scientific discoveries into solutions that improve human health, agriculture, and environmental sustainability.

Engaging with the community is a cornerstone of the Grand Challenges program. In unique 'reversed science cafés', stakeholders become the experts, sharing their insights with researchers.

In 2023, the Grand Challenges Program (GCP) at VIB launched its fifth call for transdisciplinary projects with high societal impact.

Three innovative projects kicked off in December 2023: BIOPET aims to revolutionize pet food sustainability by producing animal lipids from yeasts; BE.amycon is setting up a Belgian consortium to tackle amyloidosis, a rare disease caused by abnormal protein deposits; and Pointillism 2.0 builds on the original project by validating biomarkers to improve immune therapy predictions.

Engaging with the community is a cornerstone of the Grand Challenges program. In unique 'reversed science cafés', stakeholders become the experts, sharing their insights with researchers. One such event in 2023 invited spondyloarthritis patients to share their expertise with researchers and learn about new technologies from the scientists.

The year wrapped up with an event celebrating the success of the 'Soy in Flanders' project', showcasing all findings. Stakeholders from various sectors joined in, including companies, agricultural bodies, policymakers, and partner institutions.

IMPACT STORY

Bridging worlds, forming the future of farming in Africa

VIB-UGent International Plant Biotechnology Outreach (VIB-IPBO) focuses on promoting a sustainable agro-industry in African Least-Developed Economies (LDEs). Thanks to collaborations between African and Belgian organizations, IPBO makes the newest scientific and technological advancements available for African agricultural communities and scientists. Two projects that stood out in 2023 were the Open Doors Fellowship Program and the Kringloop Labs Initiative.

Kringloop Labs initiative

In many parts of Africa, the scarcity of equipment significantly hinders research and practical training. The IPBO's Kringloop Labs Initiative steps in to address this challenge by supplying both the necessary equipment and comprehensive training for research and educational activities. In March 2023, the initiative organized a Molecular Biology pilot program at Moi University, Kenya, giving hands-on training in molecular biology techniques, such as DNA extraction, PCR, and gel electrophoresis analysis, also securing the appropriate laboratory equipment.

Open Doors Fellowship Program for female researchers

Globally, the ratio of men to women at Bachelor's and Master's levels is approximately 50 percent. According to UNESCO data, this figure sharply falls to 28 percent when considering women who pursue careers as researchers or assume leadership roles in science. The Open Doors Fellowship Program supports female researchers in African (inter)national agricultural research centers by enhancing their technical and soft skills to strengthen their professional positions, enabling them to advance confidently in their careers. Participants in the program are offered a fully funded research internship in Belgium. Once back in Africa, besides receiving incentives to travel to a conference or publish open access, VIB's online training portfolio further enriches their abilities.

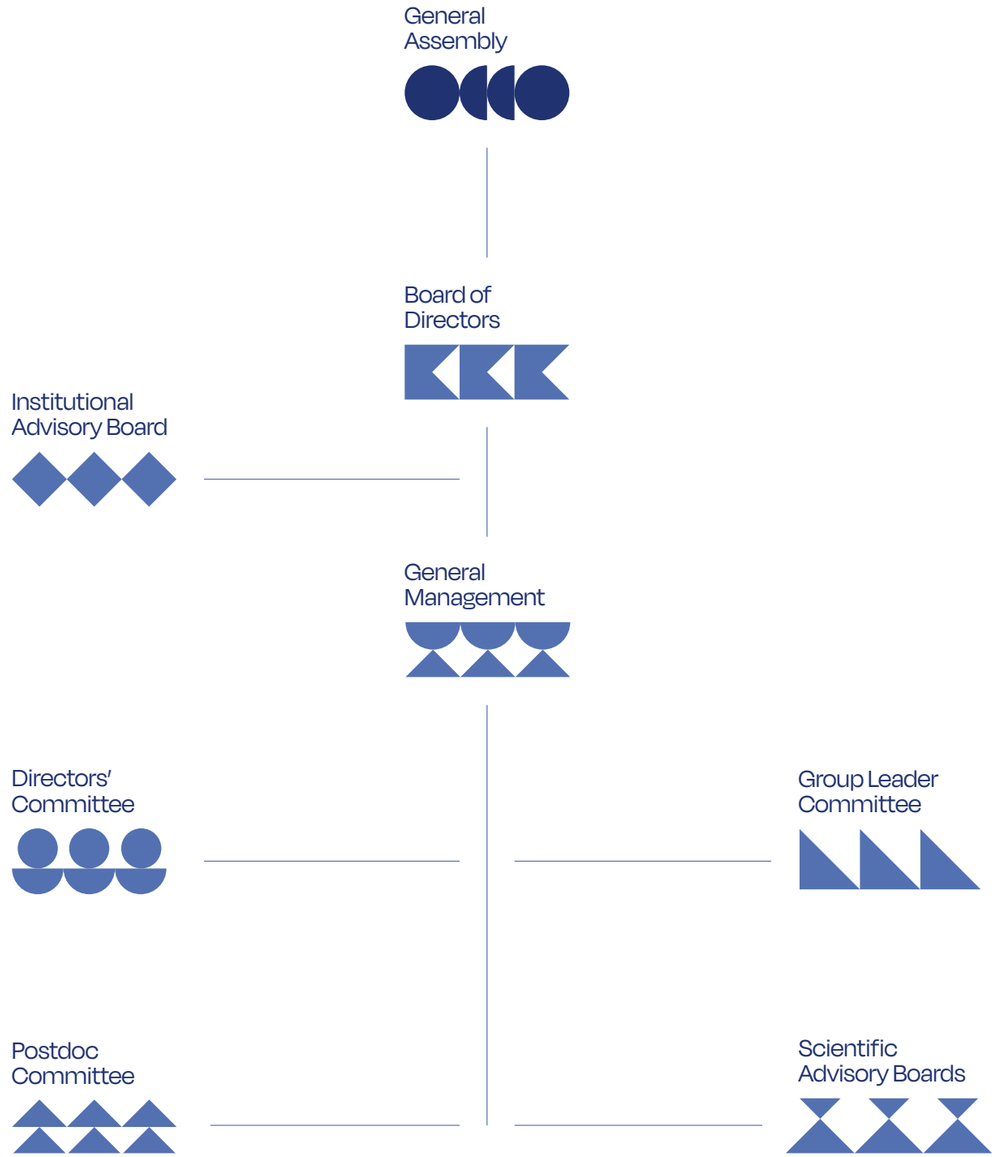
Management structure and financial highlights

VIB, established in 1995, is a non-profit organization with a clear focus on scientific excellence and technology transfer. The institute is funded by a structural grant from the Flemish government and also draws on international and industrial resources to finance its researchand operations.

Organization and governance

Overseeing VIB's multifaceted operations across various locations and disciplines calls for a tailored organizational framework.

Organizational framework



General Assembly

VIB is a non-profit organization, with its highest authority being the General Assembly (GA). The GA meets at least once a year. During this meeting, the GA endorses the annual activity report of the previous year and the budget for the upcoming financial year. The GA is also empowered to change the organization's statutes, approve the accounts and budgets; and appoint and revoke its members. The GA consists of 41 members representing the ecosystem in Flanders with representatives from the universities and other scientific institutes, the life sciences industry, employee organizations, and the Flemish government.

Board of Directors

The Board of Directors (BoD) heads the association; it holds full authority over all management activities and represents it extrajudicially. The daily management is assigned to the general management, but the BoD determines their authority and evaluates their performance. The BoD convenes five times a year to make decisions concerning the institute's management and strategic course. Furthermore, the BoD has established the Good Governance Charter and monitors adherence to it. The board comprises 13 members, including six Flemish university delegates, four business representatives, and two representatives from the Flemish government.

Board of Directors

Directors' Committee

Institutional Advisory Board

The Institutional Advisory Board (IAB) acts as an advisory body for VIB, offering regular advice on its institutional strategies. It also deliberates on policies to improve VIB's performance and global prominence in life sciences research. The IAB consists of eminent international scientists and industry leaders.

Directors' Committee

The directors of VIB's research centers serve as the institute's scientific leaders and shape its scientific vision. Together with selected members from VIB HQ, they constitute the institute's Directors' Committee (DC).

Postdoc Committee

The Postdoc Committee (PDC) fosters collaboration and networking among VIB research centers and with the industry, creating a nurturing environment for postdoctoral scientists. This supports their development of soft skills and career progression.

Group Leader Committee

Group Leader Committee

The Group Leader Committee (GLC) is an advisory board that collaborates closely with the DC to guide decisions affecting principal investigators (PIs). Comprised of voluntary group leaders from each VIB Center and a delegate from VIB Technologies, the GLC functions as a proactive, solution-oriented think tank and liaison between group leaders, HQ, and the DC. It addresses PI-specific opportunities and issues within VIB.

General Management

Christine Durinx and Jérôme Van Biervliet, serving as Managing Directors, oversee the institute's daily operations, with support from the unit managers.

Scientific Advisory Boards

Each VIB research center has a Scientific Advisory Board (SAB) that consists of international experts in the respective field. This board is crucial in setting the strategic course for the center, in collaboration with the science directors, and assists in the development of research programs.

VIB Board of Directors

ACADEMIC REPRESENTATION

Katharina D'Herde
Emeritus Professor, UGent

Luc Moens
Emeritus Professor, UGent

Chris Van Geet
Vice-rector, KU Leuven

Gerard Govers
Vice-rector, KU Leuven

Ronny Blust
Vice-rector, Universiteit Antwerpen

Hugo Thienpont
Vice-rector, Vrije Universiteit Brussel

INDUSTRY REPRESENTATION

Ajit Shetty
Honorary chairman, Janssen Pharmaceutica

Staf Van Reet
Managing Director, Viziphar Biosciences

Marleen Limbourg
Founding Partner, atoms & art

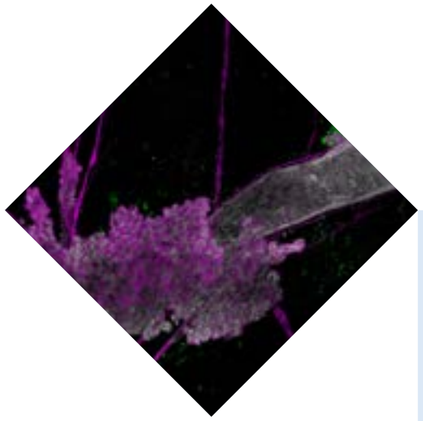
Griet Nuytinck
Managing Director, Anacura

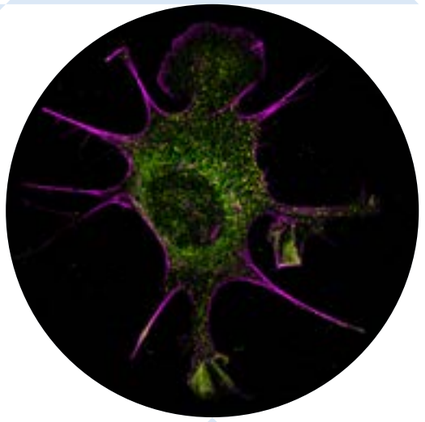
Koen Quaghebeur
Director, Globachem

GOVERNMENT OF FLANDERS

Dieter Deforce
Professor, UGent

Bart De Moor
Professor, KU Leuven





VIB Directors' Committee

Christine Durinx
Managing Director VIB

Jérôme Van Biervliet
Managing Director VIB

Bart Lambrecht
Science Director VIB-UGent Center for Inflammation Research

Yves Van de Peer
Science Director VIB-UGent Center for Plant Systems Biology

Nico Callewaert
Science Director VIB-UGent Center for Medical Biotechnology

Patrik Verstreken
Science Director VIB-KU Leuven Center for Brain & Disease Research

Diether Lambrechts
Science Co-Director VIB-KU Leuven Center for Cancer Research

Jean-Christophe Marine
Science Co-Director VIB-KU Leuven Center for Cancer Research

Kevin Verstrepen
Science Director VIB-KU Leuven Center for Microbiology

Jan Steyaert
Science Co-Director VIB-VUB Center for Structural Biology

Han Remaut
Science Co-Director VIB-VUB Center for Structural Biology

Rosa Rademakers
Science Director VIB-UAntwerp Center for Molecular Neurology

Sebastian Haesler
Science Director NERF

Stein Aerts
Science Director VIB.AI

Rik Audenaert
CFO

Marijke Lein
HR Director

Wim Goemaere
COO

Geert Van Minnebruggen
Technology Director

Inge Boets
Communications Director

Frederik De Coninck
ICT Director

Marleen Vanstraelen
Head of Science Policy

Institutional Advisory Board

Detlef Weigel
Director, Max Planck Institute for Developmental Biology (DE)

Kay Davies
Director, MRC Functional Genomics Unit, Department of Physiology Anatomy & Genetics (UK)

Huda Zoghbi
HHMI Investigator, Professor Baylor College (US)

Peter Piot
Handa Professor of Global Health and former Director of the London School of Hygiene & Tropical Medicine (UK)

Daria Mochly Rosen
Professor, Chemical & Systems Biology – Stanford, Founder and co-director SPARK (US)

Luc Debruyne
Strategy advisor to CEO of CEPI, Board member UZ KU Leuven, Board member Z.org KU Leuven, Board member Fund Plus, BE - Life science Board member Greenlight BioSciences (US)

Susan Gasser
Director, ISREC Foundation, Lausanne (CH)

Good governance

VIB has implemented a 'Good Governance Charter', publicly available on vib.be. The principles of good governance at VIB undergo regular evaluation and refinement, ensuring alignment with both local and global advancements in this field and meeting the expectations of all stakeholders.

Revenue 2023

166,714 K€
Total revenue

* ESR figures

21,767 K€
Other

27,939 K€
Industrial income
and spin-off creation

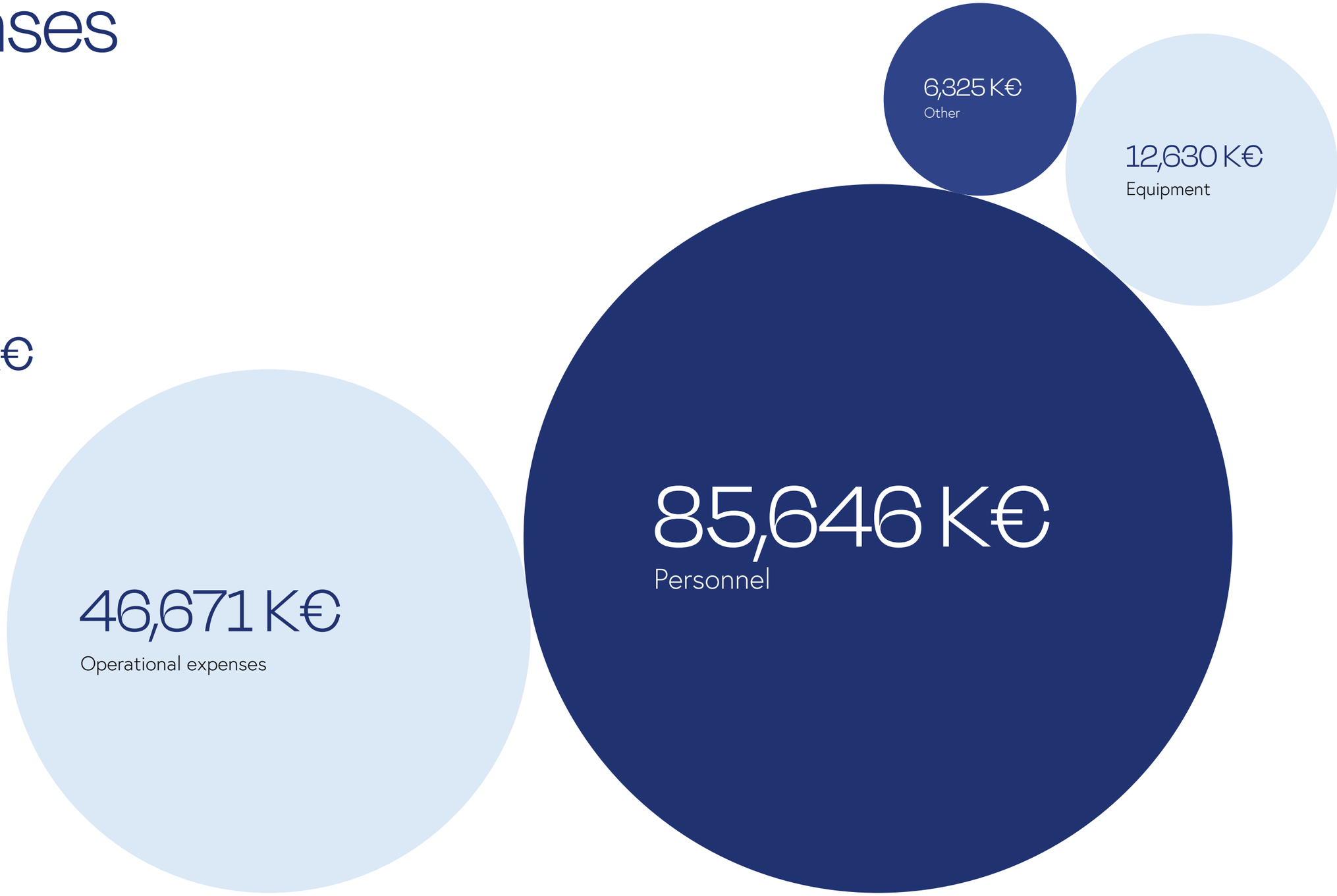
85,087 K€
Core funding

31,921 K€
International funding

Expenses 2023

151,272 K€
Total expenses

* ESR figures



Balance sheet

€ THOUSANDS

Assets

	31.12.2023	31.12.2022	31.12.2021	2023-2022 %
Intangible fixed assets	3,844	3,906	2,812	-2%
Tangible fixed assets	33,636	34,857	33,900	-4%
Financial fixed assets	55,298	53,510	53,929	3%
Contracts in progress	10,015	11,927	10,596	-16%
Amounts receivable after one year	0	121		-100%
Amounts receivable within one year	14,661	15,452	21,497	-5%
Investments	151,690	116,811	100,970	30%
Cash	18,362	29,878	27,797	-39%
Deferred charges	7,915	4,186	3,280	89%
TOTAL ASSETS	**295,421**	**270,648**	**254,781**	**9%**

€ THOUSANDS

Liabilities

Allocated funds	121,814	115,717	120,963	5%
Investment grants	37,736	38,470	35,837	-2%
Amounts payable after one year	13,118	13,958	16,010	-6%
Amounts payable within one year	66,302	57,862	46,286	15%
Accrued charges and deferred income	56,451	44,641	35,685	26%
TOTAL LIABILITIES	**295,421**	**270,648**	**254,781**	**9%**

Profit & loss statement

€ THOUSANDS

Operating income	**156,174**	**139,153**	**124,611**	**12%**
Turnover (from contract research)	42,443	36,928	43,760	15%
Contracts in progress (+/-)	-1,912	1,331	-3,670	-244%
Grants and subsidies	113,687	99,978	82,436	14%
Other income	1,956	916	2,085	114%
Operating expenses	**-156,043**	**-137,269**	**-120,421**	**14%**
Raw materials and consumables	-14,361	-13,027	-12,467	10%
Services and other goods	-43,221	-35,212	-29,987	23%
Remuneration, social security costs and pensions	-83,348	-75,568	-65,139	10%
Depreciation	-12,762	-11,843	-11,040	8%
Other operating expenditures	-2,351	-1,619	-1,788	45%

€ THOUSANDS

Financial income	**1,262**	**543**	**1.628**	**132%**
Financial charges	3,166	-7,397	-631	-143%
Extraordinary income	4,035	748	2,398	439%
Extraordinary expediture	-2,497	-1,024	-1,806	144%
PROFIT/LOSS FOR THE FINANCIAL YEAR	**6,097**	**-5,246**	**5,779**	**-216%**

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