VIB TIMES

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VIB
science meets life

20 Years VIB: science meets life

Rudy Dekeyser: alumnus on a mission for better science

VIB research may lead to effective Alzheimer's therapies

Big entrances and venerable exits

20 years of VIB: achieving excellence and maintaining it

In 20 years of VIB, we have come a tremendous way. When we kicked off in 1996, nobody would have dared to suspect that our achievements would be internationally acclaimed as they are today. And although the research institutes that served as VIB's foundations already enjoyed worldwide fame at the time, it is clear that VIB has been – and still is – a strong catalyst to ensuring that the huge potential of biotechnological research in Flanders thrives.

When our founding fathers Jo Bury and Rudy Dekeyser undertook the mammoth task of putting Flanders on the global biotech map, they set up a board of directors consisting of several delegations representing government, universities and industry. I belonged to the latter as the CEO of Janssen Pharmaceutica, which gave me a front seat in witnessing how VIB's basic research could contribute over the years to a gradual yet massive change in our pharmaceutical and medical landscape. This contribution is, as we all know, one of VIB's strong points. And the urgency to add societal value will only increase. If we take a look at today's global challenges, our added value lies in three domains: medical innovations to improve healthcare, plant science for sustainable food production, and industrial applications that can strengthen our economic fabric.

To further accelerate the valorization of scientific insights, VIB has set up close collaborations that fall into two distinct categories. On the one hand, we are joining forces with other Flemish and international research groups to share technological and scientific expertise – after all, collaborations are the key to great scientific breakthroughs. On the other hand, our Tech Transfer team is proactively reaching out to corporate partners to establish industry collaborations. In some cases, VIB is even the cradle of new spins-offs. Further on in this issue of VIBnews, you will read about a few fine examples of recent research that has been taken to the next level.

But even with the greatest ambitions and waterproof strategic plans, excellent science always starts on a personal level. Ideas are conceived by the brains of creative individuals with relentless determination. But execution always requires teamwork – preferably when heterogeneous perspectives and expertise are brought to the table. I think that VIB has found a great model in which its complementary departments and teams operate and report. This diversity, of which I'm an ardent advocate, is also reflected in the dozens of nationalities at VIB. On page 26, you will read more about our international recruiting programs – and how they lead to unique insights.

Speaking of VIB's foreign researchers, they naturally find themselves immersed in our typical Flemish habits and mindsets after a while. And no doubt it must have struck them that we are quite a humble people. We don't really like showoffs. But in my own (humble) opinion, we can take great pride in our achievements. We are playing at the top of the league here, which is why we should also set the bar high, publicly express our ambitions and claim the necessary resources. After all, that is the only way we can maintain excellence in research and valorization.

STAF VAN REET

The former CEO and Head of R&D Janssen Pharmaceutica, is now managing director of Viziphar Biosciences, a consultancy and support company in the life sciences sector. Staf Van Reet serves as an industry delegate in the VIB board of directors.

20 YEARS VIB

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Philippe Muyters

EXCELLENCE IN SCIENTIFIC RESEARCH AS ONE OF THE SPEARHEADS FOR CREATING A STRONG FLEMISH ECONOMY

The Flanders coalition agreement of 2014-2019 states that Flanders should be one of the top five European regions by 2020. This target acts as a compass for the policy of Philippe Muyters, Flemish Minister for Work, Economy, Innovation and Sports.

Minister Muyters, how did you get to know VIB?
"I first came into contact with VIB during my days at the Social and Economic Council of Flanders (SERV) and later as Managing Director of VOKA, the Flemish Chamber of Commerce. Of course, I got to know the institute a lot better when I joined the Flemish government in 2009. What remained constant during all those years is the image of a very dynamic and internationally-competitive organization."

When VIB was founded in 1995, the translation of academic knowledge into tangible benefits for society was lagging behind in Flanders. How far have we come since then?
"I think Flanders should be proud of what its research institutions have achieved in recent decades. The concentration of knowledge in a small but central region, where several universities and research institutes are less than a hundred kilometers apart, clearly gives us an enormous advantage. Having such a strong biotech cluster not only puts Flanders on the map for international high-tech companies, it also offers an attractive habitat for top scientists."

Is Flanders ahead of the pack when it comes to combining basic research with technology transfer?
"There is definitely a lot of interest in the VIB model abroad. Some countries are wondering how they can launch a similar institute, so we've definitely hit upon a good formula. However, we can't forget that other countries are not standing still. We may be at the top now, but it takes continuous effort to stay there. That involves making hard choices about individual research lines while paying close attention to new interdisciplinary fields. We also have to find ways to further reduce the risks of basic research. If we really pave the way and prepare optimally for technology transfer, it is likely to generate more value. As a result, investing in a professional team of tech transfer specialists is essential."

Do you think Discovery Sciences, VIB's strategic initiative that aims to increase the success rate of translational research, will play a big part in this de-risking?
"Discovery sciences is a great concept. Given the extremely long development phases for new therapies, talking to interested parties requires perfect preparation and real data that has been gathered through clinical testing or breeding experiments. I'm convinced that Discovery Sciences will contribute to the translation of basic research into potential applications."

A knowledge economy also needs specialized knowledge workers. What are the challenges in this area?
"For several years now, we have been encouraging students to enroll in studies in the areas of science, technology, engineering and mathematics (STEM). An investment we absolutely need to continue. On the other hand, life sciences is a very international field, which means that our research institutions and companies should also recruit overseas to bring specialized knowledge to Flanders if needed.

A second challenge is to further refine the expertise of knowledge workers after they've graduated. Again, I see an enormous advantage in the close proximity of our educational centers and research institutions. There is always a high probability that a specific specialization or postgraduate program is offered somewhere in Flanders.

I firmly believe in VIB's strategic plan for the future which should enable the institute to contribute even more to society. I'm therefore pleased that, together with the entire Flemish Government, I can announce a substantial rise in the annual grant for VIB which will allow them to implement some new initiatives described in their strategy."

> "I firmly believe in VIB's strategic plan for the future which should enable the institute to contribute even more to society."

GOING BEYOND BORDERS TO TAKE VIB RESEARCH TO NEW HEIGHTS

Jo Bury and Johan Cardoen

Since it was established over two decades ago, VIB has dedicated itself to groundbreaking basic research in life sciences. Relentless acquisition of the world's most promising talent and pursuit of pure science has propelled it to its current position as a world-leading life sciences knowledge center. We had a talk with Jo Bury and Johan Cardoen, our Managing Directors.

From the start, it was clearly stated that VIB was not going to be 'another granting body'. Why was it so important to point that out?
Jo Bury: "Because we wanted to do more than just hand out money. Our goal was to have a real impact on the research and its results by developing a clear vision and a strategic policy for the long term. That meant building an environment with core facilities, a place where top scientists can thrive. We decided to invest in people, not in projects."

Clearly a good strategy, since VIB is now at the top. The next challenge is staying there. How hard is that?
Jo: "World-class science is a moving target. We have to set the bar higher every day. That's precisely what we do, but it requires tons of creativity on a continuous basis. VIB does not aim for low hanging fruit. We want to publish revolutionary findings. We want the next big breakthrough."

VIB has prepared a strategic plan for the future, can you elaborate?
Johan Cardoen: "VIB's research is focused on two primary needs of humankind: healthy living and sustainable food production. Combining basic research and tech transfer has always been our way to respond to these needs. Now we want to take it a step further by facilitating translational research. If you want companies to invest in research, you have to decrease the potential risks by further developing the science, through clinical testing or breeding experiments, for example. In order to achieve this, we have launched a strategic initiative called VIB Discovery Sciences."

Jo: "Translational research requires expertise that VIB doesn't have today, so we have to strengthen interdisciplinary collaboration. Our recent strategic alliance with ILVO, which brings basic research and applied field knowledge together, is a prime example. It's no coincidence that the strategic plan is titled Beyond Borders."

Johan: "With no borders, boundaries or frontiers, the sky is the limit. The next five years will be filled to the brim with exciting evolutions that enable VIB to bring science and society ever closer together. From internal changes that result in a greater efficiency, a stronger brand and more accessible technologies, to external initiatives including new partnerships and initiatives that zero in on tech transfer and translational science, our multifaceted strategy at VIB aligns to target the achievement of one crucial overarching goal: the significant betterment of life."

VIB'S 8 THEMATICAL RESEARCH CENTERS

- VIB-UGENT CENTER FOR INFLAMMATION RESEARCH
- VIB-UGENT CENTER FOR PLANT SYSTEMS BIOLOGY
- VIB-KU LEUVEN CENTER FOR CANCER BIOLOGY
- VIB-VUB CENTER FOR STRUCTURAL BIOLOGY
- VIB-UGENT CENTER FOR MEDICAL BIOTECHNOLOGY
- VIB-UANTWERP CENTER FOR MOLECULAR NEUROLOGY
- VIB-KU LEUVEN CENTER FOR MICROBIOLOGY
- VIB-KU LEUVEN CENTER FOR BRAIN & DISEASE RESEARCH

> "Collaboration is key, wich is why VIB has developed the VIB Grand Challenges Program."

VIB GRAND CHALLENGES

Truly translational life sciences research requires a multidisciplinary approach and the involvement of many different players, from scientists and institutions to hospitals and farmers. Single research groups – and even large scientific institutions – rarely have all of the resources, knowledge and technologies needed to tackle research challenges from all angles and transform results into useful societal benefits. Collaboration is key, which is why VIB has developed the VIB Grand Challenges program. Through VIB Grand Challenges, VIB seeks to stimulate global, transdisciplinary, multi-institutional collaborations with external partners.

Joint efforts with hospitals and clinics, for example, open up a wide range of benefits for everyone involved, from access to new therapies to research insights that can be immediately used to help people. Partnerships with agriculture companies give scientists access to land and industry expertise, with results leading to solutions to real agricultural problems with the potential to resonate worldwide.

Despite addressing grand challenges, the program will be funded from the bottom-up, with center leaders proposing projects that are selected by a high-level, transparent governance group.

SCIENCE MEETS LIFE

From left to right: Eric Karan, Rudi Pauwels, Krista Bracke, Erin O'Shea, Johan Cardoen and Jo Bury

The celebration of 20 years VIB was a success, in great part thanks to the contributions of the speakers of the afternoon. We had a short conversation with them about science, technology, business, people… and VIB.

SCIENCE MEETS SCIENCE

ERIN O'SHEA, PRESIDENT OF HHMI

Gene regulation, signal transduction and systems biology are the research topics of Erin O'Shea. She examined the mechanisms behind the circadian rhythm in cyanobacteria, but discovered also how cells make the most of a limited number of transcription factors through their dynamics. On September 1, 2016 Erin O'Shea became president of the HHMI.

As a member of the Institutional Advisory Board of VIB, you are well-placed to compare the two research institutes. Do you see strong differences between HHMI and VIB?

> VIB not only strives for excellence in science, but also in technology transfer.

"Yes, and they are interesting ones. I see three big differences, and they really draw attention to VIB's unique features. VIB not only strives for excellence in science, but also in technology transfer. HHMI focuses exclusively on excellent science.

The way in which VIB handles IP is also completely different from our strategy at HHMI. At VIB, all IP is handled by VIB's own very pro-active tech transfer office. This strategy not only facilitates obtaining patents — it also generates more benefit by valorizing the outcomes of basic science. At HHMI, we defer IP to the collaborating universities who are less proactive and much less successful compared to VIB.

It's precisely these two activities of the tech transfer office that make VIB so strong. One can make a very compelling argument that the tech transfer activities of VIB, even considered in the absence of VIB's scientific achievements, has had an enormous positive impact on the economy of the region. That impact vastly exceeds the investment that the Flemish government has made over the course of VIB's 20-year existence. That argument ties in immediately to the final difference between HHMI and VIB — the funding source. HHMI is funded by a large endowment of US$18.2 billion, while VIB is dependent on envelope funding by the Flemish government. I hope that VIB directors can convince the Flemish government of the true extent of VIB's success — not only in tech transfer, but also in generating excellent science and elevating the visibility of Flanders and Belgium in the international scientific world."

Do you have specific advice for VIB in approaching the next 5 to 20 years?

"VIB should continue to focus on excellence in science, and that also includes basic science. I know this is a continuous process of push and pull, but one should realize the importance of basic science and its continued funding, even in times of economic constraints.

Other than that … honestly … I have resigned from many advisory boards. The reason I stay at the Institutional Advisory Board of VIB is because it is a first class operation that has really grown in success over the 10+ years that I have been involved. It continues to improve in quality and innovation. I learned so much from VIB — especially from its tech transfer aspect — that I want to remain associated with it!"

SCIENCE MEETS TECHNOLOGY

RUDI PAUWELS, VIROLOGIST, TECHNOLOGIST AND FORWARD-THINKER

As co-founder of Tibotec and Virco, Rudi Pauwels laid the foundation for several approved HIV medicines that are currently saving thousands of lives. After Tibotec and Virco were sold to J&J, he went on a three-year sabbatical at the Ecole Polytechnique Fédérale de Lausanne (EFPL) in Switzerland. Inspired by the value of combining scientific and technological approaches to solve key diagnostic challenges, he founded Biocartis in 2007.

Can you give us some insights in your passion for technology?

"For me, technology is not important just because it is fascinating. It's an enabler that leads to new ways to address challenges in medicine, whether they are therapeutic or diagnostic in nature. I have always begun with the clinical need and asked myself the question, 'which technology could provide us with the best solution?' Usually, the reverse strategy is used: someone first develops a piece of technology and only afterwards asks which clinical questions could be answered by this technology. The latter approach seldom leads to solutions that really respond to a need."

What elements are important to consider when setting up a technology-based company?

"It is crucial for medical technology developers to envision the future environment five to ten years from now. What will be the medical and societal needs? What kind of therapies and diagnostic systems will be needed? Where and by whom will they be used? How much will it cost? My approach has always been to familiarize myself with this future context very well — by reading a lot, by talking to people, by daring to step outside my own discipline and fields of expertise. From the perspective of this future vision, you look back and conceptualize what developments are needed to achieve that goal. It is only by combining developments from different fields that we can develop well-adapted, sustainable solutions.

An important element that I want to emphasize is the difference between product-centered thinking and platform-based thinking. Platform-based thinking is something that does not happen enough in the medical diagnostics industry. An example: if someone presents himself at the doctor's office suffering from a tropical fever, the doctor wants to know whether the fever is caused by Zika, malaria, dengue or something else. There is a need for versatile automated molecular diagnostic systems that will answer more complex questions like these. We at Biocartis have sought from the very beginning to develop a multiplexed, platform-based system able to answer many diagnostic questions."

Platform-based thinking is something that does not happen enough in the medial diagnostics industry.

Do you have any words of wisdom for VIB?
"Many new – or renewed - medical needs are rapidly approaching us. A very important one is the problem of antibiotic resistance. Today, about 1.7 million deaths occur each year from infections caused by resistant bacteria; that number will increase to 10 million deaths by 2050, with a total cost to global society of US$ 100 trillion. Deaths from infectious diseases will surpass those from cancer a few years from now. With the exception of the new TB drug from Janssen researcher Koen Andries, there has been a total market failure in terms of antibiotics in recent decades. Neither the industry nor academic centers are investing in research to find and develop new antibiotics. This constitutes an enormous challenge and, in addition to industry players, there are vital roles for research institutes like VIB to play. I hope they tackle this challenge."

SCIENCE MEETS BUSINESS

A LIFELONG COMMITMENT FOR ERIC KARRAN

The former head of neuroscience research teams at Johnson & Johnson, Eli Lilly and Pfizer, Eric Karran became Director of Research at Alzheimer's Research UK, a philanthropic organization, in 2012. He returned to pharma in December 2015 as Leader and Site Head of the Foundational Neuroscience Center at AbbVie in Cambridge, Boston.

To what extent is the academic community ready to collaborate with businesses?
"The academic side – and this is a generalization, there are exceptions – was mainly interested in producing good publications and furthering knowledge in a relatively random fashion. Academic researchers allowed their curiosity to take them where it would, but the researchers were less interested in utility. It's also a fact that this academic model has suffered some attrition over the past 20 years. Numerous studies have demonstrated that currently much of the biomedical academic research performed is hard to replicate in other labs. As a result, the solid foundations that existed 20 years ago do not appear to be as firm today. There are multitudes of reasons for that. It has to do with the complexity of biology and the research technologies used, but also with the pressure to publish under which academics have to perform and compete these days. Another reason is the proliferation of journals so that it is possible, ultimately, to publish almost anything. There are lots of issues at work there. What I see occurring is that a population of scientist are more and more concerned with making sure that their science does translate to something that benefits society. Whether they are in industry or in academia, good scientists are finding and collaborating with each other in a much more productive way."

We are celebrating VIB's 20th birthday. Have you been collaborating with VIB?
"I would not call myself an expert on VIB, but I do know the nature of VIB, and I have some insights into how the organization functions and I'm also aware of how incredibly successful it has been. When in the UK, I have advised institutes and researchers starting up research projects to learn from the VIB model."

Do you have a message for VIB in its approach to the next 5 to 20 years?
"Having metrics on numbers of publications and/or patents does not always lead to what you really want to achieve: answering the big biological questions. A paper in a very high quality journal is not necessarily the same as discovering the answer to an important question. Many people who made incredible discoveries - and who have received Nobel prizes for these discoveries – did not always have the most impressive publication records. Taking a long- term perspective means that you give people room to create a field or a niche from scratch. Challenging, deep scientific questions take time to answer and scientists should be given the time they need to invest in them. The trick is, of course, to select those scientists that you can trust, provide them with long-term funding and be assured that your money is not wasted. In conclusion, my message would be to keep focusing on scientific excellence, but to try to have a long-term perspective at the same time."

SCIENCE MEETS PEOPLE

KRISTA BRACKE'S LIFE ON STILTS: A STORY OF HOPE AND SCIENCE

In January 2009, the life of radio producer Krista Bracke was turned upside down. What seemed like a bad case of the flu turned out to be an aggressive Streptococcus pyogenes *infection, commonly known as the 'flesh-eating bacterium'. In just a few hours' time, Krista's body shut down. Septic shock caused multiple organ failures and cardiac arrests. For ten days, her life was hanging by a thread. Chances of survival were estimated at no higher than 5%. But against all odds, Krista pulled through. Today she bears the marks of a long and hard fight, living her life with two prosthetic legs, a reconstructed right hand, chronic lung damage and an immune disorder. Although Krista's story starts off like a nightmare, her message is an optimistic one that brims with courage and an unrelenting lust for life.*

Have you been following the advancements in science more closely since your diagnosis?
"Yes, I have read a lot of material. Most of all, my experiences made me more aware of how much important research is being performed. The VIB research of Peter Vandenabeele (VIB-UGent) on cell death and sepsis, for example, is very interesting to me. Realizing that septic shock is the most important cause of death on an Intensive Care Unit was already shocking and therefore it is reassuring to know that there are people who are trying to unravel the complex mechanisms."

Do you think more people should know about the importance of basic research?
"That would certainly be a good thing, but I know it's not easy. In the internet age, mainstream media have become very superficial, and scoring headlines is harder than ever. That's a pity, because people would benefit from knowing more about the groundbreaking work that's being done. Luckily, VIB spends a tremendous amount of effort on spreading objective, science-based information in an accessible way. The success of initiatives like the Biotech Day or Science on the Road is proof that there is real interest in biotechnology."

In the internet age, mainstream media have become very superficial, and scoring headlines is harder then ever.

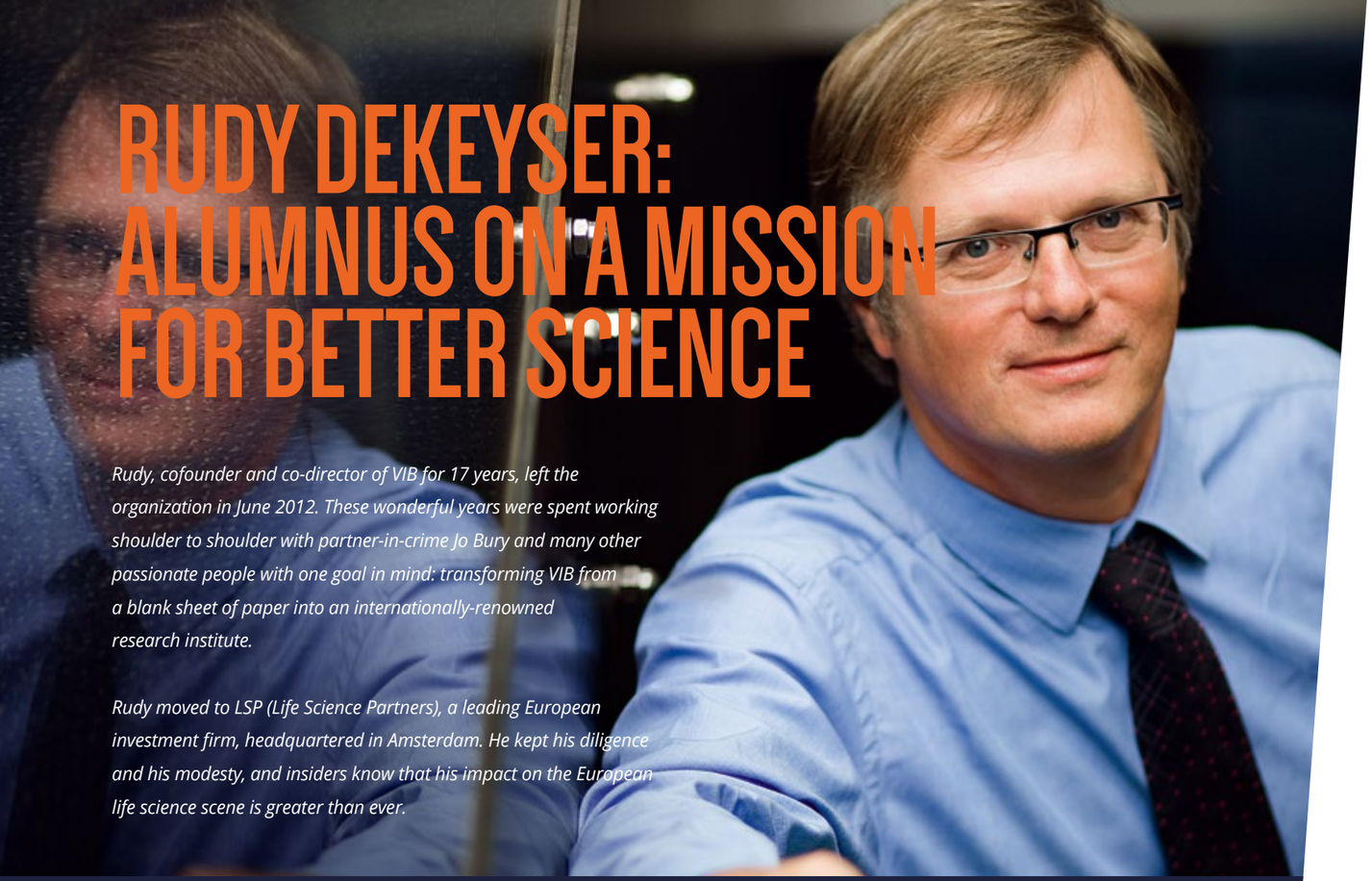
Your optimism is remarkable, to say the least. Despite what happened, you have a strong belief in positive outcomes and progress.
"What other option is there? I simply don't see the point in giving up. I won't deny that it's hard, though. Of course I feel sad sometimes. But in the end, you have to keep going. I believe that being happy with every little step forward is the key. When I managed to brush my teeth again, I thought: hey, if I can do this, I can probably use a fork as well. Little victories keep you moving forward. I like to call this 'healthy positivism': celebrating every little victory and of life."

What would be your main message for VIB scientists?
"I would simply stress the importance of what they are doing. By understanding the mechanisms of life, they can make a huge difference for people like you and me. Basic research has given me my life: if researchers wouldn't have worked hours and hours on developing good functioning artificial legs, I would be sitting in a wheelchair for the rest of my days. If no scientist had made the effort of trying to reveal what can go wrong in our immunology system, no specialist would have been able to diagnose me with PID. If sepsis would still be a complete mystery to us, I would have died in the Intensive Care Unit. I am profoundly thankful that so many researchers, scientists, professors and specialists spend day and night trying to keep people alive or to improve the quality of life of those who became seriously ill or had an accident. So I can only hope that scientists will never lose faith in their mission and that they will keep receiving the support they need to give other people a future as well.

A NEW KIND OF VOCABULARY?

Krista Bracke: "I do think communication between researchers and the general public could still be improved though, as I notice a huge gap between the work of basic researchers and the general public. I think we need to develop a sort of new vocabulary in order to translate scientific language into everyday language. And why not use images, comparisons or metaphores trying to explain the complex mechanisms of the human body? If I talk about my 'liner' for example, I compare it to a stocking made out of silicone. It isn't exactly the same, but it is a way of bringing the more technical and specialized matters closer to everyday life and of creating a better understanding of what living with prosthetic legs is about. It's a huge challenge for scientists and researchers to find a new way in communicating about the wonderful work they perform daily."

RUDY DEKEYSER: ALUMNUS ON A MISSION FOR BETTER SCIENCE



Rudy, cofounder and co-director of VIB for 17 years, left the organization in June 2012. These wonderful years were spent working shoulder to shoulder with partner-in-crime Jo Bury and many other passionate people with one goal in mind: transforming VIB from a blank sheet of paper into an internationally-renowned research institute.

Rudy moved to LSP (Life Science Partners), a leading European investment firm, headquartered in Amsterdam. He kept his diligence and his modesty, and insiders know that his impact on the European life science scene is greater than ever.

What have been your achievements at LSP so far?
LSP has been investing in life sciences companies for more than 25 years. Our support comes from successive funds, and for each new fund, we need to raise money from institutional investors (e.g. pension funds, insurance companies), strategic investors and wealthy families. My first task was to finalize the launch of the LSP Health Economics Fund (LSP HEF). The initial target was to raise 100 million euros. At the end, we were able to raise 112 million. Subsequently, we started to put this money to work by investing in innovative healthcare companies in Europe and the US.

LSP HEF has a different flavor compared to traditional biotech and pharma investment funds, doesn't it?
Indeed, the fund was established based on two observations. First, notwithstanding the great progress we made over the last 30 years, there is still a large need for better prevention, diagnosis and treatment of diseases. Secondly, due to the aging population and a sharp increase in chronic diseases, healthcare costs per capita have doubled since the start of the century, resulting in huge pressure on governments and taxpayers to keep these expenditures under control. To break the cycle, LSP HEF decided to only invest in companies developing products that improve the quality of healthcare, but to reduce the cost at the same time. After careful analysis of many hundreds of business plans, we have thus far invested in ten companies developing innovative medical devices, diagnostics or digital health technology. The potential cost savings in the event of full commercial rollout of the products in Europe amounts to up to 7 billion euros.

Is it currently more difficult to raise capital for setting up new companies?
When you have a truly innovative technology with great commercial potential and a company supported by a seasoned management team, you will always find money. I would say there is plenty of risk capital available – in Benelux specifically, which is an obvious hotspot in Europe. At LSP, we have recently raised 250 million euros for a new fund. New and older initiatives combined, there is more than a billion euros in Dutch and Belgian life sciences funds to be put to work in the coming three or so years. To manage expectations, not all that money is for early stage ventures in Belgium and the Netherlands.

Is the Netherlands catching up with Belgium?
Oh yes, not only in raising funds, but also by putting new companies on the scene and expanding them. Furthermore, the culture within the Dutch universities has changed in the past four to five years. Translating knowledge into products is becoming the new adage among young Dutch researchers.

Should we in Flanders be afraid of the Dutch expansion?
On the contrary, in my view, Flanders and the Netherlands could become a leading biotech and life sciences region in Europe. The boom in the Netherlands will be beneficial for Belgium, too. The most successful US clusters are thriving on large pools of talented people rapidly moving from one organization to the other. At the end of the day, it is all about human capital: bright scientists, wise clinicians, professional tech transfer people, seasoned management, experienced investors, etc. A larger pool of people in Flanders and the Netherlands should result in the easier exchange of a highly skilled workforce between organizations. Companies like Galapagos and argenx, active in both regions, are already role models, and there is much more in the pipeline.

There are rumors that you also have a hand in OncoXL, a brand new Dutch top research institute for cancer. Isn't it shaped according to the VIB model?
Dutch cancer research is world class. But research sponsors – the Dutch government and a big charity organizations like the Koningin Wilhelmina Fonds (KWF) voor Kankerbestrijding – felt that the results of this research could be translated better and faster into treatments and diagnoses. And this is where the VIB model has been inspirational: combining top science with dedicated and professional technology transfer to bring benefits to patients and society. I have participated with much joy in a working group with representatives from KWF, three ministries, several government agencies, research organizations and my LSP colleague René Kuijten to lay out the design of the initial contours of a new cancer institute.
Jan Hoeijmakers, Hans Clevers, Hans Bos, Anton Berns en René Bernards, five of Netherland's world level cancer researchers, will become the founding scientists, but the institute aims to rapidly grow to 1,000 researchers by recruiting more talent from the Netherlands and the world.

You participated in the 20 years VIB celebration. How has VIB evolved since you left the institute?
If you look at the facts and the figures, performance has been brilliant. VIB has become an amazing institute with sound foundations and matured concepts. More than ever, I really appreciate the impact VIB had on the life sciences ecosystem in Flanders. The return on investment for the Flemish government and society has been extremely high, although I admit that much of the impact has only been realized through the contributions of many other actors.

What do you think of VIB's plan to set up a translational component? Is it a wise decision?
I firmly believe that VIB needs to maintain its focus on exploring the frontiers of our knowledge and chasing true breakthroughs. But VIB's mission has always been 'excellent science for the benefit of society', and this requires the translation of scientific findings into products. This is why we have established a highly competent tech transfer team fully dedicated to building the bridges between VIB and third parties. Over time, industry and investors have become more demanding in terms of the results they consider sufficiently validated to take on board. The translational component that VIB is adding to the whole equation will be very helpful in closing this gap, and thus the translation into real products benefitting society. This will be money very well-spent.

ALL VIB ALUMNI ARE INVITED TO JOIN THE VIB ALUMNI GROUP ON LINKEDIN.

You are currently the president of the VIB Alumni Network. Why is this network important?
The VIB Alumni Network represents a super opportunity for VIB as an institute, but also for both current and former VIB researchers. By now, nearly 3,000 people have left VIB, and this big family is growing year after year – and they are everywhere. You can find them in research institutes, companies, government agencies and even venture capital funds. For VIB, they can be great ambassadors, increasing visibility and spreading the word that VIB is a welcoming place to gravitate toward at some time in your career. For current and former VIB researchers, it is an attractive network for accessing know-how, technologies, people, money, career opportunities and so much more.
The potential of that network is underutilized at the moment. But of course, VIB is still a young institute and the VIB Alumni Network was founded even more recently. So, there's work to be done to grow its impact and increase these interactions. An important first initiative is the VIB Alumni Award (see page 20).

What do you consider the biggest challenge for VIB in the next 20 years?
In 20 years, VIB has become a member of the champions' league of research institutes, an amazing performance thanks to the commitment and passion of so many people. But the dynamics in life sciences research are daunting, with new technologies and scientific breakthroughs surfacing not only in Europe and the US, but all over the globe. To maintain its leading position, I believe that VIB will need to become an active player in the world's leading (in)formal networks of top institutes and keep surfing the waves of true fundamental breakthroughs. Fortunately, the foundations are there, but this is no time for the institute to rest on its laurels.

Barbara Janssens, PhD Career Manager at DKFZ German Cancer Research Center Heidelberg Germany

SHAPING THE FUTURE – VIB'S SECOND POSTDOC EVENT

Are there too many PhDs and postdocs? Are funding possibilities for young Principal Investigators (PIs) dwindling? And what about mobility, not to mention gender balance in the scientific community? These big questions and more were pondered, discussed, mulled over and investigated with excellent results at "Shape the Future", a VIB postdoc event held in Brussels.

From left to right: Lars Vereecke, Hans Willems, Jo Bury, Dirk Draulans, Vanessa Morais, Anne De Paepe and Helena Nazaré

Based on a whitepaper written by the VIB postdoc committee, the second postdoc event organized by VIB centered around 3 hot topics: career opportunities and restraints for young researchers, the current and future funding situation and gender balance. These foci inspired the event's title, "Shape Your Future", and were addressed during both a panel debate and an alumni networking event. The debate sparked many interesting discussions and provided new inspiration for further reflection. Even after the event was over, postdocs from many different departments continued the conversation at a bar in Brussels – that's what we'd call a lively debate! Thanks again to our great panel members, alumni speakers and engaged postdoc audience for your dedication and participation – we're looking forward to seeing you in 2017!

Some key insights we can take away from this fruitful event:

1. PhDs and postdocs: an overpopulation problem?
The verdict: a resounding 'no!'. Everybody at the panel discussion agreed that the number of students is rising, and that the number of postdocs should increase as well to support the growing number of PhDs. According to the participants, the bottleneck is the shortage in professorships, and the shortage of jobs for highly-educated people outside the bounds of academia – which is partially fueled by the fact that there is little funding available for postdocs working in industry.

How can we address these issues? In addition to increasing the number of research-based professorships, professors should be encouraged to mix academic with industrial experience and enable their younger counterparts to do the same, giving them the opportunity to consider other career paths that also make the most of their skills. Postdocs who take up support functions vs. PI positions are also crucial to maintaining research expertise in labs and research groups, and should be given more credit.

2. Funding: who is actually getting it, and why?
It's a fact that most funding is spent on attracting top scientists from around the world. In addition to creating more research positions, participants highlighted the importance of giving young PIs the opportunity to focus on their research to protect them from administrative and teaching duties. As a whole, VIB employs nearly 20% young PIs. Mobility is also important in giving researchers independence, especially during the postdoc phase, and in creating new opportunities for other people.

3. Gender balance: rules are still needed
The members of the panel also agreed that it is still important to implement rules centering around gender balance in terms of faculty or board composition. Women should also be stimulated to seize opportunities that they would otherwise not take, since the success rates for female vs. male FWO (Research Fund Flanders) applications is equally high while the number of female applications is a lot lower. Supporting structures such as daycare could help give women (and men!) the opportunity to build careers in this highly-demanding field.

VIB ALUMNI AWARD 2017: NOW ACCEPTING NOMINATIONS

As we're celebrating '20 years VIB' this year, now is the perfect time for the VIB Alumni Board to launch a new initiative that recognizes an alumnus for excellent scientific achievements combined with a clear effort towards societal impact. The award also serves to reinforce our connection with former collaborators, research groups, companies, hospitals and universities across the globe.

Who: Any VIB collaborator who left VIB between 1 and 20 years ago, who was a member of VIB for at least 6 months. Self-nominations are not accepted.

How: Nominators had to complete and submit the application form by December 5th, 2016

Judges: The VIB Alumni Board will judge and rank all nominations, with the final candidate proposed by the VIB Alumni selection panel consisting of VIB's founding mothers/fathers: Christine Claus, Désiré Collen, Walter Fiers, Herman Van Den Berghe and Marc Van Montagu.

Award ceremony: Held at the crowning moment of the VIB Biotech tour (see page 65) in the Flemish Parliament on February 20th, 2017, in the presence of Minister Muyters (work, economy, innovation and sports).

Wim Annaert

BASIC RESEARCH: WHERE CURIOSITY LEADS TO GROUNDBREAKING INNOVATION

Although VIB is heavily focused on transforming research insights into solutions to the real problems faced by humanity, the beating heart of VIB is strategic basic research conducted by world-class scientists in our labs. After all, 20 years of experience in basic science has taught us that some of the most groundbreaking innovations come up by chance as outcomes of fundamental research.

The freedom to explore, the facilities to experiment

Scientific freedom and tangible results might sound like opposites, but they are inextricably linked. At VIB, scientists are granted full rein when it comes to their research and the facilities they have at their disposal. Their curiosity, expertise and previous findings lead them to freely pursue new projects, new angles and seek new information. Possible applications of their results inevitably pop up along the way.

Jo Bury (Managing Director, VIB): "Basic research is the absolute cornerstone of our institute. If you want to move scientific frontiers, you need to give researchers both the freedom and the facilities they need to work on the questions that inspire them. If we change that, we're shooting ourselves in the foot."

Jo: "World-class science is a moving target – we have to set the bar higher every day. That's exactly what we do, but it requires tons of creativity on a continuous basis. VIB isn't after low-hanging fruit. We want to publish revolutionary findings. We want the next big breakthrough."

When basic research has unexpected – and amazing - results

An example of a basic research study by VIB scientists that may lead to unexpected new pathogenic insights is a study led by Wim Annaert (VIB – KU Leuven) on Alzheimer's disease. A hallmark of this illness is the aggregation of clumps of proteins in the brain, leading to the eventual destruction of brain cells. Wim and his team set out to investigate the function, structure and physiology of γ-secretase – an enzyme that cuts proteins into the smaller pieces that eventually combine to form clumps, or amyloid plaques.

However, in the process of conducting the research, Wim and his collaborators discovered that not just one, but two different γ-secretases contribute to the creation of two different pools of toxic amyloid proteins. The insight they gained into γ-secretases provides a foundation for new cellular and in vivo models for Alzheimer's disease that could potentially allow researchers to intervene very early on in the development of the illness, when it can still be halted or even reversed.

Wim Annaert: "It was totally unanticipated that even after 20 years of investigating this topic, there are still important things to be discovered – which we could have only accomplished through a basic research approach. This kind of research is often underfunded, and the fact remains that it is still essential to understanding the molecular basis of disease onset, particularly in neurodegenerative diseases."

Sanneruda et al., Cell 2016

STRUCTURAL BIOLOGY ELEVATES BASIC RESEARCH TO A HIGHER PLANE

Proteins are a cutting-edge target for scientists working in many areas of life sciences because they are at the core of the most basic processes of living things. In 2012, Brian Kobilka and Robert Lefkowitz were awarded the Nobel Prize in Chemistry for the discovery of G protein-coupled receptors, and our own Jan Steyaert (VIB-VUB) and his colleagues played an important role in this groundbreaking structural biology research – demonstrating VIB's front-running position in this field. Let's have a look at other innovative projects conducted by VIB scientists that feature structural biology approaches to studying proteins.

PROTEINS IN THE STRUCTURAL BIOLOGY SPOTLIGHT

Proteins, fundamental and dynamic building blocks of life as we know it, hold huge potential when it comes to understanding vital cell processes and treating diseases. VIB structural biologists Han Remaut (VIB-VUB) and Wim Versées (VIB-VUB), together with cell biologist Patrik Verstreken (VIB-KU Leuven), are hard at work conducting basic research on proteins with the potential to have far-reaching effects, especially when it comes to treating neurodegenerative diseases and epilepsy, or developing non-antibiotic therapies for infection.

STRUCTURAL BIOLOGY DREAM TEAM

"Wim and I studied together," explains Patrik (VIB - KU Leuven). "Later on, after discussing our research interests, we discovered that while our expertise in neurology and structural biology are totally complimentary, there is also a lot of overlap in terms of the biological questions we were seeking answers for." Wim Versées, staff scientist in the Jan Steyaert lab (VIB – VUB), concurs and adds: "We're driven by our commitment to understanding biological processes in all their details, even down to the atomic level."

Structural biology gives scientists immediate visual insights into the atomic structure of proteins, leading to new hypotheses concerning their functions in cells and the way in which, for example, mutations can lead to certain diseases. Patrik and Wim initially began their collaboration by studying a protein named ELP3, which is implicated in amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease. More recently, they've been investigating an epilepsy-linked protein called TBC1D24/Skywalker, publishing a paper revealing their insights in the leading journal Nature Structural & Molecular Biology.

FIGHTING INFECTIONS WITHOUT ANTIBIOTICS

For Han Remaut (VIB - VUB) the atomic understanding of protein structures has fascinated him since the very beginning of his studies. "Each protein can be seen as a unique model, sensor or molecular machine with properties that capture the imagination," says Han poetically.

In collaboration with a cross-border team of scientists, Han investigated how the *E. coli* bacterium is able to bind to the surface proteins of bladder cells, avoiding antibiotics and leading to pain and tissue damage. Targeting this binding mechanism is a potential way for new non-antibiotic therapeutic drugs to fight bladder infections. A similar approach was used to identify non-antibiotic methods of fighting *Helicobacter pylori* infection, one of the leading causes of gastritis and ulcers, and a possible cause of stomach cancer. His research on *E. coli* was published in Cell Host & Microbe, and two lines of discovery on *H. pylori* were published in Nature Microbiology and Cell Host & Microbe.

THE IMPORTANCE OF INVESTIGATING PROTEINS

Han's study of bacterial protein binding mechanisms and Wim and Patrik's research on TBC1D24/Skywalker are great examples of how a structural biology approach to the investigation of proteins led to medically-applicable insights. "The vast majority of our medications act upon proteins. A detailed picture of their structures and functions very often has direct medical relevance, with structural insights at the molecular level enabling us to understand how drugs work, or providing us a lead to new ones," Han says.

"We study the structures of proteins to ask very specific questions," Wim continues. For example, understanding the structure of Skywalker gives insights to Patrik and his team into how pathogenic mutations lead to epilepsy. "We can see the ways in which the mutations affect different sites on the proteins, enabling us to formulate hypotheses that address the pathogenic and functional mechanisms of these proteins. That's how we discovered a new mechanism in epilepsy and a way to suppress the defects that lead to the disease."

NEXT STEPS

The scientists enthusiastically anticipate the next steps: Wim and Patrik's findings have identified a target, an enzyme that breaks down lipids in the brain. And although motivated, Han describes the translation of his insights into real drugs as a "long and uncertain road". So, what happens next?

Based on the structure of the Skywalker protein, Wim and Patrik's teams will determine specific inhibitors and develop assays that can be used to test how effective the inhibitors are. "We're also going to continue to sift through the biology of Skywalker to look for other targets that we can inhibit to suppress epilepsy," Patrik concludes.

"This research demonstrates very clearly that basic science is of the utmost importance," Wim asserts. Even though the team's initial aim was to understand the mechanisms and processes that form the foundation of Skywalker's involvement in epilepsy, their results led to new avenues for the development of epilepsy therapies. "It's incredibly motivating and serves an incentive to keep going even faster and harder," he says.

Fischer et al, Nature 2016
Conover et al., Cell Host Microbe 2016

Bio-polymer
©Bio Imaging Core Ghent

SHARING RESOURCES IS AT THE 'CORE' OF EXCELLENT SCIENCE

VIB manages nine core facilities: specialized centers that concentrate expertise, technology and high-tech infrastructure, offering it to VIB and outside scientists. This pooling of resources gives researchers access to expensive technologies that they wouldn't be able to use under ordinary circumstances. But also just as important – core facilities are places for cross-collaboration, ambitious multidisciplinary projects and innovation. What do you get when you mix these factors together? Breakthroughs.

> "It is clear that the sharing of technological equipment and knowhow is becoming a prerequisite for scientific breakthroughs."
>
> *Geert Van Minnebruggen*

SUPPORTING SCIENTISTS IN THEIR QUESTS FOR KNOWLEDGE

From protein production, genome sequencing and nanobodies to -omics and beyond, VIB's core facilities provide support to a broad range of research fields. Even better, a number of new core facilities are currently in the works, with upgrades to existing facilities planned. The strength and expertise of different core facilities can be combined with those of internal and external research groups to take science to new heights. This was again demonstrated by a recent paper published in collaboration with the Bio Imaging Core Leuven led by Sebastian Munck, and two papers supported by the Ghent based Compound Screening Facility headed by Dominique Audenaert.

QUASIMODOH: A TOOL FOR UNDERSTANDING DISEASE

What do scientists do when they know a specific technology or method doesn't yet exist, but it's needed to perform essential research? They create novel tools themselves! That's exactly what Sebastian Munck and his team at the Bio Imaging Core Leuven did in a collaborative effort involving leading researchers from VIB-KU Leuven investigating cell membranes.

QUASIMODOH WAS BORN.

While many statistical tools exist that can be used to explore the makeup of a cell membrane, most of them focus on clusters of proteins and lipids. Sebastian and his collaborators combined technologies and approaches in QuASIMoDOH to develop an accessible new tool that includes also analysis of gradients of proteins and lipids and allows to measure changes that may be caused by illnesses such as cancer and neurodegenerative diseases. It's also compatible with a range of microscopic technologies.

Geert Van Minnebruggen (Head Core Facilities at VIB): "Innovative tools are the result of pooling together technological and scientific expertise. In VIB's core facilities, including the Bio Imaging Core, expert technologists like Sebastian Munck have been joining forces with research group leaders for some time now. It is clear that the sharing of technological equipment and knowhow is becoming a prerequisite for scientific breakthroughs."

NEW METHODS FOR INVESTIGATING PLANT CELLS

Another example of a multidisciplinary approach leading to new scientific tools can be found in the research of a multidisciplinary team that worked closely with one of VIB's core facilities. In collaboration with the VIB Compound Screening Facility headed by Dominique Audenaert, a multidisciplinary team of scientists developed a microscopy-based method to screen plant cells for compounds that interfere with cell division (Hu *et al*., Plant Cell 2016). These results provided insight into how mitochondria can affect plant survival by controlling the structure of plant cell walls.

Dominique and his team were also involved in a chemical biology project that resulted in the development of a test system to assess lignin biosynthesis *in planta* in a miniaturized format (Van de Wouwer *et al.*, 2016). Lignins are the tough polymers in plants that cause their 'woodiness', making it more difficult to process plant material into sources of biofuel. The new, multidisciplinary approach allowed scientists to identify a novel inhibitor of anenzyme that is crucial in lignin biosynthesis.

THE IMPORTANCE OF INVESTING IN CORE FACILITIES

These discoveries and many more highlight how crucial it is to foster scientific collaboration – not just between research groups and VIB core facilities – but also when it comes to projects that combine the capacities of multiple core facilities. VIB has this goal in mind in the form of brand-new pilot projects that feature cooperation between and among core facilities, allowing them to serve the larger scientific community, and society as a whole, with even greater effectiveness.

Paparelli et al., PLOS 2016

STIMULATING INTERNATIONAL DIVERSITY TO DRIVE EXCELLENT SCIENCE

Describing VIB as an international melting pot is definitely no overstatement. Representatives of no fewer than 69 nationalities are currently hard at work in our organization. This is no coincidence, since we have always focused on recruiting top scientists from all over the world. And more than just a few examples illustrate the added value of cultural diversity for better science.

Omics@VIB: our postdoc program

Next to organically attracting the world's best talents, we have tailored programs to recruit specific scientific profiles. Five years ago, we set the omics@VIB program into motion, offering international fellowships to integrative biology postdocs who have advanced skills in omics technologies such as genomics, proteomics and metabolomics. This is how we were able to attract 20 international new postdoc colleagues whose research has culminated in 77 papers, many of which were published in high level journals such as Science, Nature, Nature Microbiology, Nature Medicine, Plant Cell, PNAS etc. Our 3 patent applications are another fruitful outcome of Omics@VIB. Eleonora Leucci (VIB-KU Leuven) is one of our postdoctoral fellows, who joined VIB in 2012. "My PI introduced me to VIB," says Eleonora. "And during these last four years, I have witnessed VIB's exponential growth in reputation and scientific production. This is certainly due to the hard branding work carried out by VIB, but also to the talented international PhD students and postdocs that have 'colonized' leading institutions around the world after their VIB career. I, for one, am leaving VIB with a big publication, a patent, a prize and the opportunity to work with top scientists. These are definitely great assets for my future career!"

> "I have witnessed VIB's exponential growth in reputation and scientific production."

Eleonora Leucci

VIB International PhD Program: up and running

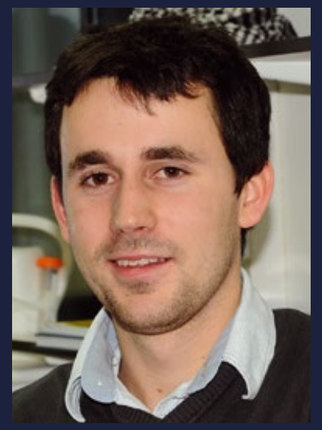
As of November 1, 2016 VIB's ninth call for applications aimed at non-Belgian PhD students in life sciences living abroad kicked off. This program offers 10 PhD scholarships and placements within our VIB research groups. Candidates can apply until February 15, 2017, after which we'll draft a shortlist and invite the lucky ones to join us for a May interview week in Ghent.

Steering these efforts in the right direction: Lieve Ongena (Senior Science Policy Manager) is applying her formidable experience – 16 years at VIB – to stimulate the international mobility of researchers while strengthening ties with foreign research institutes and universities. "Different educational systems and cultural variations bring about diverse research approaches," says Lieve.

> "Consequently, combining different cultures in international research teams can result in unique and innovative approaches and insights. This is why VIB puts a lot of effort into building an international research community."

Lieve Ongena

VIB'S PHD SCHOLARSHIPS: THREE RECENT INTERNATIONAL HITS



ONE

ALAN WALTON

NOVEL TOOLS TO MONITOR PLANT HORMONES

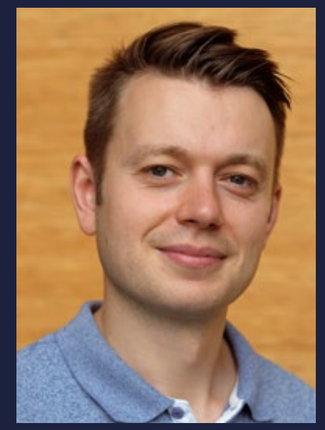
In just 3.5 years at VIB, British PhD student Alan Walton of the Kris Gevaert Lab and the Sofie Goormachtig Lab (VIB-UGent) has contributed to 10 papers. This year, he developed proteomic tools useful in gaining insights into the signaling processes in strigolactones, plant hormones that act as recognition signals for parasitic weed germination. In this way, Alan hopes to contribute to a solution for large-scale crop losses worldwide. His paper was published in the January issue of Plant Cell.

TWO

BRIGIDA GALLONE

COMPARING WINE AND BEER YEASTS

Brigida Gallone of the Kevin Verstrepen Lab (VIB-KU Leuven) and the Steven Maere Lab (VIB-UGent) from Italy recently made waves in both the scientific community and the public at large with a study published in Cell, indicating that ancient brewers and winemakers were already using yeasts long before the discovery of microorganisms. One of the paper's striking conclusions: beer yeasts were 'tamed' and adapted according to their relationships with humans, whereas wine yeasts could freely interbreed with feral yeasts in the winery. Or, to extend the metaphor: beer yeasts are like dogs, wine yeasts are like cats.



THREE

CEZARY WASZCZAK

PLANT CO2 RELEASE IN ATMOSPHERE REGULATION MECHANISM

Since joining our student program in 2008, Cezary Waszczak of the Frank Van Breusegem Lab (VIB-UGent) and the Joris Messens Lab (VIB-KU Leuven) from Poland has, in the meantime, earned his PhD. His latest scientific achievement involved identifying a regulation mechanism by which plants release CO^2 back into the atmosphere. Since photosynthetic CO^2 assimilation is vital to sustain life on earth, this study published in Plant Cell can provide a perspective for engineering this pathway to improve crop yields.

Liesbeth Aerts

REPORTER ON THE ROAD: ON ROOTS & WINGS: BREEDING A GENERATION OF SCIENTISTS AT VIB

VIB turned 20 this year. It was an achievement that was difficult to miss, culminating in a fancy birthday party at Bozar in Brussels. Although celebrated on a much smaller scale, 2016 also marked an important 30th birthday: mine. This means that I was only 10 years old when it all began for VIB. At that age, my interests in science policy and biotech research had yet to develop, and I was completely unaware of how the bold ambitions of a few politicians and scientists would affect my career path over the following decades.

My first personal experience in a VIB research lab dates back to 2008. For my master's thesis topic, I had chosen a project in the lab of Peter Carmeliet (VIB-KU Leuven). He was like The Godfather of science to us, inducing a mix of admiration and insecurity whenever we had to interact with him. The lab space was huge, filled with a very international group of researchers, all working relentlessly. While at times I felt more than a little intimidated, the encouragement of my supervising postdoc kept me on track. She would say 'If someone else can do it, why not you?' giving me confidence that with the right attitude, I also could make it.

I left VIB to continue my studies in the UK but ended up back in Belgium for my PhD. With my background, the labs of Christine Van Broeckhoven (VIB-UAntwerp) and Bart De Strooper (VIB-KU Leuven) were obvious choices, independent of their location. Most of my classmates were applying for PhD positions and some would ask: why go back to Belgium when you could do a PhD here? When I told them which labs I had applied to, they quickly realized their prejudice was misguided.

I ended up in the lab of Bart De Strooper. Ironically, he is now also affiliated with the Institute of Neurology at University College London, the very institute at which I was doing my degree - the proof that I wasn't taking 'a step back' by returning to VIB. During my PhD years, the community in which I worked made all the difference. Despite all the training and resources available at VIB, it wasn't an easy ride. Some might argue that doing a PhD at VIB is extra difficult because of the increased pressure of publishing in top-tier journals, and while every story is different, I think there may be some truth in this. The bar is set pretty high, but wasn't that the whole reason for doing a PhD at VIB in the first place?

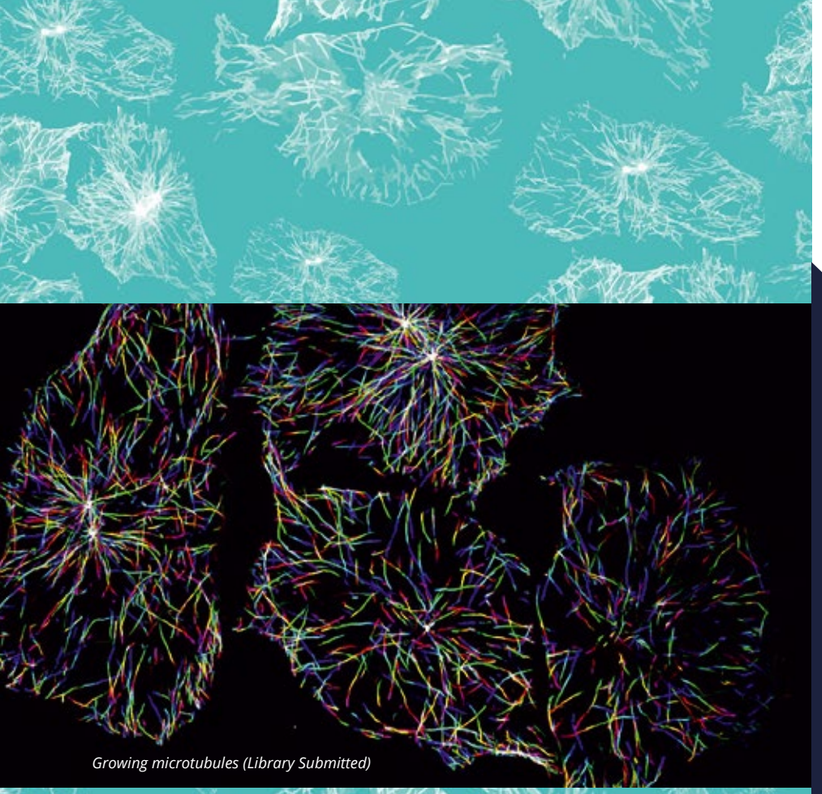
As an institute, VIB is still very young. This could be turned into an advantage for students and early career scientists, as there is some room to influence the scientific culture at VIB. I have certainly been given countless opportunities to do so: as a student representative during the departmental strategic advisory board visit, as a member of the VIBes organizing team, as co-organizer of the first edition of Patients-meet-Scientists... Even now, after having left, I can still have my say by writing for VIBnews!

Apart from the rankings and money, there are plenty of small ways in which VIB's reputation shines through. One example: during my PhD, a friend working in a non-VIB lab asked me to measure my bench. They were remodeling the lab and heavy discussions ensued on how much bench space was required per person. The decisive argument was that "even VIB researchers had only X cm", so no one could argue that it wasn't sufficient to do great science. There you have it, VIB is literally a benchmark for scientific excellence.

You may ask, what is the relevance of this personal story? By itself, it is just one experience, but by adding up these stories and perspectives, the bigger picture will emerge. Besides the spin-offs, the generated intellectual property, the awards and economic revenue, it's stories like mine and yours that ultimately weave the narrative of VIB's reputation.

When Jo Bury and Rudy De Keyser started their adventure, I was still playing with Barbies, not genes and proteins. Now, 20 years later, me and countless others with "the VIB label" are making our marks in all sorts of ways all over the world. I'd like to think that now it is up to us, and everyone who follows, to shape VIB's legacy.

After completing her PhD at VIB, Liesbeth set out to explore new horizons and ended up at UNSW Australia. She writes about her scientific adventures on the other side of the world. Follow Liesbeth on Twitter @Liesbeth_Aerts



Growing microtubules (Library Submitted)

VIB SCARF

“The original image under the microscope looked very different from the one on the scarves. It is a GFP-fusion with End binding protein-1 and marks the tips of growing microtubules, so under the microscope you just see a noisy image with some speckles slowly radiating outwards. It’s only when you record a time lapse sequence and put all the time points on top of each other – each with a different color and applying some filters – that you can see clear tracks of all newly polymerized microtubules.

Certainly nothing special that hasn’t been done by others, but I found the resulting image quite beautiful. That’s why I deposited the image into the VIB Bio Image Library, together with some others that I found aesthetically pleasing. This was in 2013 and I basically forgot about it, so it was a nice surprise to hear that this image was going to be used to decorate the VIB scarves.”

“You always hope that one of your images will end up on the cover of a top journal, but this wish vanishes completely now, knowing that these scarves will warm up so many people.”

Bob Asselbergh, Staff employee, VIB Department of Molecular Genetics, University of Antwerp

Bart De Moor
@DeMoorBart

Science policy minister @philip-pemuyters:'At 20, the performance of @VIBLifeSciences is stunning!' @KU_Leuven @Leuven_Mindgate

Piet Stinissen
@piet_stinissen

Congrats to @VIBLifeSciences for 20 y of excellence in lifesciences ! Proud to be partner @uhasselt pic.twitter.com/6Pw-WjtqfZI

Research@UGent
@ResearchUGent

Clear message of Erin O'Shea @HHMINEWS : fund basic research broadly and with a long term view. Inspirational keynote! #20yrsVIB

Liesbeth Aerts
@Liesbeth_Aerts

Science and technology can save lives. Stories like Krista Bracke's can inspire us to do our best research and talk about it more #20yrsVIB

VIB Tech Watch
@VIBTechWatch

@VIBLifeSciences celebrates #20yrsVIB in Brussels. Building biotechnology in Flanders by investing in breakthrough life science technologies

An
@AnTanghe

Whole audience at #20yrsVIB instantly "rebranded" - well done @VIBLifeSciences communications team!pic.twitter.com/xV1HW9VaiO

Barbara Janssens
@BiotechBarb

Impressive rebranding and launch of new Logo #20yrsVIB @VIBLifeSciences nomorebodybuilderspic.twitter.com/B2Db4TApeq

Philippe De Backer
@debackerphil

Concert 20 years of @VIBLifeSciences @BOZARbrussels great legacy, even brighter future #innovation #friends #biotechpic.twitter.com/YormWtVxdQ

C/Biology of Disease
@CBD_VIB

Nominate a @VIBLifeSciences Alumni for science excellence and science translation to society for the new VIB Alumni Award! #20yrsVIB

Raquel da Cunha
@RaquelCCCunha

"If VIB didn't exist we would have to invent it" Rudi Pauwels thanking @VIBLifeSciences founding fathers&mothers #20yrsVIB

Bart De Moor
@DeMoorBart

@philippemuyters:updated @VIBLifeSciences strategy = 'Science meets Future':budget will increase from 2017 ! @KU_Leuven @Leuven_Mindgate

Adrian Liston
@AdrianListon

Good question for all scientists. What drives you? #20yrsVIB

Ive De Smet
@IveDeSmet1978

@SooikeStoops @AdrianListon everlasting curiosity, being the first to observe something or make a connection

Research@UGent
@ResearchUGent

Mooie tentoonstelling voor #20yrsVIB en #biotechtour! Met enkele straffe UGent-onderzoekers en een afsluitend quizje (deze haalde 5/5 :-))

VIB
@VIBLifeSciences

Enjoy once more the great vibes on #20yrsVIB https://vimeo.com/187150757 Ready for the future :)

Adrian Liston
@AdrianListon

1. Problem solving is fun https://twitter.com/adrianliston/status/783700093983715329 ...
2. Empathy for people who *need* medical breakthroughs https://twitter.com/adrianliston/status/783700093983715329 ...
3. Deep and long term anger at the subordinate role evidence plays in our society

Flanders Today
@flanderstoday

VIB celebrates 20 years with biotech tour through Flanders @VIBLifeSciences http://buff.ly/2dsKUk8 pic.twitter.com/CIJfisjAa5

Tineke Van hooland
@T_Van_hooland

@VIBLifeSciences is an excellent partner to work with. Other countries can learn from it' dixit Eric Karran from @abbvie #20yearsVIB

Ive De Smet and Barbara De Coninck

PLANT PEPTIDES: KEYS TO UNDERSTANDING PLANT GROWTH AND STRESS RESPONSES

Peptides are well-known in the scientific community as signal molecules, but until recently, little has been known about their functions in plants. New research has shed light on what peptides mean for plants – not only in their growth and development, but also in how they regulate their reactions to stressors such as drought, heat and pathogens. A Special Issue of Journal of Experimental Botany (JXB) collects new papers that cover a combination of genetic, biochemical and developmental studies that shed light into the plant peptides' functions and actions – insights that can be easily translated to crop plants.

VIB research into these fundamental regulatory proteins is highlighted in this Special Issue of JXB, which was edited by Barbara De Coninck (VIB-KU Leuven) and Ive De Smet (VIB-UGent). A paper published by the team of Ive De Smet (VIB-UGent), which explores the role of a peptide called CEP5 in root development, was included in the compilation. Another paper authored by Ive and several international colleagues defines a new role to the RALFL34 plant peptide family, which is responsible for controlling the position and development of roots. The research team explored the role of RALFL34 through in-depth genetic profiling and analysis of mutant model plant specimens. A third VIB paper was included in the form of a study led by Pierre Hilson (former VIB-UGent; Institut Jean-Pierre Bourgin, UMR1318 INRA-AgroParisTechs at the time of publication) and his colleagues from the Plant Systems Biology Department of VIB-UGent, which explored the processing of the GOLVEN 1 peptide that controls cell elongation in plants.

Barbara De Coninck (VIB-KU Leuven): "Few plant peptides have been investigated in detail – this is only the tip of the iceberg. We estimate that plants make over 1,000 peptides – and probably many more – with huge potential in future studies that could impact agriculture worldwide."

Plant peptides - taking them to the next level. Journal of Experimental Botany. Edited by Barbara De Coninck and Ive De Smet

VIB PAPERS GET A POPULARITY BOOST: HIGHLY-CITED WORKS ON THE RISE

It's a simple fact that papers written by VIB scientists are being cited more and more often in scientific literature. Over the last 5 years, the number of papers cited over 100 times, as well as the number of new 1000+ citation papers, is on the rise. We'd like to take this opportunity to congratulate the VIB researchers who have contributed to these highly-cited, high-quality publications. But the proof is in the paper; great science speaks for itself!

Breaking records with breakthrough publications

For several years in a row, the number of highly-cited VIB papers published in the last 5-year window has been growing. Between 2011 – 2015, 101 papers with VIB authors or contributors have been cited over 100 times by the end of 2015, with 47 new 100+ citation papers on the list. Newcomers to the 100 citations threshold represent 46% of the total, a 12% increase over last year's list. Most of them investigate the molecular mechanisms of health and disease (76%), while 17% describe new tools in life sciences research. Even more, the majority – 84%! – of these highly-cited papers were published in high-profile T5 or T1 academic journals.

Achieving the 1000+ citation milestone

What's more, 7 additional papers have been cited more than 1,000 times – a huge achievement. These newcomers to the list of exceptionally-cited papers are related to recent breakthroughs in gut microflora (Jeroen Raes) and guidelines and clinical applications (Peter Carmeliet (VIB-KU Leuven), Peter Vandenabeele (VIB-KU Leuven) and Jan Cools (VIB-KU Leuven)). A paper describing a bioinformatics tool (Steven Maere (VIB-KU Leuven)) has also crossed the 1,000-citation threshold. Since VIB's foundation 20 years ago, 23 papers by VIB scientists have surpassed this esteemed number of citations.

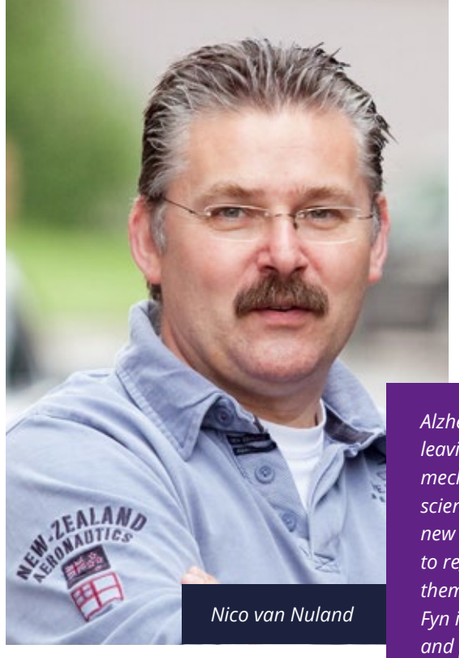
Curious to learn more? Have a look at the 5-year list of VIB highly-cited papers on the VIB website.

MAIZE TEAM

Maize is an increasingly important model at VIB. Besides the small group of people spearheading maize research, gradually more research groups start to use maize to validate their findings in the lab, but also in field trials. These are necessary steps towards securing sustainable plant derived products, which represents a mission of VIB.

Front row from left to right: Charlot Versteele, Hilde Nelissen, Kirin Demuynck, Jolien De Block, Xiaohuan Sun
Back row from left to right: Tom Van Hautegem, Lennart Verbraeken, Kim Feys, Bernard Cannoot, Hironori Takasaki, Nathalie Wuyts

Nico's co-authors wish to honor him with a quote from Ithaka, a Greek poem by C.P. Cavafy.



Nico van Nuland

VIB RESEARCH MAY LEAD TO EFFECTIVE ALZHEIMER'S THERAPIES

Alzheimer's disease affects more than 48 million people worldwide, eventually leaving them unable to care for themselves. In researching the activation mechanism of the Fyn kinase – a likely cause of Alzheimer's disease – a team of scientists led by Nico van Nuland (VIB-VUB) and Tom Lenaerts (VUB-ULB) has shed new light onto how this kinase is controlled. Cells use kinases, which are enzymes, to regulate processes like metabolism, signaling and nutrient transport, making them high-potential research targets. Nico and Tom's research describes how Fyn is regulated, paving the way for a drug with the potential to deactivate it and possibly halt or reverse the effects of Alzheimer's disease.

Kinases are switched on and off by the cell using a mechanism that disrupts how proteins interact on a molecular level through side chains – chemical groups directly attached to a protein's backbone that can influence the shape and function of the protein. By examining the specific toggling mechanism that the Fyn enzyme uses to regulate itself, the team gained valuable insight into the role that protein side chains play in the process. Related research has showed that toggling off Fyn in mice with the disease reduces memory problems in these mice.

How Fyn leads to Alzheimer's disease

The Fyn kinase is switched on through the activities of its side chains, causing it to alter a protein called Tau, eventually leading to the disintegration of crucial elements of brain cells. This new research provides drug developers with in-depth knowledge of the kinase's regulatory system, possibly leading to medicines that deactivate Fyn in Alzheimer's patients. This is an important breakthrough, as the only treatments that currently exist for this disease only temporarily improve symptoms and do not address the underlying causes.

Paying tribute to a courageous collaborator and an excellent scientist

The authors of this paper would like to dedicate it to fellow researcher and scientist Nico van Nuland, who was diagnosed with Amyotrophic Lateral Sclerosis (ALS) a few years ago. He has been courageously fighting this disease despite the poor prognosis. Without his expert knowledge, lively support and warm friendship, the team asserts that these results would never have been realized.

Nico, who specializes in protein-protein interaction, is a world-class scientist with very deep experience in nuclear magnetic resonance spectroscopy. His expertise was hugely beneficial to this research, and his many years of intensive work with VIB and numerous collaborators have been an invaluable asset not only to our organization, but to the entire scientific community.

Jo Bury (VIB): "Attracting Nico from Granada to come and work at VIB was a great decision for both sides. Nico brought his tremendous expertise in NMR technology to VIB and set up our NMR centre in no time. His expertise and dedication was amazing. His efforts made it possible to integrate the NMR technology into different sub-disciplines of life sciences. This interdisciplinary approach to studying disease pathways, and the possibility of revealing the dynamics of protein structures of different targets via NMR, have resulted in several scientific breakthroughs and will continue to do so in the future. Nico was always ready to share his expertise with fellow researchers, which makes him a very valued and respected person within the VIB community."

Huculeci et al., Structure 2016

GHENT-BASED RESEARCHERS ARE THE CREAM OF THE CROP IN RHEUMATOLOGY

Millions of people around the globe are currently suffering from rheumatism, which has a tremendous impact upon their lives and well-being. As an umbrella term, rheumatism covers dozens of specific diseases of the muscles, joints and bones – which require different treatments. Because an overall cure remains undiscovered, patients and their associations are placing their hopes in science. Saying that VIB is at the vanguard of global rheumatologic research may seem like a bold statement, but the recent achievements of Dirk Elewaut's team (UGent-UZ Gent) at our VIB Inflammation Research Center speak for themselves.

Dirk Elewaut

Ghent has been recognized worldwide as region of rheumatology excellence for some time now. In early September, this was once again illustrated by a gathering of world-leading experts in spondyloarthritis (one of the most commonly-occurring types of inflammatory rheumatism) in Ghent for the world's only spondyloarthritis biannual congress.
Dirk Elewaut: "Our department pioneered the use of anti-TNF therapy in spondyloarthritis around the year 2000, for what is now a globally-used indication. And by combining the expertise of VIB, Ghent University and Ghent University Hospital, we have further strengthened our position."

Ivy League of rheumatology

Earlier this year, the alliance between VIB, Ghent University and Ghent University Hospital was awarded the prestigious quality label Center of Excellence by EULAR, a non-profit scientific and educational association dedicated to facilitating knowledge transfer between research institutes and defending the interests of people with arthritis before Europe's governing bodies. It is the third time in a row that these Ghent-based researchers and clinicians have received the 5-year quality label.
"Being a Center of Excellence means that you've been recognized for being able to present both quality and quantity in publications," explains Dirk Elewaut, one of the driving forces. "Initiation into this 'Ivy League of rheumatology' was a real team effort. But achieving this label of excellence is one thing – maintaining it is the real endeavor. This is why we are planning to continue pooling together VIB and Ghent University's basic research knowhow with Ghent University Hospital's clinical expertise and experience."

The role of macrophages and gut flora

Two recent studies underline this ambition. The first one focused on enthesitis, a commonly occurring inflammation of tendons where they attach to the bone. In collaboration with the Geert van Loo lab (VIB-UGent), Dirk's team proved that macrophages that lack the anti-inflammatory protein A20 develop enthesitis. Since A20 suppresses the activation of STAT1, a signaling molecule that seems to be key in initiating enthesitis, the absence of A20 leads to the development of enthesitis. By using an inhibitor, the scientists were able to prevent the increase of STAT1 and successfully treat the inflammation. This approach may provide options for patients for whom existing inhibitors offer no relief.

The most recent feat of Dirk's team describes a striking link between spondyloarthritis and the human gut flora composition. Together with VIB's gut flora expert Jeroen Raes (VIB-KU Leuven), the researchers examined 27 spondyloarthritis patients to find an abundance of a particular gut microbe called Dialister, even in the disease's early stages. Consequently, these findings may provide opportunities for an improved diagnosis of spondyloarthritis. Dirk and his team are currently taking their research to the next stage, trying to determine what's so special about Dialister. To be continued!

Drennan et al., Journal of Experimental Medicine paper 2016
De Wilde et al., Ann Rheum Dis 2016
Tito et al., Arthritis Reumatol. 2016

RHEUMATISM: FACTS AND FIGURES

- There are over **200** different rheumatic diseases.
- Around **25%** of all Europeans (**120 million** people) suffer from a rheumatic disease.
- **20%** of Europeans are undergoing long-term treatment for rheumatism.
- The most common type is **rheumatoid arthritis**, an inflammation affecting the joints.
- **Women** suffer from rheumatoid arthritis **2.5 times** more frequently than men.

DIVERSE VIB TEAM INVESTIGATES THE POSSIBILITIES OF PLANT PROTEINS

Although both plants and animals are made up of cells, plants are generally unable to relocate, and thus can't migrate around freely like animals can. These constraints lead them to grow through cell division in three directions – forward, sideways or upwards – with proteins playing a role in giving cells the "identities" that eventually lead to wood and other plant tissues. A multidisciplinary group of scientists from the VIB Department of Plant Systems Biology and the VIB Medical Biotechnology Center recently collaborated on fundamental research that explores how the processes of plant root growth and patterning are affected by proteins – specifically, those that interact with a protein called ACR4.

From left to right: Kun Yue, Tom Beeckman, Ive De Smet, Geert De Jaeger, Daniël Van Damme and Kris Gevaert

Investigating the allure of roots

"At first sight, roots aren't exciting at all," jokes Tom Beeckman, 'root guru' at the VIB Department of Plant Systems Biology. "Roots only become interesting when you take a good look at their biology. Without roots, plant growth and productivity wouldn't be possible." Plant roots generally follow an 'open growth strategy', growing and branching over the entire life of the plant to provide the plant's aboveground parts with water and nutrients. They have the ability to use a layer of stem cells to create completely different tissues on the fly by responding to soil conditions.

"Intrigued by this mysterious stem cell layer, we stumbled across the ACR4 protein kinase, which plays a role in root development," Tom explains. "Protein kinases can change a protein's 3D structure, and the cell uses a process called phosphorylation to fine-tune how proteins adapt to different stimuli," elaborates Kris Gevaert. "Protein interactions play an important role in cell processes within plants and animals, which is why the study of protein networks results in some interesting biological findings."

The crucial role of proteomics

When proteins interact with other proteins, they form highly dynamic complexes that perform different functions, depending on their interaction partners at any given moment. Phosphorylation plays an important role in how proteins respond to their environments. To investigate phosphorylation, scientists must zoom in down to the molecular level. "We use mass spectrometry-based proteomics to analyze phosphopeptides and thus determine the natures of – and actually measure – phosphorylation events. There's no other technology that gives us such an in-depth look," says Kris.

"Geert De Jaeger's 'Tandem Affinity Purification' platform, or TAP, was also important to the study. The tool allows us to map protein-protein interactions in all of their details," notes Ive De Smet. TAP comes with the advantage of being able to detect protein interactions in situ as they occur. "TAP, in combination with mass spectrometry-based proteomics, helped us to gain completely novel insights into plant root development."

ACR4: the most interesting protein

Ive has been studying the ACR4 protein for a decade, ever since he was a PhD student in Tom Beeckman's lab. "This protein keeps getting more and more interesting," he says. "The ACR4 equivalent in corn controls the development of leaves and seeds, but we don't know very much at all about its other components."

Ive is convinced that the VIB Plant Systems Biology labs are the ideal environments for performing this kind of top level cross-domain research. "I've lived abroad and have been exposed to many different kinds of research environments, so I can say this with conviction," he asserts.

Multifaceted approach, surprising findings

The key to the success of this project was the multidisciplinary, multi-technique approach that the diverse teams used to study ACR4. Plenty of new information was revealed, including the identity of one of ACR4's interaction partners, protein PP2A-3. The team was also surprised to discover an unexpected biochemical feedback loop between ACR4 and PP2A, in which ACR4 phosphorylates PP2A and PP2A dephosphorylates ACR4.

Yue et al., Proc. Natl. Acad. Sci. U.S.A. 2016

THE SYNAPSE SERIES

HOW PATRIK VERSTREKEN'S BASIC RESEARCH ADVANCES MULTIPLE FIELDS

Patrik Verstreken (VIB-KU Leuven) specializes in brain research, with a particular focus on synapses. In various brain disorders, these junctions between nerve cells play a pivotal role. With an impressive series of leading papers published in the past few months, Patrik illustrates how focused and continued basic research can lead to breakthroughs applicable to a wide range of neurological diseases, including epilepsy, Parkinson's disease and Alzheimer's disease.

It is well-known that brain cells 'talk' to one another through synapses. But while considerable progress has been made in identifying the proteins present at the synapse, the roles of many of them in controlling synaptic functions remain poorly defined. That's why Patrik has made it his business to fully understand what happens at these crucial brain junctions.

Patrik, why are you specifically interested in synapses?
"Synapses are really the 'business end' of the brain. They transmit electrical signals from one brain cell to the next, and in doing so, they adapt and modulate the signals. The formation and breakdown of these contacts and the way they function are of critical importance to the way our brains 'see' and store information, like memories. The intriguing thing is that neurons are extremely polarized. Synapses are often very far away from the cell body, where DNA is stored and proteins are generated. Dopaminergic neurons, for example, are over 5.5 meters long! In order to bridge this distance, synapses need to operate independently for a large part. This is what we are studying in the lab: how do synapses regulate their own business independently? How do they maintain their function and how does this go astray in disease?"

Your work clearly shows the importance of basic research. Does it always come first for you?
"Yes, all our work is 'basic' in nature, even when we study genes related to disease. I am convinced that the only way to fundamentally understand a disease is to delineate the pathways affected and the mechanisms by which the relevant proteins, lipids and organelles operate. Taking shortcuts isn't going to work and it is critically important that we continuously remind funding bodies of that fact.
We haven't seen any major new medications for neurodegenerative conditions in the last 30 years or so. This is because we do not sufficiently understand the mechanisms behind these diseases. It is well-accepted that conditions such as Alzheimer's and Parkinson's disease originate at the synapse. However, we do not completely understand how synapses maintain their functions throughout the life of an organism. We need to understand how these diseases are affecting the synaptic machinery."

Do you have any advice for young researchers when it comes to pursuing basic science?
"Sure. Follow your interests, explore the world and above all, believe in yourself. This will help you in spotting opportunities. However, once you spot an opportunity, you have to bring focus to your ideas and your work."

> Most exciting discoveries are unplanned, so it's important to explore broadly.

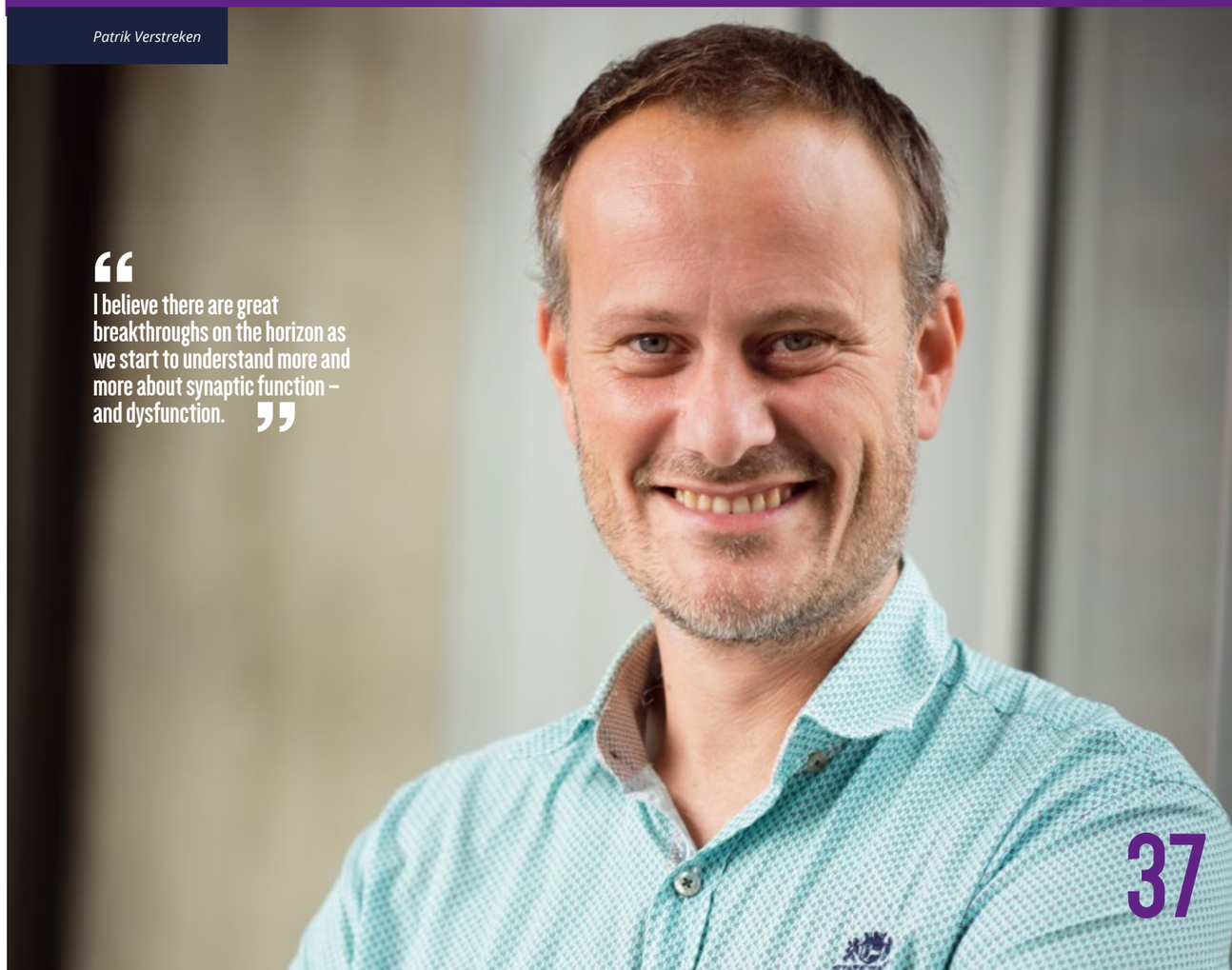
In the past months, you have published new findings at a remarkable pace. How did you manage this?
"Strategic collaborations, significant investments in technology and the generation of transgenic animals all help us speed up our ability to conduct experiments. That said, our recent publications are the result of projects that have been running for many years, thanks to the efforts of numerous people. Our collaboration with the Versées lab in Brussels, for example, has been ongoing for over five years and has three lead authors."

SEPTEMBER 2016: POSSIBLE NEW TREATMENT FOR EPILEPSY
(Fischer et al., Nature Structural & Molecular Biology 2016)
Research carried out in collaboration with professor Wim Versées (VIB-Vrije Universiteit Brussel) came to a surprising conclusion: increasing the concentration of specific fats in the brain is a possible strategy for preventing epileptic seizures. *(see page 22)*

OCTOBER 2016: DISRUPTION AT THE ROOT OF PARKINSON'S DISEASE UNCOVERED
(Soukup et al., Neuron 2016)
Research of the group of Patrik has shown for the first time that a malfunctioning stress-coping mechanism in the brain is at the root of Parkinson's disease. Genetic mutations that cause Parkinson's disease can prevent synapses from coping with the stress of intense brain activity. This damages the synapses and disrupts the transmission of brain signals.

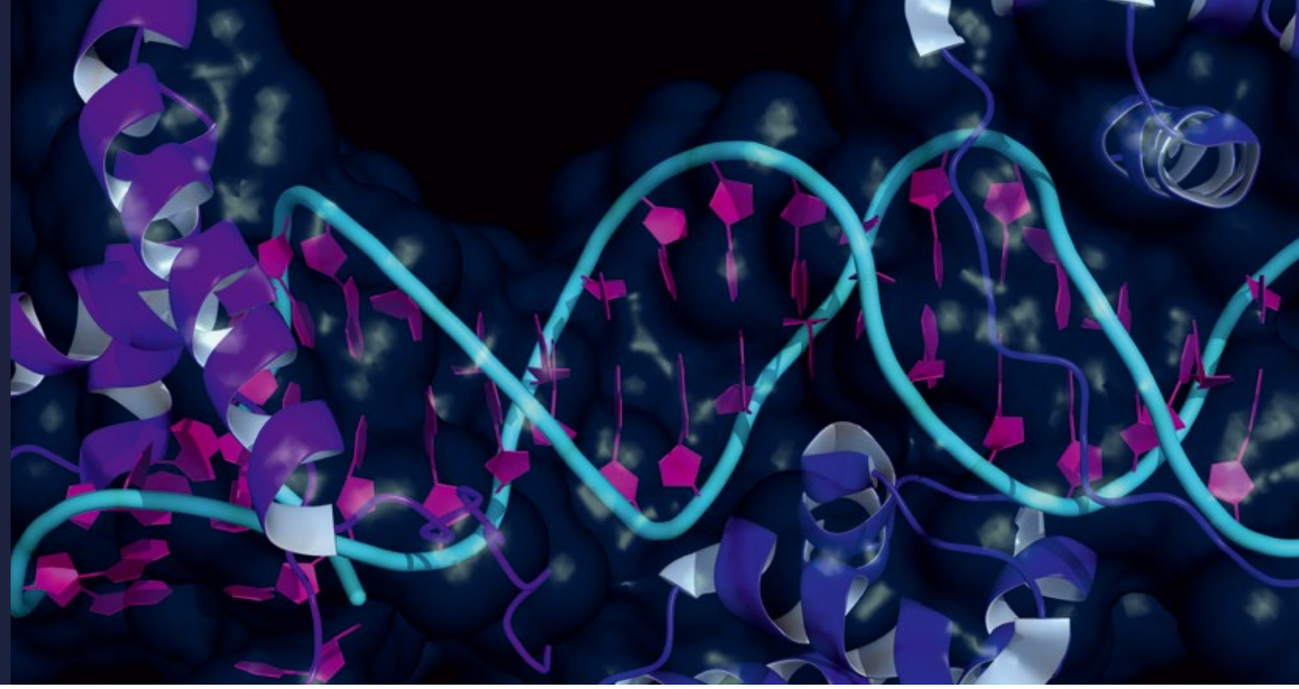
NOVEMBER 2016: INSIGHTS INTO HOW ALZHEIMER'S SPREADS THROUGH THE BRAIN
(Calafate et al., Cell Reports 2016)
Synapses play a pivotal role in the transmission of toxic proteins. This allows neurodegenerative diseases such as Alzheimer's to spread through the brain. This was the main conclusion of research by Sara Calafate and Patrik, in collaboration with Janssen Pharmaceutical Companies (Johnson & Johnson).

Patrik Verstreken



THREE STEPS ADD UP TO ONE SUBSTANTIAL LEAP IN CANCER METABOLISM RESEARCH

The fight against cancer is a long and tough one, with many battles still to be won – but we are gradually gaining ground. One battlefield currently growing in importance is the cell metabolism. Thanks to the fine work of our VIB colleagues at the Cancer Research Center (VIB-KU Leuven), a number of essential breakthroughs were made during the last few months. As they are closely intertwined and may seem quite similar at first glance, we shed more light on the recent publications and mutual collaborations of Massimiliano Mazzone, Sarah-Maria Fendt and Peter Carmeliet.



The VIB Center for Cancer Biology, with Diether Lambrechts at the helm, is dedicated to unraveling the molecular basis of vascular biological processes and diseases, with a specific focus on angiogenesis (the formation of blood vessels). The organization houses eight labs, each with its own scope and expertise, among which number the labs of Massimiliano, Sarah-Maria and Peter.

Different angles, viewpoints and collaborations

The cancer metabolism field is a hot topic, that's for sure. It is no coincidence that parameters affecting cancer development – both growth and metastasis – are being discovered at a fast rate. "This is challenging, but also yields great opportunities," confirms Sarah-Maria. "After all, the mechanistic understanding of cancer metabolism should be taken into account in the development of anti-cancer drugs. The more parameters we find, the more precise and personalized – and thus effective – therapies will become."

The three studies, published in the renowned journals Cell Metabolism, Cell Reports and Cancer Cell, are fundamental steps towards those kinds of targeted treatments. But these labs wouldn't have made waves in the international scientific community without each other's help. For example, the metabolism expertise of Peter's team triggered Massimiliano to include this research angle in his project. And vice versa: Peter benefitted from working with the other Cancer Research Center labs because of their knowhow relating to tumor oxygen shortage and blood vessel formation (Massimiliano) and expertise in stable isotope metabolite labeling and analysis (Sarah-Maria).

Discoveries marked by knowledge transfer

Tumors are sometimes studied as homogeneous entities, but they actually consist of complex interactions between cancer, stromal, and immune cells. "That is why collaborations are indispensable to understanding the bigger picture of tumor metabolism," says Sarah-Maria. Peter agrees: "Our combined expertise gives added value to our research projects, not only via our shared knowledge and experience, but also through the exchange of state-of-the-art technologies. This increases the impact of our studies immensely."

If you take a look at pivotal biological discoveries, it is clear that great science is rarely a solo effort. "The examples are numerous," says Massimiliano. "Macrophages were discovered by a zoologist, RNA silencing was first revealed in plants before being applied intensively in medicine, we owe green fluorescent protein to a biochemist studying an algae protein, and so on. These game-changers are marked by multidisciplinary approaches or knowledge transfers.

The same applies to our cancer breakthroughs. I'm convinced that our future discoveries will also involve benefitting from each other's strengths."

THE THREE PAPERS IN A NUTSHELL

1. MASSIMILIANO MAZZONE: "GLUCOSE COMPETITION BETWEEN MACROPHAGES AND BLOOD VESSEL CELLS"

"We discovered that macrophages, a particular type of white blood cell, can be tuned to prevent the spread of cancer. The key is in making these macrophages more prone to 'stealing' glucose from the cells forming the tumor's blood vessels. In other words: we install a glucose competition between the macrophages and the cells forming the blood vessels. As a result, the latter are not overstimulated by glucose anymore, leading to healthier, tighter and stronger tumor vessels. This could prevent cancer cells from spreading to other organs."

Wenes et al., Cell Metabolism 2016

2. SARAH-MARIA FENDT: "DIFFERENT DRUGS FOR CANCER METASTASES THAN PRIMARY CANCERS"

"Today, the treatment of breast cancer derived lung metastasis is usually based on the genetic background of the primary breast cancer. However, these therapies often fail. We may have revealed one important aspect in this failure. It appears that metastasizing cancer cells are able to adapt their metabolisms to the specific organs they are invading. This is a response to subtle changes in the lung nutrient microenvironment that override the influence of cancer-specific genes. So, our conclusion is that cancer metastases should be treated with different drugs than the corresponding primary cancers."

Christen et al., Cell Reports 2016

3. PETER CARMELIET: "MULTIPLE BENEFITS OF RESTORING IMPAIRED TUMOR VESSELS"

"Our research started with the observation that overconsumption of glucose by tumor blood vessel cells makes them fragile and permeable, and allows cancer cells to use them as 'highways' to spread to distant organs. We were able to manipulate the blood vessel cells' metabolism and neutralize their sugar consumption by using a small molecular compound. Our results indicate that this approach could heal the impaired tumor vessels, reduce metastatic spread and structure the vessels which resulted in a better delivery of chemotherapy drugs and immune cells to the tumor."

Cantelmo et al., Cancer Cell 2016

HOW OUR SWITCH LAB PLANS TO CATCH TUMORS IN A SPIDER'S WEB

Boiled eggs, beer foam and spider silk might seem unrelated at first glance. However, their proteins all share a similar structural element: amyloid. Although these 'clumps' of proteins are usually associated with disease development, their properties could be used to fight a wide array of conditions. Enter Pept-in™: a brand-new technology platform that exploits the power of protein aggregation to develop novel medicines. Credits go to our Switch Laboratory (VIB-KU Leuven) and inventors Frederic Rousseau and Joost Schymkowitz (VIB-KU Leuven).

From left to right: Filip Claes, Frederic Rousseau, Ladan Khodaparast, Joost Schymkowitz, Rodrigo Gallardo, Laleh Khodaparast, Frederik De Smet and Matyas Desager

> "In an era where the entire field was working to prevent aggregation, our lab turned things upside down."

The first validated result of this new technology is called vascin, a designer amyloid that targets a well-known cancer protein. In short, vascin penetrates a cell and induces the formation of protein aggregates of its target protein, VEGFR2. These 'clumps' are the result of VEGFR2 proteins sticking together, making them nonfunctional. Because VEGFR2 is crucial to the survival of certain cancer types, its inactivation kills the cancer cells and reduces the tumor's growth.

Fighting human and plant diseases

The principle of using amyloids to destroy the function of cancer drivers? "Like catching oncogenic proteins in a spider's web," Frederic sums up. "But Pept-inTM is valuable beyond cancer applications as well. Because these principles apply to virtually any protein, our approach may also be useful in treating drug-resistant infections. Although we don't yet know if functional amyloids could be used in humans for therapeutic applications, the potential for novel drugs is huge. Our team will now spend the coming years trying to turn this into direct benefits for patients."
Apart from fighting tumor growth, the Switch Lab collaborated with several research groups, both inside and outside VIB, to demonstrate that this technology could also be suitable for a variety of other applications. These include treating drug resistant bacterial infections (in collaboration with Johan Van Eldere, KU Leuven), combatting fungal infections (in collaboration with the Patrick Van Dijck lab, VIB-KU Leuven) and even engineering improved crops (in collaboration with the lab of Jenny Russinova, VIB-UGent).

The journey towards Pept-in™

Of course, developing an entirely new technology platform did not happen overnight. The idea was first formulated shortly after the publication of the TANGO algorithm in 2004, used to predict protein aggregation. It is based on the short stretch hypothesis of protein aggregation, which states that short aggregation prone regions in a protein drive its aggregation in a sequence-specific manner. "In an era where the entire field was working to prevent aggregation, our lab turned things upside down," remembers Joost. "After all, we were trying to induce the controlled aggregation of specific target proteins. Although we wanted to understand the difference between functional and pathological aggregation, the potential implications of such a protein knock-down technology were immediately apparent. Turning the idea into practice, however, turned out to be much more challenging than initially anticipated and required many steps of technical innovation and fine-tuning."
After a decade of intensive research, the Switch team was able to disclose information, eventually leading to a publication in the peer-reviewed journal Science. Meanwhile, the technology was subject to broad patent protection.

New business strategies

In close collaboration with the Switch Lab, VIB's tech transfer team is actively pursuing the translation of this top science achievement into societal value. According to Els Beirnaert, Senior Manager New Ventures VIB, Pept-in™ differentiates itself in many aspects from competing platforms. Els: "Its novel mode of action and designability and potential to knock down challenging intracellular disease targets make this technology an attractive basis for the development of groundbreaking medicines for a variety of diseases."

Science Paper
Gallardo et al., Science in press 2016

Paper with Van Eldere Lab
Bednarska et al., Mol Microbiol 2015

Plant paper with Jenny Russinova Lab
Betti et al., Plant Physiology 2016

QUICKSCAN

1

#immunology #translational science

Mice are not humans. It is trite, but true, and successful manipulation of the human immune system requires a comprehensive understanding of human immunology. A key factor in human immunology, often lost in inbred mouse strains and SPF conditions, is the enormous diversity present from individual to individual. This review of the Adrian Liston group (VIB-KU Leuven) synthesizes the recent advances in understanding human diversity, and the genetic, environmental and intrinsic forces that shape that diversity.

Liston et al., Trends in Immunology 2016

2

#protein quantification #genome editing

In collaboration with other VIB labs, the Sven Eyckerman lab (VIB-UGent) designed a universal quantitative mass spectrometry (MS) assay by mining the proteome of P. furiosus for peptides with optimal MS properties. Using CRISPR-Cas9, these peptides were fused to endogenous proteins, enabling sensitive quantification in complex samples without prior enrichment, and enabling endogenous protein-protein interaction studies.

Vandemoortele et al., Scientific Reports 2016

3

#sepsis #inflammation

In their search for solutions for sepsis, the research team of Claude Libert (VIB-UGent) recently contributed two papers that help define new therapeutic targets. In the first paper, published in PNAS, they describe an easy way to detect variant alleles in the genome of any mouse strain by developing new algorithms. They show proof of principle using Mus spretus, a mouse species displaying extreme resistance to sepsis. In the second paper, Sriram Balusu, a VIB International PhD student (VIB-UGent) shared with Kris Gevaert (VIB-UGent) and Roosmarijn Vandenbroucke (VIB-UGent), describes how micro RNAs are released by the choroid plexus in exosomes in the cerebrospinal fluid during sepsis. The micro RNAs communicate with the brain and thus provide a new, targetable way of communication between the periphery and brain.

Steeland et al., PNAS, 2016
Balusu et al., EMBO Mol Med, 2016

4

#AMPK #nuclear receptors #food deprivation

Researchers at VIB and the Pasteur Institute in Lille uncovered a novel adaptation mechanism to food deprivation. Using genome-wide ChIP- and RNA-seq analyses in primary murine hepatocytes, Dariusz Ratman from the team of Karolien De Bosscher (VIB-UGent) revealed a cross-talk between activated GR and PPARα. Prolonged hepatocyte fasting coincides with gene promoter recruitment of phosphorylated AMP-activated protein kinase (AMPK) at key GR/PPARα co-controlled genes involved in lipid/glucose metabolism. Overnight fasting in mice confirmed chromatin association of activated AMPK specifically at GR/PPARα target genes, establishing a direct role for AMPK in regulating transcription in the nucleus.

Ratman et al., Nucleic Acids Res. 2016

5

#plant genomes #guidelines

Genome sequencing is becoming cheaper and faster thanks to next-generation sequencing techniques. Also for plants, dozens of new genome sequences have been released in recent years, ranging from small to gigantic repeat-rich, or polyploid, genomes. Obviously, the complexity of a genome poses major challenges to obtaining a contiguous and complete genome sequence where all genes are correctly identified. The lab of Klaas Vandepoele (VIB-UGent), in collaboration with Elisabeth Veeckman and Tom Ruttink from ILVO, performed a systematic analysis on how to reliably estimate the completeness of a genome assembly and annotated gene space. Different measures of completeness were compared in twelve recently-published plant genomes. Several cases were highlighted in which dissimilar completeness scores are the consequence of technical issues of assembly or annotation, or due to strong biases in the expected gene space. A set of guidelines were formulated to help plant scientists in delivering better plant genome sequences, which are the templates for new biological discoveries and applications.

Veeckman et al., The Plant Cell 2016

6

#biofilm #staphylococcus aureus

Biofilm formation by *Staphylococcus aureus* is a major problem in hospitals. In collaboration with Françoise Van Bambeke (UCL), the Patrick Van Dijck lab (VIB-KU Leuven) discovered a new way to treat these biofilms using an antifungal drug. This antifungal drug targets bacterial extracellular matrix production, allowing antibiotics, which are normally trapped in the matrix, to reach the cells and kill them. This finding is important as it opens up novel avenues to tackling the problem of bacterial biofilm formation.

Siala et al., Nature Communications 2016

7

#SYNJI deficiency # phosphoinositide phosphatase #synaptic vesicle recycling

SYNJ1 encodes a polyphosphoinositide phosphatase (Synaptojanin 1) with a prominent role in synaptic vesicle recycling dynamics. Leading the genetic analyses within a large European consortia on rare epileptic syndromes (EuroEpinomics), the lab of Peter De Jonghe (VIB-UAntwerp) identified three families with autosomal recessive SYNJ1 variants. Premature stop variants were shown to almost completely abolish mRNA transcript production and, in collaboration with Pietro De Camilli (Yale School of Medicine, US), a missense variant was found to impair, but not abolish, the dual phosphatase activity of SYNJ1. A previously reported SYNJ1 variant selectively abolished only one of two consecutive phosphatase domains, leading to an early onset parkinsonism. These results provide evidence that a critical reduction of the dual phosphatase activity of Synaptojanin 1 underlies a severe disorder with neonatal refractory epilepsy and a neurodegenerative disease course.

Hardies et al., Brain 2016

8

#alzheimers #ABCA7

Evidence is accumulating that premature termination codon mutations in ABCA7 contribute to Alzheimer's disease. The Christine Van Broeckhoven lab (VIB-UAntwerp) performed a detailed clinical and pathological characterization of mutation carriers. While carriers had classical Alzheimer's disease, a wide onset age range and high familial load were noted, indicative of intermediate to high penetrance, warranting further analysis of their clinical relevance.

Van den Bossche et al, Neurology 2016

TECH WATCH: SINGLE CELL TECHNOLOGIES

Technologies for single-cell analysis are providing extraordinary novel insights into the complexity of biological systems such as tissue heterogeneity, gene expression dynamics, cellular development and disease progression. The Tech Watch team has seen significant growth in companies with technologies that can manipulate single cells on an unprecedented level. Below are a few companies we believe are developing next-gen platforms for single cell analysis:

BERKELEY LIGHTS
The US company Berkeley Lights has developed a disruptive technology that is enabling a fundamentally new approach to biology for massively parallel and automated selection, manipulation, and analysis of thousands of cells, at the push of a button.
Their OptoSelectTM visible light technology uses low intensity visible light to visualize and manipulate selected cells based on surface markers or morphology in a nanofluidic system. Applications consist of: single cell sequencing including locating and annotating very rare cells (e.g. analysis of tumor heterogeneity), antibody discovery by measuring secretion of single cells, and cell line development and screening. See more info on the Berkeley Lights website.

CYTOSURGE
The Swiss company Cytosurge have developed a technology called FluidFM whereby a nanosyringe is used to penetrate living single cells (without killing them), and subsequently extract specific organelles/cytoplasm for downstream molecular analysis such as enzyme activity or gene transcription. This unique technology allows analysis of cells in their native conditions (e.g. within a tissue culture) with the ability to repeatedly sample from the same cell. This opens up opportunities for novel cell exposure experiments with the ability to directly analyze the effects of different treatments on single cells. Taking the FluidFM technology one step further, it has even been speculated that it may be possible to use FluidFM to transplant the content of cell nuclei, thus enabling the construction of artificial cells. Learn more on the Cytosurge website.

PRIMITY BIO
The US company Primity Bio has developed an assay platform for high-throughput analysis of cell surfaces and pathway phenotyping. The platform can profile more than 100 intracellular readouts after treatment with potential drugs (antibodies/ small molecules/ligands etc.), allowing drug activity mapping across cellular signaling networks, measuring phosphorylation, acetylation, and total protein levels. Furthermore, 400 surface proteins with multiple panels of antibodies and stains can be analyzed to give high resolution maps of single cell surfaces. Visit the Primity Bio website to discover more.
For more information on the technologies of these companies and for answers to further questions, please contact the Tech Watch team at technologywatch@vib.be.

agrosavfe
protecting and saving safely

AGROSAVFE'S DESIGNER PROTEINS FOR CROP PROTECTION PROVE THEIR WORTH

The product name Agrobodies® might sound like something out of science-fiction, but they are actually small designer proteins that can be tweaked to fight crop pests and diseases and are created by the VIB spin off company AgroSavfe. In September 2016, AgroSavfe successfully raised EUR 7.8 million to further develop Agrobodies® into effective biopesticides, which are designed to control key fungal diseases on a wide range of crops.

FUNDING TO DEVELOP NOVEL BIOFUNGICIDES

Fighting harmful plant pests and diseases with proteins: this is the goal of Belgian agro-biotech company AgroSavfe, which has secured EUR 7.8 million that will fund the development of its innovative Agrobodies® - proteins that can fight crop pathogens – into effective new biofungicides. These proteins work by binding to essential elements of diseases, insects and other crop threats, destroying them or making them ineffective. As these proteins are highly specific and readily degradable in nature, Agrobodies® are safe for growers, consumers and the environment. AgroSavfe plans to focus its development efforts on the fruit and vegetable market at first, moving to fungicides for cereals and soybeans at a later stage.

Next to renowned investment organizations such as Gimv, PMV, Biovest and Agri Investment Fund, there is also an industrial partner (Globachem NV) and VIB.
"This is a technology with amazing breadth, and it's easy to manufacture – the market potential is enormous," says Koen Quaghebeur, president of Globachem NV.
Johan Cardoen (Managing Director VIB) is also enthusiastic: "This provides the necessary funds for AgroSavfe to transform its high-potential leads in biofungicides into real products."

VIB TECH TRANSFER TAKES RESEARCH TO PRIVATE PARTNERS AND BEYOND

As important as fundamental research is to new insights and discoveries, VIB is also committed to transforming those insights into real products, crops, medicines and therapies that improve lives. So, who is enabling those essential links between the scientists and businesses with the capabilities of taking VIB's research results to the next level? That's where the VIB Tech Transfer team comes into play. Jan Staelens, Business Development Manager in VIB's TT team, describes why collaboration with industry is the key to real-life solutions, and gives us the scoop on how it's done at VIB.

Scientists are excellent at what they do – excellent science. But what has to happen to take the information and discoveries that result from basic research and extrapolate it to develop tangible products with the power to change the world? Tech transfer is a key element of VIB's overarching vision, and involves a blend of good science, good business and good communication to be successful.

Doing business and keeping scientists focused

A scientist by training, Jan has been with the Tech Transfer Team at VIB since 2008. The program forges fruitful, long-lasting, mutually beneficial relationships between VIB projects and scientists on the one hand, and funders, nonprofits or private companies on the other. The program also takes the more business-focused responsibilities out of the hands of VIB scientists so they can pour all their attention into their projects.

Jan Staelens: "It's an extremely multidisciplinary team here at Tech Transfer – we have people with backgrounds as diverse as pharma, life sciences, plant biotechnology and even veterinary science. It's always useful to approach problems from different angles – that's how innovation happens."

And it's not all about commercialization – two-way learning is also an important result. VIB can gain valuable insight into how to move projects forward from partner companies and organizations – 50% of which are Flemish, with the remaining half spread across the globe. And because the Tech Transfer team works closely with scientists and companies in many areas of life sciences, they really have to 'know their stuff' so-to-speak.

Jan: "We have to know what files everybody is working on, and we have to understand the science intimately. Most of these projects are incredibly focused, and it's up to us to find the best link between companies, scientists and VIB projects."

Launching the process of commercialization

Being up-to-date on current VIB projects gives the Tech Transfer Team the information they need to identify the right corporate partners. Sometimes, corporate partners contact VIB scientists directly to engage, or the Tech Transfer team connects with suitable companies in their network or at trade fairs and conferences. Once a good fit is found, it's up to Tech Transfer to get involved in the process as early as possible and negotiate the agreements that will lead to collaborations.

Jan: "The backbones of these projects are usually the deep understandings shared by the scientists on both sides. Of course, there has to be a good match with the project and the scientists involved, but the partner company has to have the ability to take the file toward commercialization. And trust between all parties involved is essential for a successful collaboration."

Even though a project looks promising and the corporate partner is a great match, it's never easy to get a good grip on the project's potential at such an early stage. Attrition can be very high, especially in drug discovery, but taking these risks is the only path to those world-changing medicines and therapies.

VIB Discovery Sciences enables translation towards product development with Biopontis

VIB Tech Transfer kick-started VIB Discovery Sciences recently to enable scientists to engage in early drug discovery projects based on scientific breakthroughs. A recent example of such a project is run with Biopontis, a nonprofit, charitable alliance with the objective of treating an ultra-rare disorder called Charcot-Marie-Tooth disease. This project is based on scientific insights generated by the lab of Albena Jordanova and supported through the VIB Discovery Sciences team. The nonprofit has an excellent relationship with patient organizations and is closely connected to patient needs. Both sides bring science and expertise together with the long-term aim to identify an innovative drug development avenue for CMT.

VIB and ALK: working together for the long haul

VIB's strategic alliance with Danish pharma company ALK is a good example of a long-term collaboration. Both ALK and VIB have deep expertise in allergy immunotherapy, and the goal of the alliance is to learn together, contribute together and build relationships while working together on different allergy immunotherapy projects.

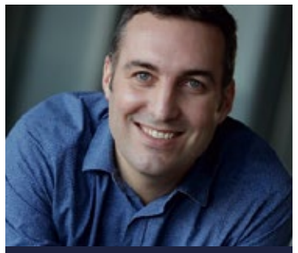
Jan: "VIB's resident allergy expert, Bart Lambrecht, is extremely visible in the scientific community, and this also attracted the attention of ALK. The alliance between ALK and VIB is focused less on developing a very specific product right now and more on fostering this great contributive relationship. It's a very early collaboration with no intellectual property involved; we're together to teach and learn from each other – another key element of tech transfer."

Jan Staelens

BIG ENTRANCES AND VENERABLE EXITS AT VIB

Whether they are new PI's joining us or experienced ones pursuing exciting new opportunities, we would like to take a moment and respectively extend a warm welcome and a special thanks.

INCOMING PIs

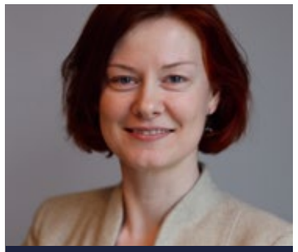


STEIN AERTS

WHERE?
Stein Aerts Lab at the VIB Center for the Biology of Disease, KU Leuven
WHO?
Stein Aerts has a double degree in bio-engineering and computer science, and started his career as bioinformatics consultant. After two years in Pharma/Biotech industry, he moved back to the University of Leuven where he obtained his PhD in Bioinformatics from the School of Engineering. As FWO postdoctoral fellow he studied Drosophila regulatory genomics at VIB and was visiting postdoc at IBDML in France. He became Assistant Professor at KU Leuven in 2009, where he started the Laboratory of Computational Biology at the Department of Human Genetics.

GABRIELE BERGERS

WHERE?
Gabriele Bergers at the VIB Cancer Research Center, KU Leuven
WHO?
Educated in Germany, Austria and California, Gabriele Bergers has had a long career cancer research and neurological education, principally at the University of California San Francisco. She is an experienced lecturer, speaker and reviewer with numerous awards, honors and fellowships under her belt. Her areas of interest include tumor microenvironment, angiogenesis, tumor inflammation, stem cells, epithelial-mesenchymal transition, resistance mechanisms to therapy and various forms of cancer.



NATALIA GONKO

WHERE?
Electron Microscopy Platform at the VIB Center for the Biology of Disease, KU Leuven
WHO?
Originally from St. Petersburg, Russia, Natalia Gonko began her undergraduate education with neuroscience and has continued along this path, completing her PhD in this field at the University of Groningen. Since 2014, she has been the Electron Microscopy Unit Manager at the Institute of Molecular and Cell Biology/ Institute of Medical Biology at A*Star in Singapore.

THOMAS JACOBS

WHERE?
Thomas Jacobs Lab at the VIB Department of Plant Systems Biology, UGent
WHO?
Having received his PhD in plant breeding genetics and genomics in 2014 from the University of Georgia, Thomas Jacobs is fascinated by the application of biotechnology to create useful plants. His areas of interest are genome editing, small RNA pathways and gene silencing, and he holds a patent covering compositions and methods of gene silencing in plants.

AYA TAKEOKA

WHERE?
Aya Takeoka Lab at the Neuro-Electronics Research Flanders, Imec
WHO?
Aya Takeoka received her PhD from the University of California in molecular, cellular and integrative physiology in 2010. A postdoc fellow in biomedical research at the University of Basel in Switzerland for the last 6 years, Aya has a keen interest in neuroscience – specifically neural regeneration – and has been involved in many publications and has given talks in Europe, Japan and the United States in this field.

ALAN URBAN

WHERE?
Alan Urban Lab at the Neuro-Electronics Research Flanders, Imec
WHO?
Hailing from France, Alan Urban is an alumnus of Henri Poincaré in Nancy, France. He completed his PhD in molecular biology in 2007, following which he did his postdoc in neuroscience at l'Ecole Supérieure de Physique et de Chimie Industrielles de Paris (ESPCI). He holds two patents and his areas of expertise include imaging, fluorescence microscopy, optogenetics actuators & sensors, and electrophysiology.

LEEN VANHOUTTE

WHERE?
Transgenic Mouse Core Facility at the VIB Inflammation Research Center, UGent
WHO?
A Belgian native, Leen Vanhoutte will start as a PI after already several years working with Bart Lambrecht at the Inflammation Research Center. With an undergraduate background in industrial science, biochemistry and biotechnology, she completed her PhD in medical science at Ghent University and now specializes in various aspects of embryology. She will lead the Transgenic Mouse Core Facility together with Tino Hochepied.

OUTGOING PIs

CLAUDIA BAGNI

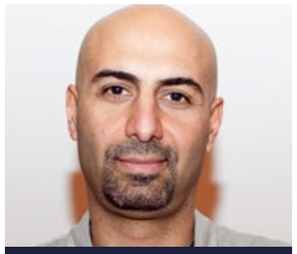
Claudia Bagni will be leaving the VIB Center for the Biology of Disease, KU Leuven to take on a new role as the Chair of the Department of Fundamental Neurosciences at the University of Lausanne, Switzerland as of January 1, 2017.

GEERT BERX

Continuing his cancer research at the University of Ghent, Geert Berx will be leaving the VIB Inflammation Research Center as of January 1, 2017.

PATRICK CALLAERTS

As of January 1, 2017, Patrick Callaerts will be continuing his research in behavioral and developmental genetics solely for KU Leuven, after a 14-year career as group leader at the VIB Laboratory of Behavioral and Developmental Genetics, KU Leuven.



BASSEM HASSAN

Bassem Hassan will be bidding adieu to his 15-year group leadership role at the VIB Center for the Biology of Disease, KU Leuven as of January 1, 2017 to start a new research group at ICM in Paris.

FRANS VAN ROY

After his research career as group leader at the VIB Inflammation Research Center at Ghent University, Frans Van Roy was retired from October this year.

AWARDS & GRANTS

VIB talent attracts the attention of esteemed supporters of science from around the world. Here's a quick overview of the achievements of VIB scientists who have been recognized for their vision, curiosity, dedication and excellent science during the past quarter. A hearty congratulations to every one!

PETER VANDENABEELE

Peter Vandenabeele of the VIB Inflammation Research Center at Ghent University was presented with the prestigious Jürg Tschopp Science Award for Excellence by the leading-edge scientific journal *Cell Death & Differentiation*. He received it for his pioneering work in the domain of cell death and inflammation.

> We stand on the shoulders of giants, and Jürg Tschopp was one of them. Despite the fact that he was an extremely talented scientist, I remember him as a humble, accessible and amiable person, always ready to discuss and to encourage young scientists to pursue their results even when they do not fit the current concepts.

CHRISTINE VAN BROECKHOVEN

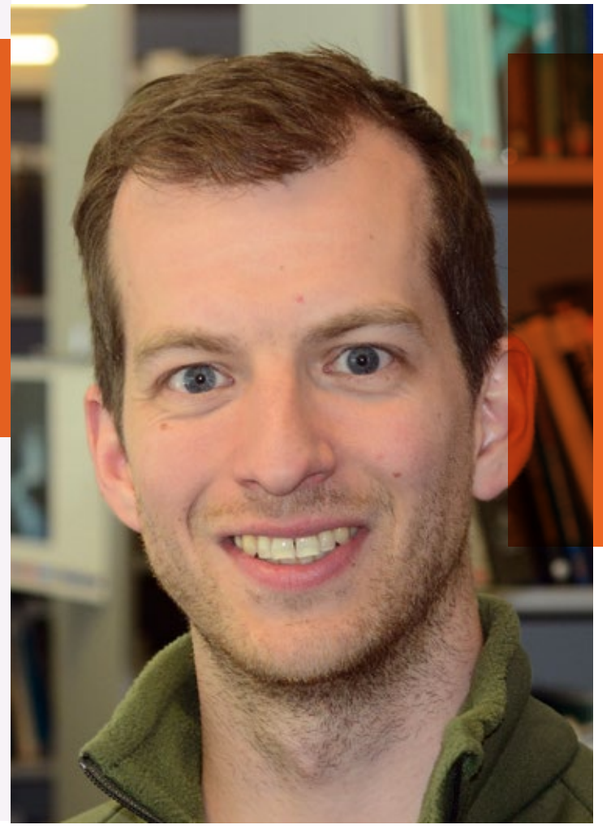
Christine Van Broeckhoven, director of the VIB Department of Molecular Genetics, UAntwerp, has been awarded the INSEAD Innovator Prize of 2016 for her groundbreaking research, which is described by the selection committee as a cornerstone in the analysis of the genetic basis of neurodegeneration. Her findings have helped advance understanding of neurodegenerative dementia, and her dedication to societal engagement has touched the lives of many people affected by these diseases.

LUCAS TREPS

Lucas Treps, postdoctoral researcher at the VIB Center for Cancer Biology, KU Leuven, was one of 14 happy winners to be awarded EUR 25,000 by the French Bettencourt Scheuller Foundation, which provides young scientists with the funds they need to complete their postdoctoral internships at the highest-quality foreign laboratories.

HOLGER GERHARDT

Holger Gerhardt, group leader at the VIB Center for Cancer Biology of KU Leuven, is included in the 125th anniversary publication of the Lister Institute as part of the Lister Institute Top 10. He is included among mainly historical names as a recent example of a scientist funded by the Lister Institute.



BERT DE RYBEL

Bert De Rybel, scientist at the VIB Department of Plant Systems Biology, UGent, was awarded an ERC Starting Grant by the European Commission, consisting of nearly EUR 1.5 million over 5 years. As one of the most prestigious grants for young researchers in the EU, it is designed to encourage young talented research leaders to gain independence and build their careers.

> Receiving the ERC Starting Grant is one of those special moments when you feel both supported by the scientific community and excited by the opportunity to tackle the next big question in your line of research.

Evgenia Salta, Carlo Sala Frigerio and Heather Rice

HEATHER RICE, EVGENIA SALTA AND CARLO SALA FRIGERIO

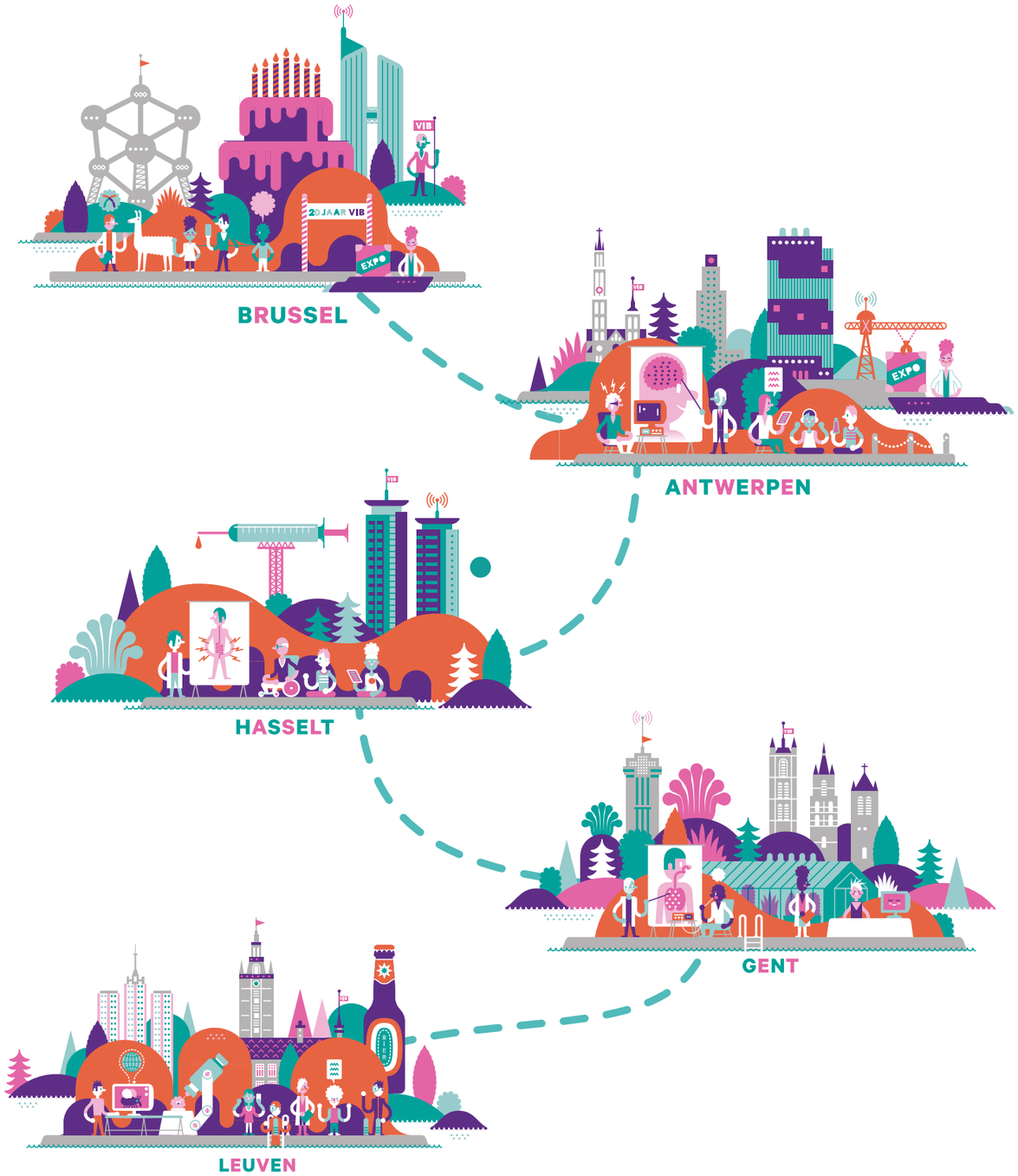
Heather Rice, Evgenia Salta and Carlo Sala Frigerio (VIB Center for the Biology of Disease, KU Leuven) were awarded Research Fellowships of $150,000 each by the Alzheimer's Association. The fellowship program supports exceptional researchers in the field of Alzheimer's disease and other dementias engaged in their post-graduate work for up to three years.

Evgenia's project is titled "Functional validation of miR-132 loss in AD and therapeutic targeting", and this grant will fund her further research on the effects of microRNA loss on Alzheimer's disease pathology and the potential of microRNA replacement in clinical therapy.

Heather's project concerns "Selective vulnerability of interneurons in Alzheimer's disease." The grant will allow her to investigate the physiological function of amyloid precursor protein in this subset of interneurons and the contribution of those interneurons to amyloid plaque formation and hippocampal circuit dysfunction in Alzheimer's disease.

Carlo's research project is titled "Somatic mutations as pathogenic drivers in sporadic Alzheimer's disease". He will use his grant to analyze the DNA of sporadic Alzheimer's disease patients to look for causative somatic mutation and model the occurrence of these mutations in mice to characterize the mechanisms responsible for the propagation of disease from the mutant focus to the entire brain.

THE VIB BIOTECH TOUR IS COMING TO TOWN



Since October 2016, our biotech tour has been moving from town to town, treating people to a captivating exposition as well as 'biotech talks' to celebrate VIB's 20th anniversary.

EXPOSITION FOR THE WIN

After kicking off in Brussels, the exposition moved to Antwerp and Hasselt before setting up shop in Ghent. Bringing biotech research closer to society, we went from university campuses to hospitals, and also reached about 3000 people during the Day of Science on November 27, 2016.

> **An amazing experience! It was also great to see how many young people are motivated to keep their finger on the pulse of what's happing in the world of science and beyond.**
>
> *Saskia Lippens about TEDx*

TALKING BIOTECH

On October 13, 2016 we kick-started our first 'biotech talk' – which took place at Antwerp University Hospital. The central theme? Citizen science. The interview with Christine Van Broeckhoven on Radio 2 during the popular 'De Madammen' show was the ideal extra trigger to get attention for this very relevant aspect of scientific work.

Christine Van Broeckhoven (VIB-UAntwerp) talked about the pressing need for volunteers for her research on Alzheimer's disease. Meanwhile, Doris Vandeputte discussed how the Flemish Gut Flora Project (VIB-KU Leuven) counts on the support of thousands of volunteers, and Bart Loeys (UZA) took us behind the scenes of heart disease research at Antwerp University Hospital. Quite some attendants signed up as volunteers at the end of this evening.

TEDX EVENT TO BE PROUD OF

On November 30, 2016 Saskia Lippens (VIB-UGent) and Steven Boeynaems (VIB-KU Leuven) shared their passion for research, art and positive societal impact at TEDxUHasseltSalon – taking the floor alongside artist Koen Vanmechelen and Jack van Horssen (UHasselt). With a baseline like 'life is science', their biotech talk was bound to receive a lot of attention.

Saskia: "An amazing experience! It was also great to see how many young people are motivated to keep their finger on the pulse of what's happing in the world of science and beyond."

Steven: "Participate in a TEDx conference? I didn't have to think twice! I really appreciated the support from both our VIB HQ and the TEDx community."

JOIN IN

You can still join the biotech tour on its cross-country trip in:
- Ghent, until January 13, 2017;
- Leuven, from January 16 until February 12, 2017;
- Brussels, from February 13 until February 19, 2017.

What's more, the tour will come to a festive close on February 20, 2017 at the Flemish Parliament in Brussels. More info at www.biotechtour.be.

From left to right: Sten Linnarsson, Thomas Riemensperger, Karthik Shekhar, Grant Belgard, Luis de la Torre-Ubieta, John Marioni, Mike McConnell, Amita Sehgal, Ed Lein, Naomi Habib, Guoping Fan, Michael Vanlandewyck, Megan Crow, Joakim Lundeberg, Simon Hippenmeyer, Bart De Strooper, Je Hyuk Lee, Jo Bury, Matthew Holt, Thierry Voet

PAST CONFERENCE
FULL HOUSE AT FIRST EDITION OF VIB CONFERENCE 'THE BRAIN MOSAIC: CELLULAR HETEROGENEITY IN THE CNS'

Leuven, September 22 – 23, 2016

VIB organized the first edition of a conference titled 'The Brain Mosaic' in Leuven. With over 200 attendees, of which more than 40% came from abroad, the conference was sold out. Recent advances in technology now allow us to explore multiple aspects of heterogeneity at the single cell level. The Brain Mosaic conference gathered key opinion leaders to address the technologies and questions that will shape the field in the coming years.

19 invited speakers emphasized the multidisciplinary nature of the field, with subjects ranging from genome sequencing and epigenetics to the optical control of defined cell types in neural circuits. Keynote talks were given by Chris Walsh (Harvard Medical School, US) on 'Somatic mutation and genomic diversity in the human cerebral cortex' and Sten Linnarsson (Karolinska Institute, SE) on 'Molecular anatomy of the brain by large-scale single-cell RNA-sequencing'.

Five young scientists were selected for a short talk during the plenary sessions, and 44 junior scientists presented a poster. In addition, attendees had the chance to join a round table discussion with Amita Sehgal (University of Pennsylvania, US) during the 'Meet the Expert' session.

92 scientists participated in the 'Single Cell Analysis' training course organized by the VIB training team the day before the conference. The training focused on different tools, technologies and approaches to isolate, prepare and analyze single cells, and concluded with a panel discussion. Many tips and tricks for single cell analysis experiments were shared in talks from 10 trainers.

UPCOMING CONFERENCE
REVOLUTIONIZING NEXT-GENERATION SEQUENCING (SECOND EDITION)

Antwerp, March 20 – 21, 2017

Enabled by better cost-performance curves and new tech developments, next-generation sequencing technologies keep on pushing the boundaries of scientific knowledge. The NGS field is still expanding, and to take advantage of new opportunities offered by these technologies in life sciences, VIB Conferences will host the second edition of 'Revolutionizing next-generation sequencing, a tools and technologies meeting'.

After a sold-out 2015 edition, RNGS17 will look at emerging tools and approaches for:

- Large-scale sequencing
- Applications for current and emerging next-generation sequencing platforms
- Single-cell genomics
- Epigenetics
- Next-gen transcriptomics technologies
- Ultra-long reads and assembly
- Computational genomics and data analysis

The full speaker's lineup (44 speakers from academia and industry) can be found at www.vibconferences.be

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MARK YOUR CALENDAR

Biotech Tour
January 25, 2017 - Leuven

ER Stresss, Autophagy & Immune System
January 26-27, 2017 – Bruges

Apotheosis Biotech Tour
February 20, 2017 - Brussels