

SPECIAL ISSUE ON BIOALPS, THE LIFE SCIENCE CLUSTER OF WESTERN SWITZERLAND

# technology

BY

**Bilan**

**BioAlps 4 à 6:  
company  
profiles  
and business  
guide P38**

## INSIDE THE SECRETS OF THE BRAIN

WESTERN SWITZERLAND'S BUOYANT  
NEUROSCIENCES CLUSTER TRANSLATES  
RESEARCH INTO INNOVATIONS



**bioalps**  
Lake Geneva Life Science Cluster

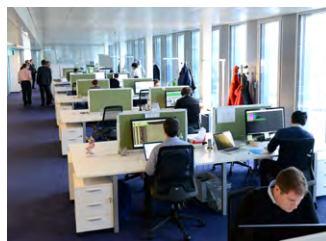
Switzerland





## Campus Biotech: Brains inside

Campus Biotech's futuristic technological platforms attract the best scientists to the challenge of understanding, curing and perhaps enhancing the human brain. **BY FABRICE DELAYE**



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COVER: DR. CONTENT: DR

# The brains who uncover the secrets of the brain

**HOW TO MAKE IT SIMPLE?** How to explain a biological machine that contains 100 billion neurons each interconnected by an average of between 1,000 and 10,000 synapses to allow information to circulate at speeds of up to 120 metres a second? How to explain emotions, consciences, dreams or love? And beyond that, how can you diagnose and cure the vast range of nervous system-related diseases that affect no fewer than one in three people worldwide?

Explaining the brain, one of the last great frontiers of science, is the first critical mission of Campus Biotech (see page 14) a futuristic facility in the heart of Geneva supporting 750 neuroscientists, engineers, psychiatrists, technologists, medical doctors... a tool that is for neurosciences a bit like what CERN is for particle physics.

It all started early in the 2000s when neuroscientist Patrick Aebischer became president of the nearby Swiss Federal Institute of Technology in Lausanne (EPFL) (see page 40). He soon created the Brain Mind Institute with the explicit ambition of discovering the biological basis of consciousness. He recruited promising young researchers to join forces with the already strong pool of neuroscientists in the region. Among them was Henry Markram whose ambition was to model all scientific knowledge about the central nervous system in order to build a digital simulation of the brain. The project became Blue Brain in 2005 and grew to become the Human Brain Project when the European Union chose it as one of the two 1 billion euros-funded research initiatives of its flagship Future and Emerging Technologies (FET) programme in 2012.

The same year an unfortunate event happened in Geneva. Pharma company Merck, which had acquired Geneva-based Serono, decided to downsize its operations there, leaving the brand new headquarters built by Serono empty. Former owner Ernesto Bertarelli did not accept this situation. Together with entrepreneur Hansjorg Wyss, who had just sold Synthes Stratec to Johnson & Johnson, he decided to buy the facility. Aebischer and the dean of the University of Geneva, Jean-Dominique Vasalli, offered to move the Human Brain Project as well as various research initiatives such as the National Centre of Competence in Research "Affective Sciences – Emotions in Individual Behaviour and Social Processes" into the newly opened Campus Biotech. Hansjorg Wyss added a grant to create the Wyss Center for Bio and Neuroengineering.

Understanding the brain is

one of the most noble missions science can pursue, because taxpayers who support universities also happen to be patients. Neuropathologies account for a third of health-related costs in Europe. With ageing, the number of people affected by Alzheimers and Parkinsons is due to explode in the coming years, threatening the economic viability of health systems as underlined by neuro startup business angel Martin Velasco (see page 23). Strokes are the leading cause of handicap. Multiple sclerosis affects 3 million people, placing an unbearable toll on families, friends and social workers. And the list goes on.

Because there are few if any cures for all these neurological problems, Campus Biotech and the neurosciences cluster of Western Switzerland beyond it have a second mission: to translate discoveries in the lab to the patient's bedside. The Wyss Center is offering competitively awarded support for neurotechnology projects that have the potential to make substantial clinical impact. This promises an entire new generation of prosthesis which could be controlled by the nervous system and restore sensory perception.

With the support of the various institutions in the region such as the University of Applied Sciences Western Switzerland in Geneva (HEPIA) and the Swiss Institute of Bioinformatics, Campus Biotech is emerging as a powerhouse in neurosciences. A new building has just opened to welcome the startups that will spin off from research done there and in the region. Everybody is now aware that breakthrough research in neurosciences may lead to success. Not least because one of the first neuroscience startups that has emerged from this cluster, AC Immune, has just succeeded in making an IPO on NASDAQ and is moving forward with its revolutionary drugs for Alzheimer's.

The story of the brains exploring the brain on the shore of Lake Geneva has just begun. We hope you'll enjoy discovering in the following pages what's coming next.



**FABRICE DELAYE**  
Editor of Technology  
by Bilan

*"Campus Biotech translates discoveries in the lab to the patient's bedside."*

PHOTO: NINGHETTO



# Health Valley: the Dynamics of Global Innovation

IN THE SPACE OF A DECADE, our region in the West of Switzerland near the lake of Geneva has become the Health Valley, a world-class laboratory for discovering and developing the healthcare of the future. Thanks to many visionary individuals, exceptional infrastructure and financial support, the Bioalps life sciences cluster has become one of the most dynamic and innovative in Europe. It is driven by leading scientific research and powered by exceptional people supporting the commercialisation of academic innovation through to industrial application with the ultimate aim of improving the lives of patients and their families.

This magazine offers a deep dive into the spectacular expansion of the Bioalps Health Valley, one of the fastest growing life science clusters in the world and rated the third most important European centre for research into biotechnology and medical technologies after the UK's Oxford and Cambridge.

It comprises around 1,000 companies, 500 research laboratories and 40 research institutes, universities and university hospitals as well as many bodies supporting innovation including science parks, incubators for startup companies, venture capital funds and new innovation hubs such as Campus Biotech and the Wyss Center.

Above all, the Health Valley is a centre of excellence that attracts many leading scientists, stemming as much from its dynamic nature as from its resources in research and development and its dense industrial fabric which offers so many opportunities.

Today, on account of its excellence and supportive environment, it is a premier location for industries active in the life sciences. The proof lies in the many companies working in the different fields of life sciences which have established themselves in the region, including Baxter, Beckman Coulter, Celgene, Debiopharm, Edwards, Ferring, Johnson & Johnson, Lonza, Merck Serono, Medtronic, Stryker and UCB Farchim. More recent arrivals include Alcon, Incyte, Santen, Ariad and Nestlé Health Science, just to mention a few.

Even better, tomorrow's

companies are already here. AC Immune, Asceneuron, GenKyoTex and Novimmune, for example, as well as many others, are growing companies whose roots are fed by the innovation originating in our research institutions and which benefit from our supportive environment.

Indeed, beyond the scientific and technological innovations of the Health Valley, it is critical to ensure that these discoveries are translated into measurable benefits in the clinic and that they will be put to the service of the patient as soon as possible. There is always a long maturation time between scientific discovery and clinical application – Pasteur and Koch highlighted the existence of germs in the 19th century, but it took a generation to benefit from the development of antibiotics. The aim should be to continue to reduce this time to a minimum, and for that it is necessary to test these new approaches and active substances as efficiently as possible in order to answer the simple question of whether they help save lives and improve the quality of life of our fellow citizens.

To accelerate this transfer we help empower competent intermediaries, entrepreneurs and investors, and provide an environment that will help them benefit from our fertile region and encourage them to create jobs and local wealth.

The Health Valley is abundant with opportunities. It has allowed a number of companies to enjoy exceptional growth, justifying the several hundred million francs invested over the past few years by companies such as UCB, Nestlé Health Sciences, Celgene or CSL Behring. Its assets are the basis of the success of companies including Ferring, J&J, Medtronic, Debiopharm and many others.

Whether we look at regional competitiveness on the level of investment, demand perspective, products, technologies, the financial situation of industrial companies, technological quality, level of training/competencies or entrepreneurial drive, all these indicators show the region to be competitive on a global scale.

Our ambition is to make sure that Bioalps maintains its leadership in innovation and guarantees prosperity in an increasingly competitive and fast-paced world. We are doing this by focusing on the fundamentals: creating an optimal environment for the exceptional

people who are the cornerstone of our academic, industrial, medical and entrepreneurial community.

**BENOIT DUBUIS**  
President of Bioalps  
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“Tomorrow's companies are already there such as AC Immune, Asceneuron...”



PHOTOS: MÉGEVAND, DR

# Geneva's Wyss Center is poised for the neurotech revolution

**From developing mind control devices that help paralysed people move again to bionic eyes and even a solution for dyslexia, Geneva's Wyss Center wants to be at the heart of the neurotechnology revolution.**

Ever since my early training in biology I have wanted to know what makes humans so smart. We know that our brains produce interesting functions like creativity, or the skilled movement of a ballet dancer through complex patterns of neural activity, but we are still a long way from fully understanding how the brain accomplishes these remarkable feats. Until relatively recently we didn't even have a way to study and record activity from the brain directly.

Ten years ago, at Brown University in the US, we developed a little electrode-array that picks up patterns of signals when placed on the brain. This was the key to the BrainGate system that my team and I worked on. By implanting a tiny sensor in the area of the brain that generates movement commands, we were able to reconnect the brain to the outside world for people with paralysis. The sensor detects brain signals that are transmitted to a computer, connected through a plug on the head. The computer then translates the brain signals into simple actions that can be performed by a robot arm, such as picking up a cup to take a drink. The next step would be for the brain signals to be connected back to the arm muscles, so a paralyzed person could move their body again.

While these experiments were revolutionary at the time, we are still not at a stage where the system is ready to be rolled out by clinicians across the world to help people with paralysis. One limiting factor is usability. Refining the plug on the head, the large cable and huge computer to create a usable device will take the combined skill sets of an interdisciplinary team of specialists including engineers, neuroscientists, and clinicians.

However, as with the transformation of mobile phones that we have seen over the past 30 years, we are witnessing the beginning of a similar revolution in neurotechnology. This is where the Wyss Center comes in. Our aim is to take truly innovative neurotechnology ideas from the lab and accelerate their transformation

into useful products that clinicians can use to help people with nervous system disorders. We want to be part of the neurotechnology revolution by developing smart, miniaturized devices that can communicate wirelessly with each other – in-

side and outside the body.

The Wyss Center now has 18 projects including Neurocomm – our miniaturized, wireless version of the early BrainGate technology with the potential to directly reactivate paralyzed limbs through thought. We are also working on a novel electrode to restore vision and a project exploring brain stimulation to help people with dyslexia.

When Hansjörg Wyss decided to create the Wyss Center here in Geneva, he knew there was already a great deal of cutting edge brain science and technology development going on in the region. Hansjörg has given me the freedom to develop the Wyss Center in such a way that we can combine the crucial elements of neurotechnology development – neuroscience, engineering, clinical expertise and business – and make a real difference in neurotechnology development.

As Director, I have been given a tremendous opportunity to advance exciting but risky new ideas to help people with brain disorders. To do this we provide a team of specialists with broad technical and business expertise, access to Campus Biotech's state-of-the-art facilities and financial resources.

We are now in the process of scouting for innovative ideas and, as we are not-for-profit, we have found that people are willing to talk to us and discuss their ideas as well as the technology development challenges they face. The local Lemanic community is a tremendously fertile area for ideas and we have fully embraced these as well as attracting projects from Europe and the US.

We are in good company at Campus Biotech. Here in Geneva, at the former Merck-Serono research campus, we have six neuroscience entities in one building. There's an amazing energy to the place. I see this as the

next phase, the time when all the pieces of the neurotechnology jigsaw fall into place, here in Western Switzerland.

**PROFESSOR JOHN DONOGHUE**  
Director, Wyss Center, based at Campus Biotech, Geneva



“The Lemanic community is a tremendously fertile area for new ideas.”



# SOPHIA GENETICS DEMOCRATISES DATA-DRIVEN MEDICINE

PAR MATTHIEU HOFFSTETTER **AFTER HAVING DEVELOPED A PERSONALISED DIAGNOSTICS SOLUTION BASED ON LARGE AMOUNTS OF GENETIC DATA FROM PATIENTS, SOPHIA GENETICS IS WIDENING ITS OFFER TO OTHER PARTNER MEDICAL INSTITUTIONS WHILE CONTINUING TO WORK ON DATA SAFETY.**

**J**urgi Camblong founded Sophia Genetics in 2011. Originally from the Basque Country, he now lives in the French-speaking part of Switzerland where he launched his startup with a strong conviction: “The more we have detailed genetic data on patients, the more we will be able to fine-tune the treatment for their pathology”. Camblong quickly recognised that his firm would have to combine two major assets: scientific rigour and high informatics data security. ISO accreditations 13485 for medical devices and 27001 for data safety have since validated these two key axes.

## European expansion

The months rolled by and partnerships were forged with prestigious university hospitals in Switzerland, France and Germany as well as in many other countries in Europe. As data was being transferred by the different laboratories to Sophia Genetics, the firm perfected its algorithm, enabling physicians to establish more and more precise diagnoses and to offer treatment which was not only personalised but also more effective.



“Sophia Genetics will have 140 collaborators at the end of 2016.”

In 2014, 5,000 patients benefitted from data-driven diagnostics with the data screened by Sophia Genetics. In 2015, the total increased to 22,000, and by the end of 2016, the firm expects to reach 80,000 patients. «In January we performed 3,000 analyses, while in June we managed to complete 5,000”, says Camblong. In parallel, clinics and hospitals are coming to understand how important the Swiss startup’s solution is: “Barely a year ago, we were signing five to six opportunities a month. Currently we are signing 25 a month. It’s a snowball effect”, Sophia’s CEO adds.

The company’s growing success can also be measured in terms of its workforce. In 2011, there was a handful of collaborators, but by June 2015, Sophia Genetics had 60 employees and was expecting a staff of 100 by the end of 2016. “Currently, we have a staff that has already exceeded 100 and by December this year there will be over 140 collaborators”, says Sophia’s CEO enthusiastically. Camblong’s ambition for his fledgling company is no secret: “We would like to be the leaders in data-driven medicine on a global scale.” he says. By the end of 2015, partner hospitals in 20 European countries had already adopted Sophia’s solution. Currently 27 countries collaborate with Sophia, now based in Saint-Sulpice in the Canton of Vaud, Switzerland, and the company is beginning to expand outside Europe.

Though the volume of activity of this



**Jurgi Camblong founded the fast growing start-up in 2011.**

emerging firm continues to expand, the technology it develops has not been overlooked. To improve the procedure of genetic data transfer still further, Camblong has turned to laboratories at the Swiss Federal Institute of Technology in Lausanne (EPFL), where Sophia Genetics first saw the light of day. Professor Jean-Pierre Hubaux – himself a pioneer in genomic information confidentiality – will be piloting an ambitious project with a \$1 million budget. “It was necessary to combine several crucial aspects,» he explains. «Huge files of raw data needed to be compressed, then encrypted, and their selective reading enabled so that the data can be accessed in as subtle a way as possible.”

The mission is far from simple. Not only are genome sequencing data extremely bulky because of information redundancy – files reach 500 Go per patient – but you also need to develop software that is capable of reading the data in a selective manner. Supported by the Swiss Commission for Technology and Innovation (CTI), the project finally achieved its aim in the spring of 2016 and the device was patented.

In the past few months, the services offered by Sophia Genetics have increased and new health establishments are able to benefit from their solution. “Until recently, our only partners were large hospital facilities who had the means to sequence the genome of their patients,» says Camblong. «Today, clinics and hospitals with fewer means and less equipment can also benefit from our solution. All they have to do is send their patients’ samples to the larger hospitals who sequence the DNA for them and then transfer the information to our Sophia DDM platform.”

## On Obama’s short list

Thanks to this procedure, the solution can be applied to a wider range of patients. “It was our objective from the very start,» Camblong enthuses. «By way of a hospital facility community, we wanted to democratise solutions based



on data-driven genomics.” There is no question, however, of disclosing data: samples are entrusted by less well-equipped establishments to those with better facilities so that sequencing can be performed, and the data are processed by the Sophia DDM diagnostic testing platform. Following this, the physicians themselves, who are in direct contact with their patients, receive the resulting information which helps them decide on the best possible treatment for their patients.

#### A revolution in diagnostics

This is a revolutionary approach in diagnosis and treatment that American investors were quick to acknowledge. In an open letter to US president Barack Obama published on July 13, Tracxn’s venture capitalists established a list of fifteen startups that could change the state of medicine and science in a positive way. Only one of these fledgling entrepreneurs was not American, and it was Sophia Genetics. “For us, it is hugely encouraging to be part of a selection that stemmed from the United States”, Camblong confides. Especially since this open letter was a reaction to President Obama’s appeal to uncover innovations that would allow notable advances in science and medicine.

Only two other startups in the data-driven medicine sector were selected. Sophia Genetics is clearly a reference in the field and in the most influential circles. “Until recently, our strategy was to establish a firm in Europe as a first step while we developed our solution via our platform and algorithms,” Camblong says. “Then we imagined turning towards the United States once everything was on our side. It so happens that we have grown unexpectedly fast, and American investors are already backing us. So much so that we can now clearly state our objective: we aim to become global leaders in the computer-aided diagnosis of genomic data.”



Michel L. Pettigrew joined Ferring in May 2001.

## FERRING CELEBRATES 10 YEARS OF PRESENCE IN SWITZERLAND

**FERRING HAS BECOME AN ENGINE LIFE SCIENCES RESEARCHES IN WESTERN SWITZERLAND.**

**F**erring Pharmaceuticals is a research-driven biopharmaceutical company founded in Malmö, Sweden in 1950 and headquartered in Switzerland. We are a privately-owned company which always allowed us to put science first and profits second and is the basis of our long-standing success.

We concentrate our activities on innovative peptide and endocrine research with the aim to identify, develop and market innovative products in the areas of reproductive health, urology, gastroenterology, endocrinology and orthopaedics.

In recent years Ferring has expanded beyond its traditional European base and now has 6,700 employees, its own operating subsidiaries in nearly 60 countries and its products marketed in 110 countries.

#### Science first

Today our focus is still on research and on further development of our existing products to better meet the needs of our

patients in different geographies. We also want to have the opportunity to work in closer collaboration with our healthcare partners.

At the beginning of this year, we changed our global infrastructure to have a stronger regional presence with the set-up of regional centres which encompass all aspects of our work from R&D through manufacturing to marketing and sales.

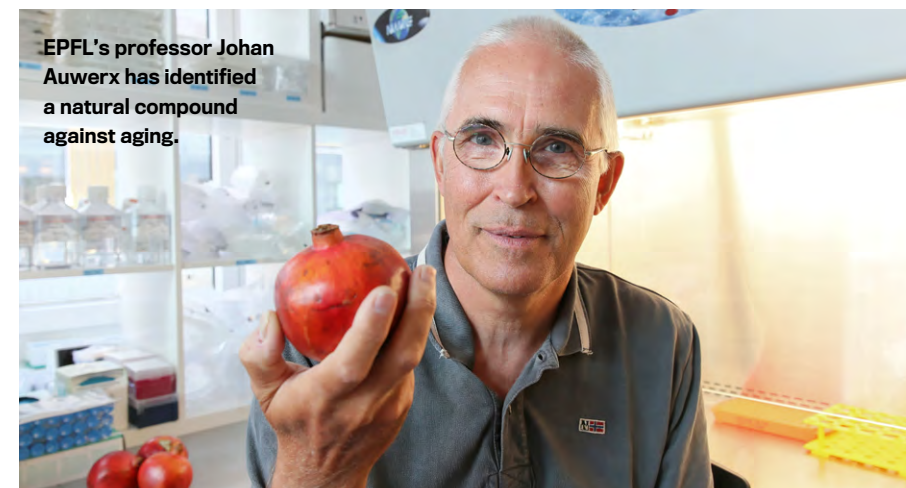
We just celebrated the 10 years anniversary of our presence in Saint-Prex. On this site we make two products and we condition about 65 % of the global production, including the secondary packaging of most of our medicines. We are proud to be a global company while being very committed locally.

Our intention is to stay and to continue to invest durably in our site of Saint-Prex. In 2015, we were very honoured to receive the “Prix Vaudois des Entreprises Internationales 2015”, in the category “foreign company ». It is a great reward for our efforts in the areas of local production, scientific collaboration, job creation and support for the local community.

\* MICHEL L. PETTIGREW, President of the Executive Board of the Ferring Group

# AMAZENTIS PREPARES TO LAUNCH THE “VITAMIN C OF ANTI-AGEING”

BY FABRICE DELAYE **THANKS TO A COLLABORATION WITH RESEARCH SCIENTISTS, A LAUSANNE-BASED STARTUP HAS IDENTIFIED A NATURAL COMPOUND THAT REDUCES MUSCULAR AGEING. HUMAN CLINICAL TRIALS HAVE ALREADY STARTED.**



EPFL's professor Johan Auwerx has identified a natural compound against aging.

**A**mazentis has been somewhat under the radar since it was founded in 2007 by Patrick Aebischer, president of the Swiss Federal Institute of Technology in Lausanne (EPFL), Novartis board member Pierre Landolt, Roche vice-chairman André Hoffmann and Chris Rinsch, its CEO. The headcount of this lean startup, based at EPFL's Innovation Park, has always been limited to the essentials, but it found its strength in targeted scientific collaborations, in particular with professors Johan Auwerx and Carmen Sandi at EPFL.

Now an article published earlier this year by Nature Medicine suggests that Amazentis is about to achieve a huge breakthrough. It has identified a natural food supplement that reduces ageing in muscle.

PHOTO: DR

#### A scientific breakthrough

To understand this, we have to look at the way our cells work. In many of them, mitochondria – structures that have their own genomes – play an essential role in metabolising food digested as glucose into the main source of energy in our body, adenosine triphosphate or ATP. In this process, which takes place by oxidation, the mitochondria are damaged by free radicals. Nature has provided a way of recycling this damaged mitochondria, but the process, mitophagy, becomes gradually less efficient over time – one of the main reasons why older people gradually lose muscle function.

Amazentis and Prof Auwerx's research group have identified a natural compound that restores mitophagy. The article published by Nature Medicine

reveals that it extends life by 45% in lab worms *C. elegans*, and in the case of aged mice, increases longevity by 42% compared to the control group. In younger rats, the ability to run is increased by 65%.

Clinical trials on humans that have recently started need to confirm whether this compound may be considered the fountain of youth. But we can be optimistic. First because mitochondria entered the cells of animals, plants, fungi and protozoa (eukaryotes) from a symbiotic bacteria two billion years ago and is therefore a universal biological mechanism. Secondly, because the compound in question, or rather its precursor, is present in large quantities in pomegranates, nuts and berries that humanity has consumed since the hunter-gatherers of the Paleolithic age. It is also found in acorns from oak trees consumed as flour by Native Americans. This long history of consumption suggests the substance is safe, unlike many promising chemicals that have failed the test of human trials because of toxic side effects.

#### A premium strategy

The simple solution may appear just to eat large quantities of pomegranates or raspberries. But biology is a little more subtle. These fruits contain compounds called ellagitannins that are transformed into urolithins during digestion by intestinal flora, but it is only one of these, urolithin A, which restores the mitochondrial recycling process, not the primary compound, and the process of converting this by the intestinal flora varies greatly depending on the individual. In more than 50% of people, the transformation does not take place at all because of a lack of the right bacteria in their gut, and it may vary during life, making it impossible to predict



the effects of the naturally-occurring ellagitannins.

So Amazentis has come up with the idea of short-circuiting the natural process by producing urolithin A as a dietary supplement like vitamin C – and potentially with just as big a market.

Euromonitor estimates the worldwide dietary supplements market at about \$50 billion in 2015 with annual growth of 4.4%. Including energy drinks and vitamins, the market is expected to exceed \$100 billion next year.

The pomegranate, whose benefits have long been known, is already part of this market. A Californian company founded in 2002, Pom Wonderful, has built a success story on the exploitation of its juice – but without strong scientific evidence to back it up or critical understanding of the role of the intestinal flora that vary between individuals.

#### Cardio and neuro applications

In addition to its strategy of developing dietary supplements from natural products on a scientific basis, Amazentis has done all the work for the commercial launch of urolithin A including preparing for scale production and studying the impact of industrialised processes on product composition.

So after five years of applied and fundamental research, it is ready. “The first clinical results on humans let us consider fairly rapid commercialisation,” says Chris Rinsch. “But Amazentis does not plan to be a mere subcontractor of the food industry. Starting our own product is one of the tracks envisaged.”

It may be possible to justify a premium price by marketing urolithin A as a dietary supplement sold in the same way as vitamin C or magnesium rather than just as an ingredient to enrich yogurt or cereal.

But, as has been seen with omega 3, both approaches are possible, especially as urolithin A could have applications – albeit yet to be demonstrated – in the cardiac field and on the brain, for example in preventing Parkinson’s disease.

Dr Jean-Marc Brunner,  
CEO of the Swiss  
Integrative Center  
for Human Health.



## THE SICHH: RE-THINKING BOX OF INCUBATOR AND INNOVATION CATALYST

BY DR JEAN-MARC BRUNNER **IN A WORLD WHERE FUNDAMENTAL AND APPLIED RESEARCH AND DEVELOPMENT NEED TO INTERACT MORE EFFECTIVELY, THE SWISS INTEGRATIVE CENTER FOR HUMAN HEALTH (SICHH) DISTINGUISHES ITSELF BY ITS INTEGRATIVE, HOLISTIC APPROACH.**

Combining academic and industrial excellence, SICHH is located in the new blueFactory innovation site in Fribourg. We offer customised Research & Development services adapted to the needs of each client. Our specialists manage projects mainly in the fields of medical technology, biotechnology, food technology and pharma in a creative environment with technological intelligence support.

Our skills are embodied in scalable projects focusing among other things on building the latest generation of diagnostic tests for the medical world as

well as identifying new biocompatible materials.

#### Strategic industry partners

Organised as a not-for-profit limited company, SICHH shares are held by a network of Swiss science and applied science universities. We have created a strong knowledge network by integrating internal competencies with those of our academic partners. Zeiss, the world leader in optical microscopy, and Nanosurf, a specialist in atomic force microscopy, were the first to join our network of strategic industry partners, enabling us to provide unique services.

PHOTO: DR

## FROM SWITZERLAND TO THE WORLD

**WHAT MAKES SWISS BIOTECH FIRMS GREAT IS THEIR INTERNATIONALITY.**

The Tasly Holding Group has its core business in the biological medicine and is dedicated to build a modern and international Traditional Chinese Medicine brand. Following a rapid growth in the last 20 months, Tasly made the decision to set up European headquarters – after a first contact on a road show with the Swiss Business Hub in Beijing, the representative of Switzerland Global Enterprise (S-GE) in China, Tasly had initial meetings with the Economy Development Agency of Western Switzerland (GGBa). With the help of the Swiss authorities, they finally made the decision to settle in Geneva where they saw a strong potential for

### + SWITZERLAND GLOBAL ENTERPRISE

cooperation with leading biopharmaceutical players.

The presence of international top companies like Tasly is proof of Switzerland’s vibrant technology cluster. Representing only 0.1 % of the global population, 4.8 % of the world’s private research and development expenditure is made here. Large or small, Swiss biotech companies make business abroad. Their broad global orientation

creates growth and balances risks like currency fluctuations.

Switzerland Global Enterprise makes sure exporters get all the support they need, mandated by the Swiss State Secretariat for Economic Affairs SECO, offering a broad range of services from basic trade information to sophisticated consulting for international business projects, relying on a network of 21 Swiss Business Hubs all over the world. Collaborating closely with Confederation and Cantons, S-GE also acts as Switzerland’s official investment promotion agency, providing interested foreign companies with information on Switzerland as business location. Within both mandates, S-GE is thus dedicated to keeping the Swiss biotech system what it is: one of the best in the world.

## REPRODUCTIVE HEALTH DRUG PIPELINE ATTRACTS TOP TIER INVESTORS

PAR FABRICE DELAYE **GENEVA-BASED OBSEVA RAISED CHF 60 MILLION FROM BIG NAME INVESTORS TO MOVE ITS REPRODUCTIVE HEALTH-FOCUSED PIPELINE INTO LATE-PHASE TRIALS.**

Millions of women worldwide between the ages of 20 and 50 suffer from reproductive health conditions that affect their quality of life as well as their ability to conceive. These conditions can even lead to babies dying during neo-natal period.

Premature birth is today the biggest cause of neonatal death (death in the first 28 days of life) globally, and is now the most common cause of child deaths (under the age of 5), accounting for a total of 1.1 million deaths in 2013. Endometriosis, a disease in which tissue that normally grows inside the uterus develops outside, affects an estimated one in 10 women during their reproductive years. Uterine fibroids are very common non-cancerous (benign) tumors that develop in the muscular wall of the uterus and affect about 30 per

cent of all women by age 35. Finally the demand of assisted reproductive technology – the number of babies conceived with this procedure doubled between 2002 and 2012 when the total was 326,426 – continues to increase and improving success rate remains an objective.

#### Moving to phase III

Geneva-based ObsEva aims to improve on the current treatment landscape with the development of new oral medicines for each of these medical conditions.



Ernest Loumaye is co-founder and Chief Executive Officer of ObsEva.

Through strategic in-licensing agreements with Japanese pharma company Kissei Pharmaceutical as well as the development of compounds first identified at Merck-Serono, ObsEva has established a late-stage clinical pipeline with multiple development programmes focused on treating uterine fibroids, endometriosis, assisted reproductive technology and premature birth.

Only two years after its creation, ObsEva raised CHF 60 million from new prominent investors such as HBM Healthcare Investments, New Enterprise Associates (NEA), OrbiMed and Rock Springs Capital as well as existing big name investors including Sofinnova Partners, which seeded the company, Sofinnova Ventures, Novo Ventures and MS Ventures. With these proceeds, the company is conducting a phase IIb trial, OBE2109, for the treatment of fibroids and a phase IIb for endometriosis. Its two other products, OBE001 and OBE022, for treatment of premature birth, are also entering phase III and phase I respectively. The 25-strong company is currently recruiting and aiming to reach a headcount of 30 by the end of the year.





134'000 m<sup>2</sup> of offices and laboratories where all partners can thrive.

## THE BIOPÔLE: DISCOVER A VIBRANT LIFE SCIENCE COMMUNITY

PAR NASRI G NAHAS\* **DESPITE ITS SMALL SIZE, SWITZERLAND IS A CRADLE FOR INNOVATION, RANKED AMONG THE THREE WORLD LEADERS IN SCIENCE ACCORDING TO THE OECD.**

The Canton of Vaud, the fourth largest of the 26 states that make up the Swiss Confederation, is home to more than 37,000 companies, including around 100 multinationals that have established their Europe Middle East Africa headquarters here.

### At the heart of the health valley

The canton contains 25% of life science workers in Switzerland and its industry contributes significantly to the country's economic development. Half of all Swiss startups in the life sciences were born here. In 2015 Vaud ranked number one among the cantons for fundraising by start-ups, with four of the top five investment totals raised by new life science companies.

At the centre of this "health valley" is the Biopôle life science park, located in Épalinges, to the north of Lausanne. It is considered a leading European hub for technology and innovation – home to industry leaders, research groups at the cutting edge of their discipline, avant-garde collaborative models and a significant surge in life sciences initiatives in recent years.

While open to all therapeutic areas,

Biopôle's main focus is on oncology, immunology, personalised medicine and nutritional health.

### Soft factors are key

Life science is the label for a vast sector and it is not always clear what it covers or what is key to success. Biopôle has a simple answer: bringing science to life.

The basic nuts and bolts of a life science park are buildings, laboratories and facilities management. This is what everybody expects, and what they are offered at Biopôle. It is an 80,000 sqm park, providing more than 134,000 sqm of office and laboratory space – the largest in Switzerland devoted to life science. A further 9,000 sqm of new space is expected to be added in 2017, and double that figure in the following years.

It also hosts everyday amenities including a hotel, shops, café, medical centre, bank and pharmacy, and further added-value services include purchasing, finance, legal, business development, communications and executive coaching. As a result, every company can focus on what it does best: developing innovative solutions for life science challenges.

However, these hard facts miss a critical ingredient: a community where ideas cross boundaries, generations and disciplines in a collaborative spirit. Soft factors are key – the way in which people interact, get inspired by their environment and generate cutting-edge ideas. Biopôle's ambition is to nurture such a

vibrant life science community.

Biopôle believes in embracing differences and cultivating synergies. Industry and academia co-exist within the park, thereby ensuring active knowledge sharing, appreciation of the various projects being pursued and an understanding of where opportunities for synergy and collaboration exist.

World-class academic and research institutions are a draw for industry anywhere in the world. Biopôle is especially proud to be neighbours of, among others, the Swiss Federal Institute of Technology (EPFL), the University Hospital of Canton Vaud (CHUV), the University of Lausanne Centre of Immunology and the Ludwig Institute for Cancer Research. Academic partners develop their innovations at Biopôle alongside major industry players, small and medium enterprises and an incubator dedicated to life sciences start-ups.

### Enabling innovation

Our ambition is to nurture a leading vibrant life science community that enables innovation, the holy grail of industry and academia.

We do this by putting all the ingredients of success together and offering a world-class combination of infrastructure, added value services, living space and community engagement where our members thrive in an enjoyable, dynamic and collaborative environment.

\* NASRI G NAHAS,  
Chief executive officer, Biopôle

PHOTO: DR

## NANOLIVE'S MICROSCOPE INTRODUCES 3D CELLULAR EXPLORATION

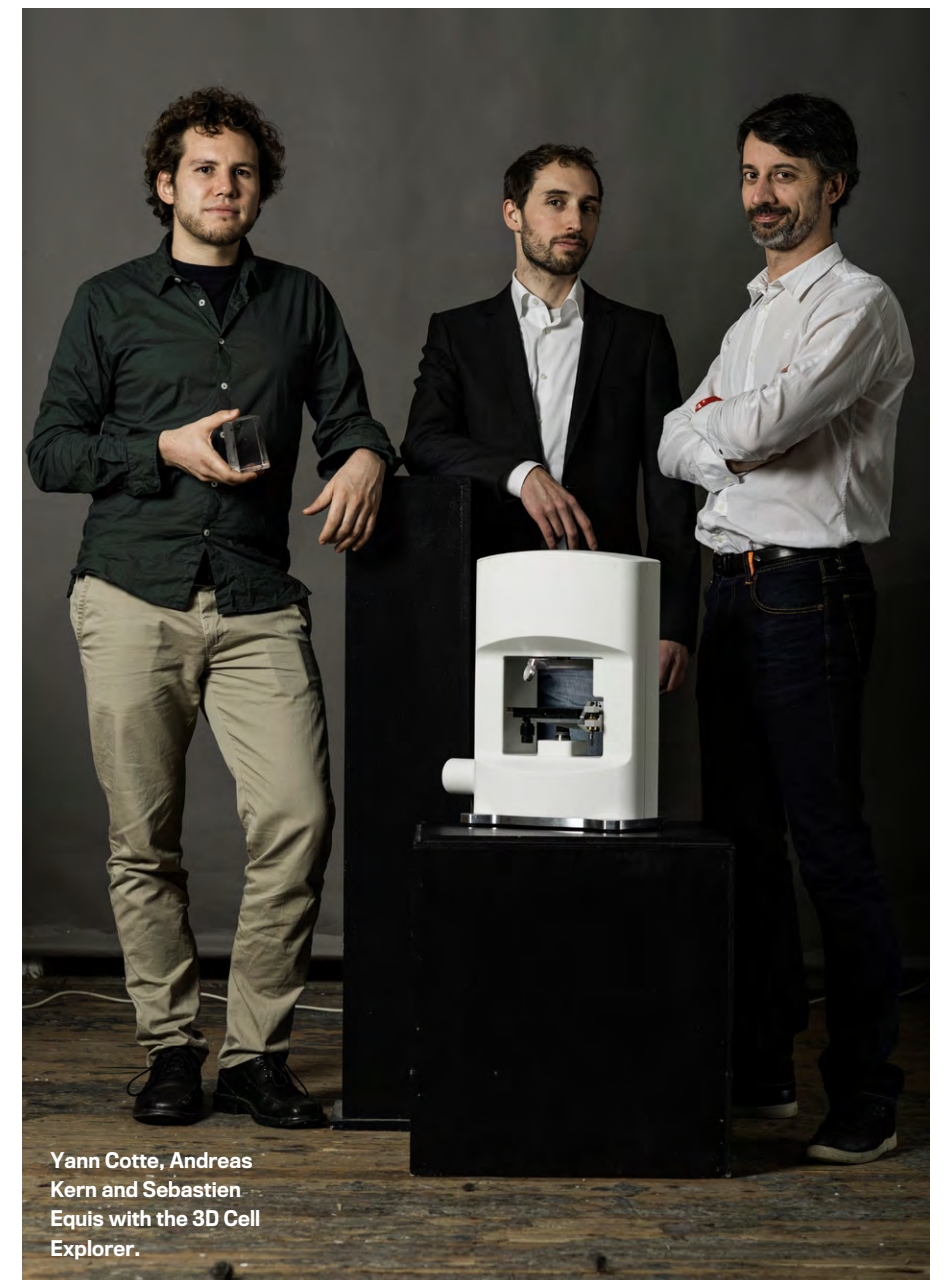
FABRICE DELAYE **THANKS TO A MAJOR INNOVATION IN PHOTONICS, THE LAUSANNE-BASED STARTUP HAS MADE HIGH-RESOLUTION OBSERVATION OF LIVING CELLS POSSIBLE.**

For years the use of microscopy in biology has been limited by two obstacles: cells are very small and they are transparent. With conventional optics, observers cannot see an object smaller than the visible light. Using a beam of accelerated electrons, electron microscopes have overcome this difficulty to reach very high resolving power. But to do so, living compounds such as cells must be chemically prepared, usually with reagents. The process kills these cells, making high-resolution observation of living cells close to impossible.

### A Spin-off of the EPFL

However, during their PhD studies at the Swiss Institute of Technology in Lausanne (EPFL), Yann Cotte and Fatih Toy have developed a super elegant solution to this challenge. It works exactly like an MRI scan in hospital but with cells and light. The technology combines a laser beam that illuminate the sample and rotates around it at 360° with a camera that takes different perspective photographs of the cell. Then a software system based on holographic algorithms recombines these hundreds of photographs into a 3D cell image that lets users colour the different parts of the observed cell to get a full reconstruction. The process works in seconds and the cells need no specific preparation or manipulation.

PHOTO: DANIEL MIHAILESCU/AFP BRCK DR



Yann Cotte, Andreas Kern and Sebastien Equis with the 3D Cell Explorer.



# CAMPUS BIOTECH: BRAINS INSIDE

BY FABRICE DELAYE **CAMPUS BIOTECH'S FUTURISTIC TECHNOLOGICAL PLATFORMS ATTRACT THE BEST SCIENTISTS TO THE CHALLENGE OF UNDERSTANDING, CURING AND PERHAPS ENHANCING THE HUMAN BRAIN.**

There remain two last big frontiers in science: space and the brain.” So spoke Patrick Aebischer 15 years ago when he became president of the Swiss Federal Institute of Technology in Lausanne (EPFL) and launched a breathtaking avalanche of initiatives that raised his campus to the top ranks of international universities.

Aebischer had a curious mind and under his leadership EPFL increased its support for a broad range of research and disciplines. But as a neuroscientist himself he was naturally biased. So when pharma company Merck Serono decided in 2012 to close its headquarters in Geneva, he saw, together with Serono former owner Ernesto Bertarelli and Jean Dominique Vassalli, dean of the University of Geneva, an opportunity to build for neurosciences an equivalent to another science powerhouse in Geneva: CERN, the European Organisation for Nuclear Research.

Building on solid Swiss and international networks, identifying future star professors and seizing public and private opportunities for research funding, a consortium including the University of Geneva, the EPFL, the Bertarelli family and Swiss medtech billionaire and philanthropist Hansjorg Wyss, gathered their energies to build Campus Biotech, officially launched in May 2015. Occupying 28,000 square metres, the futuristic facility currently employs 750 people, a

number that will peak at close to 1,200.

The organisation functions under a foundation led by its founding partners and others including the University Hospitals of Geneva (HUG), the Swiss Institute of Bioinformatics (SIB), the University of Applied Sciences Western Switzerland in Geneva (HEPIA) and the newly created Wyss Center for Bio and Neuroengineering.

## Open minds

“Campus Biotech is mainly an enabler with four technological platforms giving access to top research tools such as virtual reality for experimental neurosciences, EEG an MRI for human neurosciences, electronics for integrative systems and clean room for neuroengineering”, ex-



**HEPIA's professor Luc Stoppini develops lab-on-chip for neurosciences researchers.**

plains Campus Biotech's director Benoît Dubuis. A fifth platform with genomic tools such as sequencers and computational capability supports e-health and genomic research. This broad array of technologies says important things about the functioning of Campus Biotech.

First, as Dubuis stresses: “Beyond the researchers based here we have a very open model. We welcome both academic researchers and groups from private corporations to use our platforms.” About 40% of Campus Biotech users come to conduct specific experiments during a limited period of time, just as at CERN. The other characteristic of Campus Biotech is its holistic approach to brain research. Some groups, such as Professor Luc Stoppini's Center of Competence for Micro and Bioengineering (CMIBIO) at HEPIA are developing enabling technologies as labs on chips. At the same time David Sander at the Brain and Emotion Laboratory of the University of Geneva is using tools such as virtual reality and functional MRI (sometimes associated with olfactory stimuli) to better understand the neuronal bases of emotions.

Because its founders believe innovation flourishes at the crossroads of disciplines, the more than 15 labs at the campus study the brain from genes to the expressions of joy, fear or surprise. They aim to improve our fundamental understanding of the brain - the pan-European Human Brain Project whose initiator, Professor Henry Markram (read his interview page x), has his lab there. But they are also developing better diagnostics, drugs and prosthetics and may even enhance our cognitive capacities such as learning.

But beyond the technologies, institutions and money are the researchers, the brains inside this hive of neurosciences and the true strength of Campus Biotech, as can be seen in the following examples.

## Olaf Blanke's multisensorial cognitive engine

How does the human brain represent one's own body? How does this bodily representation impact cognition and

PHOTO: DANIEL MIHAILESCU/AFP/BRCK DR



**New generation EEG to study the brain at the Wyss Center.**

consciousness? How can we use robotics and information communication technology to better answer these scientific questions and translate this knowledge into concrete applications for the benefit of medicine and society?

Since his medical studies, Professor Olaf Blanke has made his mission to understand the brain mechanisms that enable consciousness. He heads the Laboratory of Cognitive Neurosciences (Bertarelli Chair in Cognitive Neuroprosthetics) and directs the EPFL's Center for Neuroprosthetics and its eight laboratories which are currently moving to Campus Biotech. “Our second mission is translational,” Blanke explains. “We develop cognitive neuroprostheses that combine the design of new wearable technologies with our neuroscience research. The aim is to create novel strategies to better diagnose and restore cognitive functions in disease.”

In neurosciences, Blanke's team investigates the brain mechanisms of body perception, self-awareness and consciousness, combining psychophysical and cognitive paradigms with the whole range of human neuroimaging techniques. In its clinical research projects, his team of neuroscientists, medical doctors, biologists, engineers, psychologists and computer scientists explore the diagnostic and therapeutic impact of robotic and ICT technology in two major conditions: chronic pain and schizophrenia.

## Silvestro Micera's bionic hand

Blanke's research with ICT technology has already been key to the MindMaze spin-off (see page x) and its virtual reality-based rehabilitation technologies. His research to find the neural bases of consciousness is also one of the building blocks of the Center for Neuroprosthetics (CMS). Supported by the Bertarelli Foundation, the Defitech Foundation and the International Foundation for Paraplegia Research and Medtronic, the CNS is developing a new generation of mobility, sensorial and cognitive prosthesis.



For example, Professor Grégoire Courtine stunned the world when he demonstrated in 2012 how laboratory rodents, paralysed after spinal cord injuries, were able to voluntarily walk again thanks to a cocktail of drugs, electric stimuli and robotic prosthesis. Thanks to collaboration with Stephanie Lacour's Laboratory for Soft Bioelectronic Interfaces, his group has now designed and produced soft neural implants with the shape and elasticity of dura mater, the protective membrane of the brain and spinal cord. The hope now is that these technologies will be successful in clinical trials to restore walking in humans who have been paralysed.

As head of the Translational Neural Engineering Laboratory, Professor Silvestro Micera is also developing implantable neural interfaces and robotic systems to restore sensorimotor functions in people with different kinds of disability. In particular, his lab is working on the development of a novel bionic hand controlled by the peripheral nervous system.

Because of the complexity of the nervous system, this research benefits from the expertise of the CNS. Miceras' team is working with collaborators at the Blanke lab to understand how the brain will represent a prostheses of which feedback from artificial sensors as well as natural sight must be integrated if the patient is to recover real agility. His group is working with the Laboratory for Soft Bioelectronics Interfaces to shape traditionally rigid electronic circuits into conformable, skin-like formats for better biocompatibility.

#### From labs to market with Claude Clément

This kind of creative interaction is exactly what Claude Clément is after. Head of technology at the Wyss Center for Bio and Neuroengineering, Clément comes from industry where he spent 23 years in the field of active implantable medical devices, as director of manufacturing engineering at Intermedics and plant manager



**Claude Clément wants to spin-off new start-ups from breakthrough discoveries.**

at the Swiss operations of Medtronic, the world's largest site for the assembly of active implantable medical devices.

Clement explains the Wyss Center's objectives: "Hansjorg Wyss has trusted us with the mission to make paralytics walk again, the blind to see and the deaf to hear." He adds: "It is in the very nature of the Wyss to collaborate. We are tackling difficult problems that generally need the involvement of multiple partners and institutions. We federate their human and technical means and solve aspects such as intellectual property sharing and regulation. Our approach is translational. We take the brilliant ideas that arise in academia and transfer them to clinical trials on humans. And we don't stop at proofs of concept or prototypes. We support the product up to market approval."

For example, Professor John Donoghue, director of the Wyss centre (see page x), is developing second generation brain-computer interfaces with an implantable neurocommunicator that can read brain signals of people with paralysis and transmit them wirelessly in order to control a robotic arm or even the patient's own arm. A second project, led by Professor Diego Ghezzi in collaboration with Professor Micera, aims to develop a bionic implant that will bypass damaged optical cells and restore lost vision by directly stimulating the optic nerve. Based on discoveries by Professor Anne-Lise Giraud of the University of Geneva that oscillations in the brains of people with dyslexia are not at the correct frequency or in the correct location, a third project is using transcranial alternating current stimulation to reorganise brain rhythms so that signals are properly processed.

Being not only a medtech executive but also a serial entrepreneur, the path to the market Clément envisions for such innovation, and much more now under development, will likely be through new

startup companies. On September 3, Campus Biotech inaugurated another side of its activity with a 4,500 square metre tower for its Innovation Park. Various startup support institutions such as the incubator Ecllosion and the co-working space for entrepreneurs Geneus have already moved in as well as biotech companies such as Relief Therapeutics and Signals Analytics. If Clément is right many more will spin off from the CERN of the brain.

## CAN DAPHNE BAVELIER ENHANCE LEARNING?

**GAMING** If an understanding of the brain is needed to better diagnose and cure numerous pathologies, it has other consequences: what if we could improve it? Professor Daphne Bavelier, head of the Cognitive Laboratory of the University of Geneva, is exploring various technologies for such a purpose.

In 2014 her team published a study that demonstrated for the first time that people who played action games like "Call of Duty" showed greater capacity to learn than those who played non-action games. "We showed action gamers excel because they are better learners," explains Bavelier. "That is because our brain keeps predicting what will come next. To predict better, the brain constructs templates of the world. The better the templates, the better the performance. And playing action fosters better template construction."

With a dozen colleagues at Campus Biotech, Bavelier has established collaborations with Olaf Blanke and Silvestro Micera to improve virtual reality and with Sophie Schwartz's Sleep and Cognition Neuroimaging Laboratory, neural bases of language experts Anne-Lise Giraud and Narly Golestani as well as the group of computational neuroimaging led by Dimitri Van de Ville. Her research focuses on characterising the factors that may contribute to greater plasticity of the brain and wider transfer of learning.

PHOTO: DR

# IN HENRY MARKRAM'S BRAIN

BY FABRICE DELAYE **NEUROSCIENTISTS AT CAMPUS BIOTECH HAVE RECONSTRUCTED PART OF THE NEOCORTEX'S SENSORY SYSTEM WHICH SIMULATES THE BIOLOGY OF THE BRAIN. IT IS A DECISIVE STEP IN THE €1 BILLION EUROPEAN HUMAN BRAIN PROJECT**

In 2008, Henry Markram, professor of neurosciences at the Swiss Federal Institute of Technology in Lausanne (EPFL), announced the first results of a project aimed at building a digital copy of the brain in a supercomputer. He revealed a detailed digital simulation of a rat's cortical column – a group of 10,000 neurons that form a field of sensory reception. Seven years later, the cover of the journal Cell showed the Blue Brain project's sequel: a digital reconstruction of the centre of the rat's sense of touch. A 36-page report followed, co-authored by 83 researchers from 18 laboratories and 13 institutions.

This led to the €1 billion European Union Human Brain Project, focused on developing a digital simulation of the brain's biology. In an exclusive interview at his laboratory at Campus Biotech in Geneva, Markram tells us about the most recent results of his research into the role of the brain and its incredible universe of 100 billion neurons and a million billion synapses.

**In light of the controversy that has surrounded the Human Brain Project in 2015, can you describe the context in which you carried out the research you've published recently?**

It was in the context of the Blue Brain project, although some of the funding to enable us to make the data and the tools we've developed public through a dedicated website came from the Human Brain Project. It was basically the result of 20 years of research. When I started, I wanted to map the brain on an experimental basis. I began to realize that you can't, and what's more, it's not reason-

PHOTO: DR



**Professor Henry Markram wants to digitally reconstruct the entire circuitry of the brain.**

nable to try to. You cannot measure all the biological phenomena going on in the brain, and it's not scientifically necessary to make such an attempt because there are hidden forms of an underlying organization that help predict most of the data – the brain is not a random system. Just as in physics, there is a given order, or laws – if you want to reconstruct a model of a diamond, for instance, you don't need to measure each carbon atom in it – just an extreme example.

**What exactly are these laws?**

In the first ten years of our research we only carried out biological experiments. Realizing gradually, however, that we

would never manage to measure everything, my lab started to look for underlying laws. Such as how many synapses form at the site of connection and how they organize into networks. In parallel, we referred to millions of scientific articles in the quest for other laws. In fact, we were on the constant lookout for laws and data. In the lab, after tens of thousands of experiments, we finally generated a pool of core data. Today it is one of the largest databases on a particular part of the brain: a tissue which is about 0.3 cubic millimetres in size, and is the centre for the sense of touch in the rat.

**And you'll be using these laws and data to help you design computer models?**

Over the past ten years we've been set on building a digital version of this tissue, which belongs to the neocortical column. We have demonstrated that it is possible to reconstruct, in detail, a digital version of part of the brain. Of course it is possible to achieve a higher resolution using the same approaches we developed. For the time being we're at the level of the cell, but we have started to zoom down to the molecular level. We have also started to build models on a larger scale, covering not only a microcircuit but brain regions and also the whole mouse brain. That said, what we have designed is already 100,000 times bigger than the biggest reconstruction ever done using electron microscopy. And we are currently building virtual tissues a million times bigger.

**Is it really possible to reconstruct the brain without having all the biological data?**

Yes. Within a microcircuit there are 31,000 neurons that form 37 million synapses. But we have estimated that there are also 140 million synapses that come from the rest of the brain. It's



possible to carry out a digital reconstruction – which is biologically precise – of one part of the brain. It's just a small region, but it is a proof of concept. And it shows that precision in reconstructing parts of the brain is feasible, even when you have a limited amount of experimental data at your disposal.

#### **Does this mean that you have discovered new neurons?**

Let me take a tangent. A hundred years ago, Santiago Cajal, father of the neurosciences, discovered almost all of them, and even drew them. Cajal tried to understand how the brain worked by drawing it. He drew arrows where he imagined the flow of information lay between the neurons, without knowing the role of synapses – it was an analog approach. In a way, we're just completing his vision, but using a digital approach. This allows us to understand all the neurons and their variations.

#### **With a computer as opposed to a pencil...**

Instead of using arrows, We start with a 0.3 cubic millimetre circuit crossed by half a kilometer of fibres. In this tissue, the fibres meet at 600 million different points. This indicates where the synapses could be ideally situated so that the neurons can communicate with one another. We know by experience that you can't have so many synapses because there wouldn't be enough energy to support them all. So we developed an algorithm that compares these points and then applies five biological rules to eliminate those where synapses couldn't exist. In this way, we reached a count of 37 million synapses whose positions we can predict. I suppose you could see this as a sort of recipe. We know it's not perfect but it is the closest estimate of the biology available today.

#### **How can you be so sure?**

We took some experimental data to challenge our model, and the correlation was fantastic. We were able to cross-

check results that were part of many of our studies in the past. There are subtle differences but the synaptic connectivity is precise.

But a biological microcircuit is not an electronic circuit. Connectivity is not the only issue.

The next step was to perform an electrophysiological reconstruction. A neuron has not only a shape but also an electric "personality". After 3,900 experiments, we were able to profile these personalities and classify them into eleven archetypes. A neuron can react fast, or

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*"We write equations to express what flows from one neuron to another."*

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slowly, or use a sort of Morse code, and so on. When we combined these characteristics with those of a neuron's anatomy we counted 207 different cell types. This led to an even greater understanding of the recipe itself – why one type of neuron is here while another is there. If you have this type here, then you need that type there. And so on. Our virtual tissue has now reached a level of reliability where we can reproduce the in vivo experimental results without adjusting any of the parameters to obtain a result. That was never possible before with other models of the brain. Scientists had to tweak all the parameters to get the model to behave like the brain. We subsequently also made new discoveries about how the brain works.

#### **Which exactly?**

We already knew that calcium is vital for the brain and we had carried out experiments on calcium levels in synapses. We gathered all the data on this subject and observed that synapses transmit information in different ways depending on the level of calcium.

Synapses show a high level of calcium



when we are asleep or during an epileptic fit, for instance, while they show a low level in a fully awake state. There is a hidden mechanism that affects calcium level and synaptic activity: when the calcium level is high, synaptic activity is synchronous; when it is low, it is asynchronous. Other mechanisms are also involved but, fundamentally, what this implies is that the brain operates on a wide spectrum of activities, not only one. We found how each type of neuron, synapse and layer of the neocortex can slide the state from one side of the spec-





Markram started to build models covering not only a microcircuit but brain regions.

trum to the other. Each state allows the circuit to perform a specific operation and if you are not in the right state, you can not perform the operation. In a given state, you'll either succeed in certain activities – like sending back a tennis ball – or you won't. But the most exciting part is that there is a sharp cliff in the middle of the spectrum where the activity between neurons can become explosive, causing an avalanche of electrical activity. The brain can perform many very precise operations only if it is very close to this dangerous cliff. We've verified this

phenomenon in five models from different rats.

### And does this change our understanding of the brain?

It helps us to reinterpret quite a few things that have been scientifically debated for many years. We have observed that to see some of the phenomena that have been found in the brain, that you must first shift the brain into the right state. Let's take an illustration: in state x, you're not able to resolve a mathematical equation, but if you shift to state y you can. In other words: I can't go to sleep if my state is prepared to play tennis. For everything we do, we first have to prepare our brain to be in the right state. When we say we can't do something, perhaps our brain is simply not in a state capable of doing that particular something. But it could, if it we can shift it to the right state. If we understood this phenomenon better, we would probably be able to bypass certain limitations.

### How do you think the neuroscientific community will make use of your model?

They'll begin by challenging it, which is a healthy reaction and will help to improve it. But we can already use it to verify certain theories. For example, there is a theory that suggests that epileptic fits are caused by certain neurons whose synapses are too strong. With our model, you can double the strength of a synapse

strategies to solve the problem. Many scientists have already started to use the tools and study the data, which has been made available through the Brain Simulation Platform of the Human Brain Project. It is the most used platform in the HBP.

### Can you give an example?

Yes. We asked a question that was not possible before. A camera has pixels, and the spatial resolution of a camera is one pixel. What is the spatial resolution, or pixel size of the brain? One neuron? It's a very difficult question to answer if all you have depends on animal testing. So we recreated the input from the thalamus, a region of the brain. We observed that the spatial resolution only occurs when the level of calcium is correct. And that the spatial resolution of the brain is at least 25 cubic micrometres. Each neuron has a different spatial resolution – some below 25 cubic micrometers others more than 150 cubic micrometers. We are continuing our studies because we believe that the resolution is finer if we ask what the spatial resolution of a single synapse is. We are trying to understand how the brain puts these different signals together to form an image.

### What's next for Blue Brain?

We'll be moving to a higher scale and building a part of the brain that is seven times bigger than what we've already done. If we want to simulate the neocortex, we're going to have to consider different data and laws, in particular with regard to connectivity. In microcircuits, laws all have to do with how neurons connect locally. In a brain region it is about how microcircuits connect together. For the whole brain it is about how brain regions connect together. With these three sets of laws one can connect most of the neurons in the brain. We have completed the first draft for one region of the brain – and even for the whole brain. But it will probably take few more years before we publish anything because there is still so much to verify.

“A neuron has not only a shape but also an electric personality.”

and see what happens. If your hypothesis is correct, there'll be a seizure. You can carry out an experiment under any given conditions, reproduce it in a model and then begin to imagine a whole load of



# HEALTH VALLEY SWITZERLAND

In Ar Ti S  
Fondation Inartis

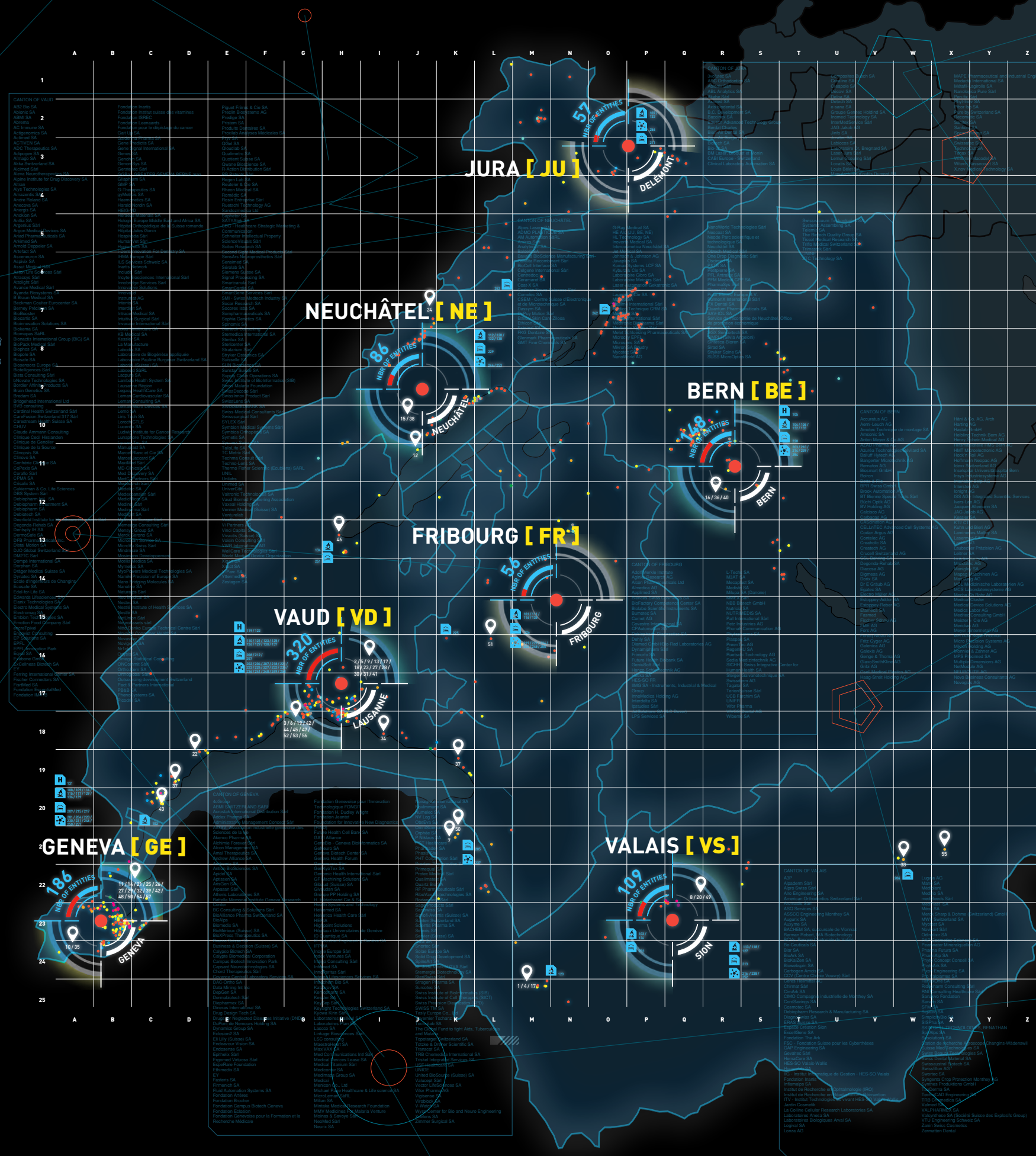
BioAlps  
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## PROUD MEMBERS OF THE HEALTH VALLEY



## MAP LEGEND

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- MEDTECH
- SERVICE
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- PHARMA
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## RESEARCH INSTITUTES

- Adolphe Merkle Institute (AMI)
- Agroscope Changins
- Agroscope Changins Wädenswil - Centre des Fougères
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- Bern University Hospital (Inselspital)
- Bern University of Applied Sciences
- Cell Bioscience Swiss Center
- Campus BioTech (Geneva)
- CERN
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- EPFL Fribourg - The smart living lab
- EPFL Neuchâtel
- EPFL Valais Wallis
- Haute école du paysage, d'ingénierie et d'architecture de Genève (HEPA)
- HBP Human Brain Project
- HES-SO Fribourg
- HES-SO Genève
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- Swiss Institute of Bioinformatics (SIB)
- Swiss Vitamin Institute
- University Hospitals of Geneva (HUG)
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- University of Neuchâtel (UNINE)
- Wyss Center for Bio and Neuroengineering

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- GENILEM
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- Innovation Lab Fribourg
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- MassChallenge Switzerland
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- NDPI
- PACT
- Phytoark Sion-Conthey
- Platin
- Republic of Innovation
- SRI EPFL / Innovants
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- Swiss Federal Institute of Intellectual Property
- Swiss Integrative Center for Human Health (ISCHH)
- Switzerland Global Enterprise
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- Unicet
- UniverCité
- VentureKick
- VentureLab
- World Health Organization (WHO)
- Y-Parc

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- Promotion économique du canton de Jura
- Service de la promotion économique de Genève
- Swiss Federal Institute of Intellectual Property
- Swiss Integrative Center for Human Health (ISCHH)
- Switzerland Global Enterprise
- Technology Park of Saint-Imier
- Technology transfer office of the University of Neuchâtel (TTO UNINE)
- Transfercenter Fribourg
- Unicet
- UniverCité
- VentureKick
- VentureLab
- World Health Organization (WHO)
- Y-Parc

## INVESTORS

- 4FO Venture Partners
- A3 Angels
- BlackRock Asset Management
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- Capital Risque Fribourg SA
- Capital Transmission SA
- Centre de Cautionnement et de Financement - Valais (CCF SA)
- Club Valaisan des Business Angels
- Debiopharm Investment SA
- Eclon 2 SA
- Endeavor Vision
- ECC Partners
- Euro-Private Equity S.A.
- FIPA (Fonds Inartis de pré-amorçage)
- Fondation d'impulsion économique et technologique (FITEC)
- Fonds de soutien à l'innovation du canton de Fribourg
- Geno Ventures
- Frut
- Index Ventures
- Medici Ventures
- NeoMed
- Ondander Fredriksson SA / HealthCap
- Pictet Alternative Advisors SA
- Polytech Ventures
- Swisscom Ventures
- Valley Road Capital
- V Partners
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- Alcon Pharmaceuticals
- Altran
- B Braun Medical
- Bacmex
- Bachem
- Baxalta Manufacturing (Shire)
- Beckman Coulter Eurocenter
- Becton, Dickinson and Company
- Bion-Air Dental
- Bion-Air Surgery
- Bio-Rad Laboratories
- Bracco Suisse
- Carbogen AMCS
- Celgene
- Covance Central Laboratory Services
- CSL Behring
- Debiopharm Research & Manufacturing
- Debiopharm
- Debiotech
- Dentsply Sirona
- DuPont de Nemours Holding
- Edwards Lifesciences
- Electro Medical Systems
- Eli Lilly (Suisse)
- Ferring
- Firmenich
- FKG Dentaire
- Galenica
- Givaudan
- Glenmark Pharmaceuticals
- GSK
- Haag-Struit
- Haemovis
- Hebeling Technikern
- Heraeus Materials
- Incyte
- Intuitive Surgical
- Johnson & Johnson
- Lonza
- Medtronic Europe
- Medtronic Kyphon
- Merck Serono
- Merz (Anteil)
- Micro Precision Systems
- MindMe
- Nestlé Health Science
- Novimmune
- PaxVax
- RegenLab
- Santen Switzerland
- SGS
- Siegfried (Evonox)
- Sintetica-Bioren
- Socorex Isba
- Sophia Genetics
- Straumann Villeret
- Stryker Spine
- Symbios
- Symyx
- Syngenta Crop Protection Monthey
- UCB Biopharma
- UCB Farmchim
- Unilabs
- Unimed
- Valnephre (Société Suisse des Explosifs Group)
- Valronic Technologies
- Vifor Pharma
- Ypsomed
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Prexton's CEO François Conquet is supported by the Michael J. Fox Foundation.



Asceneuron's CEO Dirk Beher is starting clinical trials to cure tauopathies.

# A NEW GENERATION OF STARTUPS TRANSFORMS NEUROSCIENCE INTO THERAPIES

BY FABRICE DELAYE **THE RECENT BURGEONING OF NEUROSCIENCE RESEARCH INITIATIVES IN WESTERN SWITZERLAND IS SPINNING OFF NEW BIOTECH STARTUPS. SOME HAVE ALREADY STARTED HUMAN CLINICAL TRIALS TO MEET UNMET NEEDS FOR THE TREATMENT OF NEUROLOGICAL DISORDERS.**

**W**hen Merck Serono decided to close its headquarters in Geneva in 2012, it not only left 40,000 square metres of labs, offices and conference rooms that are now the premises of Campus Biotech (see page 14). Based on its leadership in multiple sclerosis with its blockbuster drug, the interferon Rebif, Merck Serono had developed extensive expertise in research into the treatment of diseases of the central nervous system.

For strategic reasons, the company then decided to focus its R&D on immunotherapy and more specifically multiple sclerosis. But it recognised the value of its other ongoing preclinical programmes. Instead of closing them down, it created an investment vehicle to seed science entrepreneurs willing to transform this research into products. Supported by the €100 million venture arm of the firm, MS Ventures, the Entrepreneur Partnership Program (EPP) has spun off four biotech startups. Two of these are developing breakthrough therapies for neurological pathologies.

## An alternative for Parkinson's

Prexton Therapeutics, based at Geneva's incubator Ecllosion, is developing a unique

approach to treating Parkinson's disease. This progressive neurodegenerative disorder is caused by the loss of dopaminergic neurons in the brain which control movement initiation and coordination. Current treatments try to replace dopamine or to mimic its effects by chronically administering patients with the dopamine precursor L-dopa, inhibitors of dopamine catabolic enzymes or direct dopamine receptor agonists. These treatments provide symptomatic relief in the early to middle stages of the disease, but lose their efficacy as it progresses. None of them has demonstrated neuroprotection which can delay the disease's progression.

Following research started at Merck Serono, Prexton stimulated a compensatory neuronal system that was not impacted by the disease. Some receptors (mGluR4) were strategically localised to counteract neurotransmitter imbalance and restore motor behavior. The company developed positive allosteric modulators (PAMs) to increase mGluR4 activity while mitigating the likelihood of adverse effects. According to Prexton's CEO and founder François Conquet: "This approach received a crucial validation when in 2014 the Michael J Fox Foundation selected us for a grant of \$2 million and ranked our

## GENEURO OPENS THE IPO WINDOW FOR NEUROTECH STARTUPS

**AMTIBODY** Despite difficult market conditions in April, Geneva-based GeNeuro succeeded in raising €33 million on Euronext, valuing the company at €190 million. "We have a very strong story", explains Jesús Martín-García, CEO of the 25-employees company. "Our approach is unique because we target the very causes of diseases such as multiple sclerosis." Founded in 2006 as a spin-off of research conducted over 15 years at Institut Mérieux, GeNeuro has advanced rapidly over the past decade in the development of monoclonal antibodies targeting pathogenic effects of human endogenous retroviruses for treating autoimmune diseases. The company is currently developing the first treatment that directly targets a cause of multiple sclerosis. GeNeuro has a 350 million euros agreement with French pharmaceutical company Servier which is funding its multiple sclerosis clinical trial in exchange for licensing rights outside the US and Japan. It is conducting a phase IIb clinical trial with 260 patients enlisted in 13 European countries. Preliminary results are expected by the end of 2017. Its IPO has opened a window for Swiss neurotech companies such as AC Immune.

technology first in its category."

In February 2015, this endorsement facilitated Prexton's fundraising of \$10 million in a Series A round, co-led by Sunstone Capital and Ysios Capital and supported by the company's founding investor MS Ventures. With these funds, Prexton was able to enter into a phase I clinical trial in the UK in March. Conquet is confident and is starting to raise another round of \$30 million to finance a phase II. "The demand for a cure for Parkinson's disease is huge with about 8-10 million patients in the world and an annual increase of 2.5 % because of an aging population" he explains. "Parkinson's exerts a huge toll on society because of the lack of autonomy it induces for patients."

## The road to Alzheimer's

If Parkinson's weight on society is heavy, what to say about the predicted epidemic of Alzheimer's disease? In the last 10 years, the number of adults living with the neurodegenerative disease has jumped from 26 million to more than 36 million worldwide. Experts are predicting this number will reach 100 million by 2050.

Asceneuron, another spin-off of Merck Serono supported by the Entrepreneur Partnership Program and an initial investment of 6 million Swiss francs, is working to treat Alzheimer's disease with three complementary therapies. In particular, the company is developing a molecule to prevent the formation of neurofibrillary tangles by the dysfunction of a protein

(tau) associated with the disease.

CEO Dirk Beher explains: "We chose to focus on the molecule tau, the lesser explored of the two major Alzheimer's disease pathologies, because it offers us the chance to establish proof of concept first in another tauopathy: progressive supranuclear palsy (PSP)." PSP is an orphan neurodegenerative disorder also associated with tau accumulation. Drug development in PSP could be faster and more tractable than Alzheimer's. "Since

people are making slow progress with amyloid beta (the other protein's dysfunction associated with Alzheimer's), it is most likely we will need therapies for both pathologies to have success in humans," he explains.

In September 2015, Asceneuron announced the closing of a series A financing round of 30 million Swiss francs led by Sofinnova and joined by SR One, Kurma Partners and JJDC. MS Ventures again participated in the round.

## "INVESTING IN NEUROSCIENCE HAS A MAJOR SOCIAL IMPACT"

Considered a leading European business angel by the Wall Street Journal, entrepreneur and philanthropist Martin Velasco pioneered investment in neurosciences as chairman of AC Immune. Your background is in information technology, why did you get involved in life sciences and specifically neurosciences? "There are two reasons. First the very high quality of research in Western Switzerland. Also, success in this field can have a major impact on people and society. It is particularly true with brain diseases. The increase of Alzheimer's with the ageing of the population has the potential to drive all health systems into bankruptcy in the decades to come."

Is that why you invested in AC Immune and chair its board?

"I want to be an active investor and support a company where I can offer my business perspective as well as funding. When I met Andrea Pfeiffer, the founder and CEO of AC Immune 13 years ago, she presented me with a radical new approach to not only treating but also diagnosing Alzheimer's. Even if there were many risks, it was the potential impact of these technologies that drove me to get involved in the company. The logic was the same a few years later with the deep brain stimulation devices developed by Aleva Neuroprosthetics."

And is it this potential impact that gave you the patience to wait years before seeing a return on your investment?

"One has to understand that brain research is very complex and requires time. If the team is performing well it does not matter if there are delays in phases I and II."



# MINDMAZE, NEUROSCIENCE'S FIRST UNICORN IS SWISS

BY FABRICE DELAYE **A PRODUCT OF WESTERN SWITZERLAND'S STARTUP ECOSYSTEM, THE COMPANY FOUNDED IN LAUSANNE BY INDIAN ENTREPRENEUR TEJ TADI IS USING VIRTUAL REALITY FOR NEUROREHABILITATION AND OTHER BRAIN ENHANCEMENT APPLICATIONS.**

It's surprising who you might chance to encounter at MindMaze. On the day of my visit, I met Guerrino De Luca, president of IT company Logitech, leading a delegation to the Lausanne-based startup and meeting its 35 year-old boss Tej Tadi.

Since the company's announcement earlier this year that it had raised \$100 million, Tadi has brought Switzerland into the small club of countries able to produce a "unicorn" – a startup valued at more than the symbolic US \$1 billion mark. TechCrunch lists 168 of these worldwide, mainly in the United States and China but including 12 in Europe.

In his new 7th-floor offices with breathtaking views over Lake Geneva and the Alps beyond, Tadi intends to leverage these new funds in an ambitious growth strategy. A clear sign of buoyant growth is that his 55 employees are already rather cramped, barely three months after they moved in.

The company's spectacular fundraising has aroused great interest, but Tadi will not be diverted from the path he started on twelve years ago, rooted in the mission driving the Swiss Federal Institute of Technology in Lausanne (EPFL) to turn science into business. Tadi is the product of the transdisciplinary scientific ethos encouraged at the institute by its president Patrick Aebischer. He is also the beneficia-

ry of the EPFL's various support mechanisms for the creation of startups at its Innovation Park.

## "Video ergo sum"

How Tadi came to Switzerland says something of his character. While at high school in Hyderabad, India, he published an article explaining how fuel cells could perpetually power a spacecraft to explore the universe. Its originality and ambition caught the eye of an electronics professor at EPFL, Alfred Rufer, who invited him to Lausanne. It was a trip that decided Tadi's future. "I come from a family of doctors and all I knew then was that I did not want to do medical studies," he says. "Electronics and graphic interfaces were much more fun." So much so that he got work developing special effects in Bollywood movies and continues to this day to make short films in 3D, just for fun.

Having started his engineering studies jointly at EPFL and the University of Nagpur in Mumbai, he settled in Switzerland in 2004 to start a masters degree with Prof Daniel Thalmann, one of the pioneers of virtual reality. At that time, however, major changes were also taking place on the Lausanne campus.

Professor Aebischer's initiatives in neurosciences led to the creation of the Brain Mind Institute and the recruitment of visionary researchers including Olaf Blanke who was investigating how the brain builds representations of the body through illusions like phantom limbs and extracorporeal experiences. Fascinated, Tadi started his PhD with Blanke exploring how to digitise human walking for avatars and robots. To do so, he proposed using virtual reality.

Tadi built the basic components of the system that now drives MindMaze: 1,100

cameras recorded the movements of healthy people as well as patients affected by neural problems. At the same time, an electroencephalogram (EEG) and other sensors measured brain activity. Tadi discovered the power of brain plasticity and the ability of neurons to reorganise.

"I realised the exercises patients were doing for rehabilitation such as using a mouse to move a hand on a screen were not satisfactory," he says. "They were not consistent with the representations our brain has of our body." Hence the idea of using the immersive world of virtual reality. This was the "eureka" moment which led to the 2007 publication in Science journal of an article titled "Video ergo sum" – I see therefore I am – and laid the foundations of MindMaze's technology culminating two years later with the Pfizer neuroscience prize.

## A product of Western Switzerland's ecosystem

Unlike his colleagues, Tadi is not a pure scientist. The more he experienced virtual reality with patients, the more he became convinced of its potential for rehabilitation, and the idea of a startup matured. He had no business experience. But he had the advantage of being immersed in the entrepreneurial ecosystem the EPFL was growing.

The first to see his potential was Hervé

"Tadi had the advantage of being immersed in the Swiss entrepreneurial ecosystem."



PHOTOS: FRANÇOIS WAVRE/LUND13

Lebret who managed the Innogrants programme which supports new ventures. In the last eight years it has backed 90 projects selected from 650 applications, and of these, 60 resulted in the creation of startups. "My number one criterion is the personality of entrepreneurs," Lebret says, recalling his meeting with Tadi. "I went to see an esoteric virtual reality technology and I found someone who was charismatic and funny and who could explain an ambitious project with great simplicity. It didn't take us long to select him." Innogrants provided 100,000 francs to allow Tadi to concentrate for a year on transforming his project into a startup.

Tadi thus entered a community, passing through VentureKick, an acceleration programme that awarded him 30,000 francs, then the business training programmes VentureLab and VentureLeaders that brought him to Boston to meet potential partners and investors. His selection in the startup competition of the IMD business school led him to Silicon Valley, but seed financing came from Swiss institutions such as the Gebert Rf Foundation, the Commission for Technology and Innovation (CTI), the canton of Vaud and

two business angels.

Incorporated in May 2012, MindMaze runs parallel strategies. "The idea was always to have a medical grade product," Tadi says, "plus a technology for other markets." This led to the development of MindPlayPro, a suite of interactive games for the rehabilitation of upper limbs, then to MindLeap, a virtual reality helmet associated with EEG.

The company opened an office in San Francisco where, in nearby Silicon Valley, Tadi saw virtual reality gathering momentum with the acquisition of Oculus by Facebook and the phenomenon of unicorns. This made him think about how to finance MindMaze. "We were not building an app but hardware," he says. "It needed scale and long-term investors. Raising a spectacular amount became justifiable because we had not only a commercial product validated by clinical data but also a technology for the future."

Recruited by the Davos Forum Young Global Leaders programme in 2015, Tadi found his way to the giants of tech. But it was ultimately chance, philanthropy and the proximity of Geneva that led to the 100 million francs financing round. "We had

MindMaze's CEO Tej Tadi has developed its own VR Helmet associated with EEG.

started a special project for developing countries where treatment of brain diseases remains primary," he says. "I was looking for a hospital in India with which to collaborate. I finally came to the Hinduja clinic in Mumbai that has an interesting model because doctors do not know the financial means of patients and treat them all the same way." This led him to meet with the Hinduja group and specifically Ajay Hinduja who is based in Geneva.

## Enhanced training

After due diligence, the Hinduja Group invested 100 million francs of which half is in cash and the rest takes the form of convertible loans. Few other private investors joined the round. With this deal, Tadi found funding but also a strategic partner with which he has the equivalent of a credit line. The Hinduja conglomerate, with 70,000 employees and revenues of \$30 billion, runs factories, distribution networks, leasing and call centres in 50 countries.

It was not only the potential of virtual reality for motor rehabilitation of patients that interested the Indian group. They also saw opportunities for a medical grade device which also had applications in other markets such as security, sports and learning.

Tadi uses applications such as remote control for drones and robots as well as performance training. MindMaze can be used, for example, on a simulator project for the improvement of brain-motion interfaces for driving. The way of learning is the same for anything from golf to trading.

But there is yet more to Tadi's vision. He is currently working on a multisensory processing chip to create deeper identification between avatars or robots and people through the use of human senses. As he looks out at the magnificent view from his Lausanne office, he is counting on Western Switzerland's renowned expertise in microelectronics and neurosciences to achieve his further ambitions.



# THE BENEFRI, A NETWORK FOR STUDYING THE BRAIN

BY PASCAL VERMOT **BERN AND FRIBOURG IN SWITZERLAND HAVE PIONEERED TRAINING PROGRAMMES FOR YOUNG NEUROSCIENTISTS SETTING UP THE FIRST DOCTORAL SCHOOL DEDICATED TO NEUROSCIENCES IN SWITZERLAND.**

**T**he initiative was ahead of its time. In 1996, when the cantons of Bern and Fribourg signed an agreement in favour of joint education to support postgraduate training in neurobiology, and neurobiology combined with neuro-informatics, they were pioneers in setting up the first doctoral school dedicated to the neurosciences in Switzerland.

However, the programme has not completely lived up to its name. There is supposedly a network between Bern, Neuchâtel and Fribourg – designated by the acronym BeNeFri – yet what has been called the neuroscience programme has partners only at the universities of Bern and Fribourg. And although its website states that the University of Neuchâtel “may become involved” in the more or less near future, for the time being it is not. Most of the effort put into developing the programme is still done by Bern and Fribourg.

## Doctoral school

Éric Rouiller, chair of neurophysiology at Fribourg and the programme’s manager until recently, explains: “The initiative was thought up over twenty years ago. The project developed gradually over the years, and then became formalised between Bern and Fribourg. Our wish was to create one of the first doctoral schools in the neurosciences so that our students could benefit from training programmes that were both generous and advanced in the various areas related

to this type of research and teaching. The University of Neuchâtel, however, had no active research group in neurosciences – their activities were more focused on special strengths such as parasitology.”

The point of such a joint initiative is to allow PhD students to assist selected lectures that are in the European credit transfer and accumulation system (ECTS), and to take part in seminars, workshops and other research activities. At Fribourg, eight research groups are part of the initiative. Their core interests range from the cognitive and neurological sciences to neurophysiology, including the perception and control of motion and brain circuits involved in positive emotions and visual cognition. In Bern, no less than three faculties are partners: medicine, veterinary medicine and science. A clinical component is also integrated, as research is carried out in the department of neurology at the university hospital, Inselspital.

In terms of the upcoming academic generation, there are many benefits of a doctoral school focused on research topics as promising as those in neuroscience.

“The BeNeFri opens neuroscience to aspects other than those purely related to human biology.”

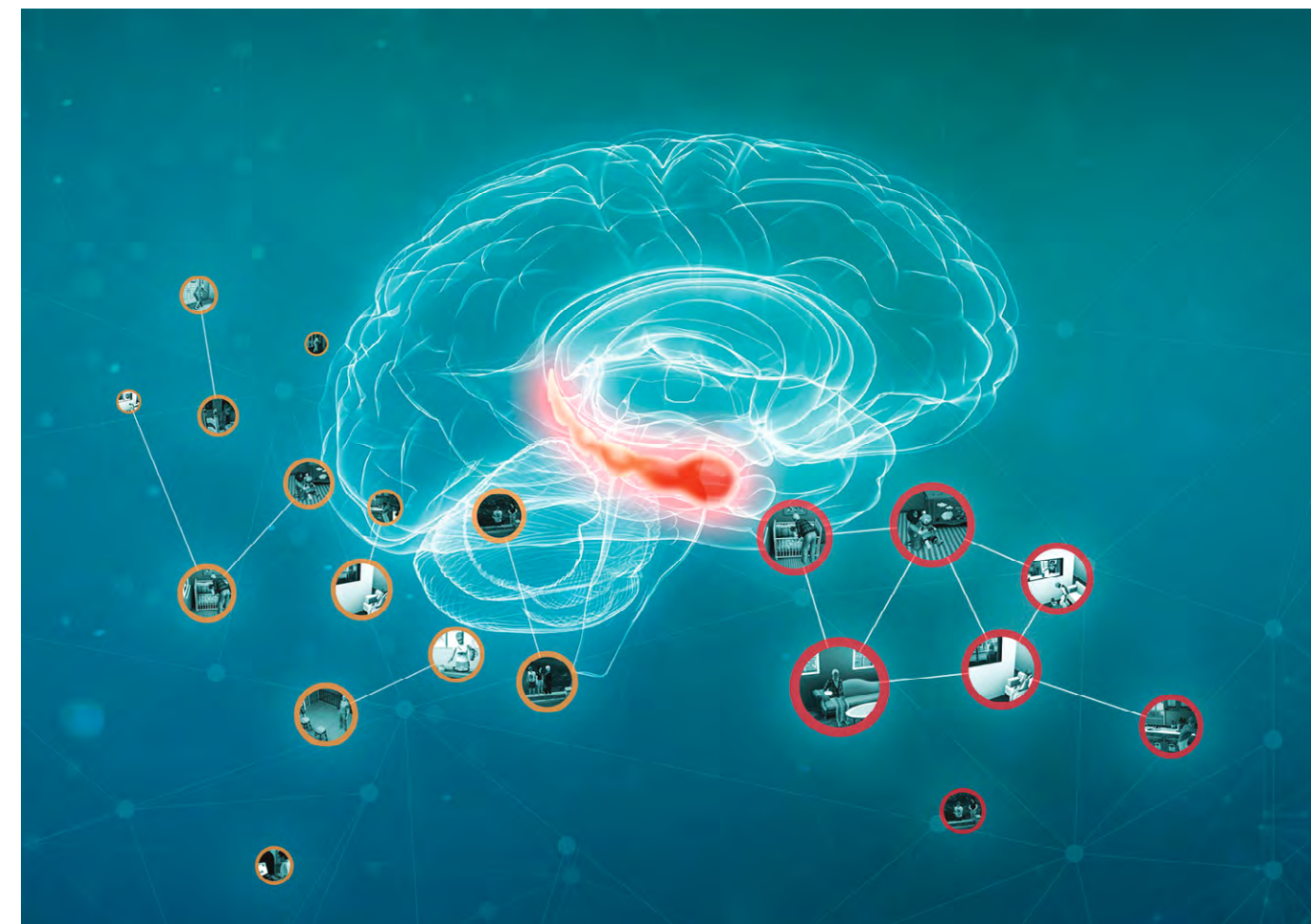
First, dedicated training attracts students who are finalising their master’s degree and could be tempted to turn their attention to other areas of research for their PhD, or perhaps even to leave altogether for new horizons. The originality of the BeNeFri neuroscience programme opens neuroscience to aspects other than those which are purely related to human biology – such as veterinary medicine, mathematics, computer science and clinical psychiatry – a feature also likely to seduce many PhD students.

Second, one of the essential facets of the project was to urge participants to carry out “certain aspects of the scientific work with other partner institutions in a collaborative spirit” even if they are pursuing a scientific assignment for the institute which is supervising them – a facet that would lead to tangible benefits such as joint publication in renowned scientific journals or exchanges of PhD students between the various research groups.

## Exploring pain

Professor Dominique Glauser leads a group at the department of biology at Fribourg which is a partner in the programme. His team offers to future PhD students the opportunity to carry out research on the fascinating and mysterious area of neuron pain receptors. Research is carried out on the commonly used worm model, with state-of-the-art technology in optogenetics and bioinformatics. The job offer was advertised early on in July on the website of the prestigious journal Nature and stresses the possibility of joining the BeNeFri neuroscience programme as an opportunity to benefit from high-quality training.

However, the number of candidates is



relatively modest. The last batch had only 15 PhD candidates. Even if the training programme lasts three years, the annual workforce will be limited to 50 PhD trainees. This is not a lot in the context of similar and more recent initiatives. Launched in 2002, the Lemanic Neuroscience Doctoral School, a joint initiative of the Swiss Federal Institute of Technology (EPFL), the universities of Lausanne and Geneva and their hospitals, attracts about 130 doctoral trainees. The Swiss Federal Institute of Technology in Zurich’s Neuroscience Center created a programme in 1998 which, from the very beginning, was clearly orientated towards being international and attracts 260 students every year.

## The challenge of local competition

So why continue to work on your own when there are two other major doctoral programmes within 150 kilometres? “I believe that proximity is essential for the smooth-running of our training programme,” says Gregor Rainer, associate professor at the University of Fribourg and recently appointed co-manager of the programme. “Imagine a doctoral

student in Bern who has to follow courses at the University of Geneva. This sort of logistical challenge hinders more than it is beneficial”. Apart from these practical issues, merging programmes would require a complete overhaul of the kind of training offered between the academic institutions, and, though it may seem a paradox, gathering all resources under one flag would not necessarily attract more PhD candidates in neurosciences.

According to its initiators, the Bern-Fribourg programme has a satisfactory track record, even if it is difficult to quantify. “What is essential for PhD students is to benefit from high-quality training that we are in a position to offer, and for scientific collaborations to blossom”, Rainer stresses, while Rouiller adds: “The network that is required to

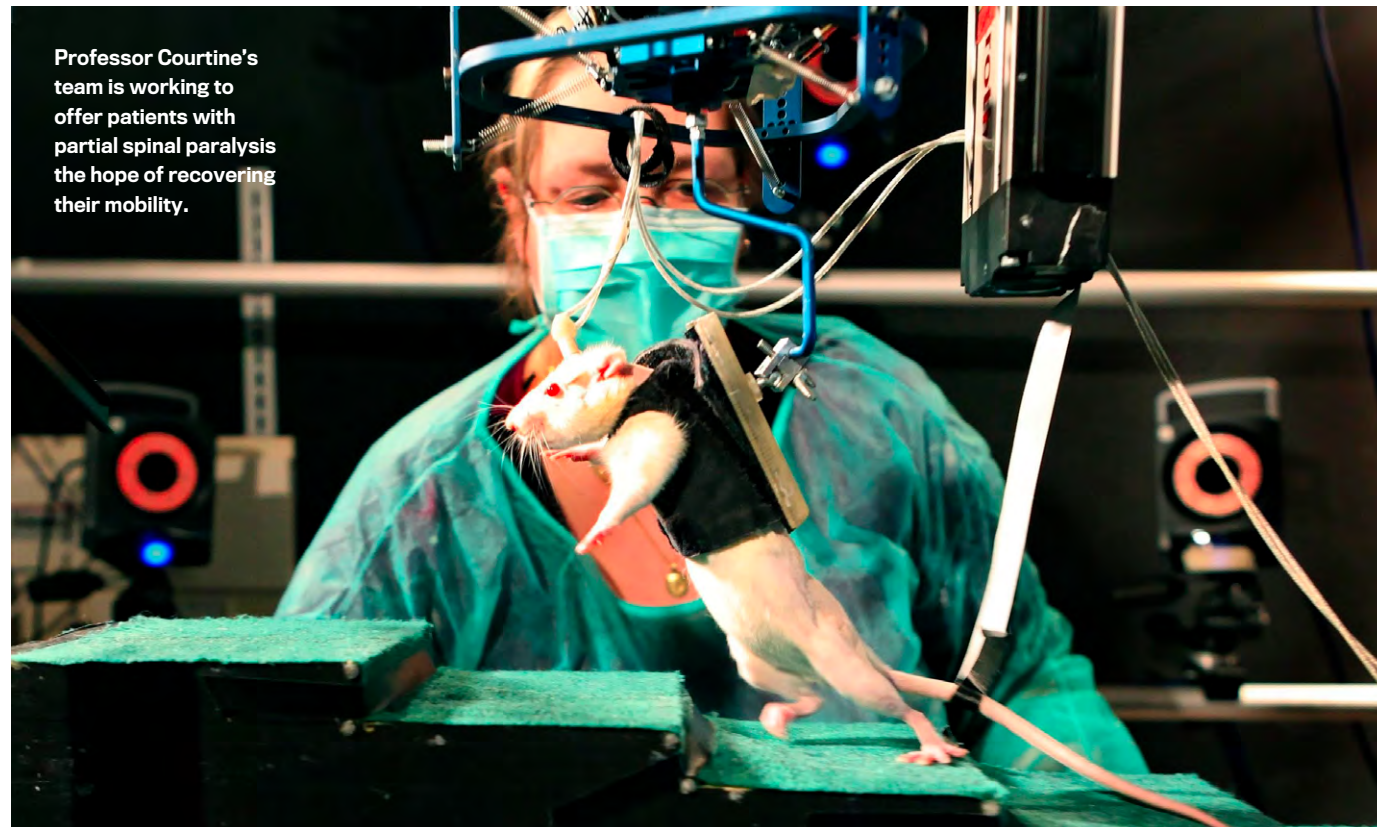
“Research are carried out on the fascinating area of neuron pain receptors.”

implement courses for students and hence to organise their training has had beneficial impacts on research carried out in different partner groups. As an illustration, in 2009, Fribourg introduced the third year of their training programme into the curriculum of their faculty of medicine which allowed us to set up training courses in neurology at the Inselspital in Bern, and thus approach the clinical environment”. In this way, training and research are tightly related.

Every network forms a structure in perpetual motion. On the whim of academic migrations, researchers who were formerly linked to Fribourg or Bern have become the programme’s ambassadors well beyond its historical borders. Rainer mentions the case of a colleague who went to the canton of Ticino but remains a member of the network. New collaborations can emerge.

Switzerland seems a small country to accommodate so many competing PhD training programmes. Rainer tried to bridge the BeNeFri with the Lemanic Neuroscience Doctoral School a few years ago but, officially, it was not successful. Perhaps it’s just a matter of time?





Professor Courtine's team is working to offer patients with partial spinal paralysis the hope of recovering their mobility.

# THE VALAIS REGION, EUROPEAN NURSERY FOR NEUROREHABILITATION

BY PASCAL VERMOT **BY INCORPORATING TWO RESEARCH CHAIRS AT THE SWISS INSTITUTE OF TECHNOLOGY LAUSANNE (EPFL), THE VALAIS REGION AND CAMPUS ENERGYPOLIS' "HEALTH CENTRE" ARE LEADING THE WAY TO CLINICAL NEUROSCIENCES 2.0**

The canton of Valais is reshuffling its cards in providing care to patients who suffer from serious injuries, paralysis and strokes. By 2020, the Rehabilitation Clinic SuvaCare (CRR) – the main actor in the field in Switzerland – will have merged with the Rehabilitation Research Institute (IRR). CRR already accommodates IRR on its premises, and sharing their expertise in research and medical quality control will create an organisation dedicated to clinical research. Meanwhile, CRR is tightening its bonds with the Swiss Institute of Technology Lausanne (EPFL). Apart from the half-dozen researchers who currently hold the school's chairs in neuroprosthetics, a new chair in clinical neuroengineering and human-computer interaction has set up its headquarters in a brand new 300 square metre laboratory

in Sion. Thomas Hummel was appointed head of the laboratory this summer.

## Clinical Neurosciences

Clinical neuroscience is emerging as a new field of expertise in which the Valais region intends to be competitive. Once established, about twenty EPFL scientists will be working at CRR, thus constituting the heart of Campus Energypolis' "Health Centre". The centre is already under way within the framework of a partnership between the Valais State, EPFL and HES-SO Valais-Wallis.

This is an unprecedented development for a clinical entity more accustomed to surgeons, orthopedists and physiotherapists than to engineers and neuroscientists. "Historically, CRR has specialised in orthopedic traumas, even if we do already have a department of neurology,"

Bertrand Léger, interim director of IRR, explains. "There was growing demand from our clinicians to develop research projects, and we decided to react by tightening the bonds between fundamental science and engineering. With respect to other fields of research, such as cancer for example, very little had been carried out in the field of rehabilitation, so the request was all the stronger".

EPFL has had a centre for neuroprosthetics since 2013. The incorporation of a similar chair in Sion boosted the alliance between fundamental, applied and clinical research. The type of research carried out by Professor Olaf Blanke's team fell effortlessly within the scope of "activity and pain" that had been carried out by CRR. "Our scientists concentrate on the translational reach of technology we are developing in the lab. Our research is carried out where our patients reside. This is of immediate benefit to our scientists because we can test each device under real conditions, and then regulate them according to a patient's individual profile", the centre's

director explains. And the new field of expertise will be neurorehabilitation, that is to say all fields of technology that are required to support the replacement of any motor or cerebral function that has been lost in a patient, or indeed facilitate its recuperation.

## Rehabilitation medicine 2.0

Ongoing research gives a good picture of what is meant by "rehabilitation medicine 2.0", a form of medicine gradually coming to prominence. For example, Professor Grégoire Courtine's team is working on being able to offer patients who suffer from partial spinal paralysis the hope of recovering their mobility. By using the mouse model and combining a chemical cocktail coupled to implant-induced electrostimulation of the nervous system, researchers have already managed to control in real time the way rats move and the height to which they can lift their hind limbs. Tests have already been carried out at Lausanne University Hospital (CHUV), and the robot platform that was developed for analysing walking ability is about to disembark in Sion to tried out on patients at CRR.

Professor José Millán's research group has made numerous advances in the field of man-machine interfaces. The team has already shown that patients with spinal paralysis are able to pilot a wheelchair merely by way of thought with a system that can translate a patient's electrical signals into an executed command, although only by intense concentration. This kind of research should significantly improve the way patients – whose hand, arm or leg, has been amputated – will cope with controlling new generation prostheses. These robotised limbs are particularly

complex and still at the prototype stage. However, they do give patients hope not only that they might recover their ability to walk or grasp but also acquire a sense of touch thanks to the development of "bionic tissues". With obvious caveats, it seems we are not far from Steve Austin's "Six Million Dollar Man".

With the arrival of Hummel in Sion, future developments in the field will no doubt be of a very different calibre. "His nomination marks the beginning of a new period in neuroscience development in Sion," Olaf Blanke explains. "Trained as a neurologist and specialising in cellular and molecular neurobiology, Thomas Hummel will be at the head of a group of 15 to 20 people whose competencies are especially useful to patients in a hospital specialising in rehabilitation, particularly in the field of cognitive rehabilitation." Many patients are admitted to CRR following strokes. Acquiring a greater fundamental understanding of the mechanisms that underlie symptoms associated with these pathologies such as impaired vision could nourish future research projects carried out in Sion.

## Transcranial magnetic stimulation

Michela Bassolino has only just arrived in Sion, and her objectives give a brief insight into the new alleys she intends to explore. Award winner of the Swiss National Science Foundation's "Ambizione" grant, the neuropsychologist intends to combine transcranial magnetic stimulation – a non-invasive method – with virtual reality to manipulate and restore a feeling of physicality in patients inflicted with chronic neurological troubles.

This goes to show once again that the frontiers which traditionally existed between different scientific domains are

slowly fading, and that clinicians are benefitting from an ever-widening collaboration with fundamental researchers. "CRR is a field partner offering its researchers direct access to fellow clinicians as well as to patients," says Gilles Rivier, medical director of CRR. Conversely, clinicians can count on specialists who are able to decipher the underlying mechanisms at work in each of our patients. Take hand paralysis for example. Scientists can exploit a patient's will to make his or her hand move in order to regain the use of it faster. That said, you still have to be able to decode the patient's brain signals correctly through computer analysis and put to good use the technology you have at your disposal. It is in this way that translational research makes sense."

Naturally, researchers at EPFL find something in it for themselves. Patients admitted to a rehabilitation hospital are usually there for a relatively long period. Consequently, the scientists are able to follow them for many weeks at a time, sometimes even months. The pool of patients in rehabilitation medicine is not big, so having access to a population of patients who are all admitted to the same centre – and what is more the biggest of its kind in the region – comes as a piece of unexpected good fortune. "If we could, we would all like to move to Sion", smiles Blanke.

Just a joke? Not really. "It is important for the scientists to be where the patients are," he says. "If you want to achieve true medical and technical advances, if you hope to succeed in developing robotic systems that have been tested, approved and optimised, not only do you need to see the patients frequently, but also their physiotherapists and their doctors. Just shaping an idea in the lab is not enough."



By 2020, the Rehabilitation Clinic SuvaCare (CRR) will have merged with the Rehabilitation Research Institute (IRR).

PHOTOS: DR



# BUILDING A STRONG PATENT PORTFOLIO IN NEUROSCIENCES

BY GILLES PFEND\* **FLEXIBLE AND CREATIVE INTELLECTUAL PROPERTY PROTECTION STRATEGIES MUST BE IMPLEMENTED BY RESEARCH INSTITUTIONS OR COMPANIES ACTIVE IN NEUROSCIENCES. HERE IS WHY AND HOW?**

It is increasingly clear that studies of central and peripheral nervous systems require an interdisciplinary approach. Discoveries made during these studies lead to inventions in fields as diverse as biology, chemistry, psychology, engineering, and bioinformatics.

New challenges emerge; flexible and creative intellectual property (IP) protection strategies must be implemented by research institutions or companies active in this field in order to obtain a strong patent portfolio to better protect these inventions.

## Identifying promising patentable inventions

For budgetary reasons, it is not always possible to file patent applications for all inventions. Therefore, it is necessary to identify promising inventions that are worth pursuing in a patent application preferably with the aid of a Patent Attorney who understands the technology and who regularly attends internal meetings of the R&D and Marketing departments.

Additionally, not all inventions are patentable inventions. For example, the use of stem cells for treating neurological diseases is excluded from patentability in Europe when these stem cells have exclusively been obtained by a method,

which necessarily involved the destruction of human embryos.

## Freedom to operate?

Before launching a new product (drug or medical device) on the market, and often even before undertaking a new round of research that could lead to the development of a new product, it is essential to ensure that the manufacture, the marketing or the use of said new product, does not infringe intellectual property rights of third parties by determining whether a “freedom to operate” (FTO) exists.

The Patent Attorney in charge of this FTO analysis, will determine the territorial scope of third party IP rights, their respective statuses, the scope of protec-

“It is imperative to involve the patent attorney not only in early stages of a drug but also throughout the life of said drug.”

tion conferred by the patent claims and their validity. If the analysis concludes in a partial or complete dependence of the product toward one or more existing third party IP rights, it will be necessary to consider negotiating one or more licenses from those parties.

## Strong priority application

If the invention is patentable and you have the freedom to operate – or that at the time the invention will be operated,

third party IP rights have expired – you may want to protect your invention by filing a priority patent application. The principle of priority is very useful since the applicant does not have to file the patent application in several countries of interest simultaneously as most countries follow the so-called “first-to-file-system” in granting a patent to the applicant who filed the application first. The applicant is then entitled to claim priority for a period of twelve months and the filing date of that first application is considered the “priority date”.

The importance of the quality of this first filing is often overlooked. During the analysis of third parties patent portfolios, it is unfortunately not rare to find priority applications of poor quality (so called “dirty filings”), because either they do not accurately describe the invention or in contrast, these applications describe and claim the invention too narrowly.

A priority application written quickly and without the help of an IP expert is likely to be invalidated in case of dispute (opposition before the patent office or validity contest in court). Any disclosure such as a scientific publication, a poster, an oral communication, that took place between the filing date of the priority application and the subsequent international application will be destructive of novelty and inventive step for patentability of a subsequent patent application in case the priority is found invalid

## Timing of filing

The ideal time to file a patent application is always difficult to determine. Indeed, the filing should neither occur too early in the product development phase nor too late. We generally recommend filing the priority application when the proof of



concept for the lead compound has clearly been established.

In contrast to the requirements to be met for scientific articles submissions, it is not necessary to focus on the exact biological mechanism affected by the administration of a drug, what matters is the technical effect observed.

## The selection of countries

It is advisable to take into account the territorial scope of the patent protection for an invention well before extending the application by national phases. Several legal factors must be taken into account when drafting the priority application, or at the latest while finalizing the drafting of the international application (PCT) claiming the benefit of the priority application, so that the patent application meets the (formal) requirements in most countries.

The language of the description is an important factor to keep in mind when preparing the application in order to avoid additional translation costs. Drafting in English language will reduce costs when extending to other countries or regions accepting the English language such as, the United States, Europe, Canada, Israel, India, Singapore, and

Australia, to name a few.

Countries in which protection is sought is generally governed by several criteria: country where the headquarters, R & D of the applicant and its production are located; country where the applicant conducts clinical trials, the presence of competitors in given territories and territories where competitor is usually seeking patent protection, disease prevalence, etc.

It is also advisable to file regional applications rather than national ones. For example, filing an application at the European Patent Office (EPO) or at the Eurasian Patent Office shows the advantage of a single prosecution before said offices, as opposed to separate prosecutions in each single country of interest.

## Patent life cycle management

In contrast to other technical domains, drugs development and their necessary regulatory processes can often be lengthy. Both the US and Europe provide exclusivity extensions for patented drugs in order to compensate somewhat this delay and R&D costs. For example, in the countries of the European Union (EU) and of the European Economic Area (EEA), a national intellectual property

Filing an application at the European Patent Office (EPO) shows the advantage of a single prosecution before said office, as opposed to separate prosecutions in each single European country of interest.

right – named supplementary protection certificate (SPC) – provides for up to 5 years of further monopoly protection for specific patented medicinal product.

Additional examples of patent life cycle management strategies include filing patents on a specific pharmaceutical

“A priority application written quickly and without the help of an IP expert is likely to be invalidated.”

formulation of the drug, a specific treatment regimen, a combination therapy, an alternative method of producing the drug or specific chemical forms of said drug.

Building a strong patent portfolio that adds value to companies active in the Life Sciences and in particular in Neurosciences is a long process, which requires special attention. It is imperative to involve the patent attorney not only in the early stages of development of the drug but also throughout the life of said drug in order to adapt the protection during the prosecution of the patent application.

\* GILLES PFEND is a partner with KATZAROV, one of the foremost intellectual property firms in Switzerland. He is Swiss & European Patent Attorney and specializes in pharmaceutical, chemical and biotech inventions. Gilles Pfend counsels local and international Life Sciences clients on strategic issues relating to the development and management of their global patent portfolios. His practice focuses on preparing and prosecuting patents with a key objective of ensuring that the clients' business objectives are met. He also performs patentability analysis, due diligence analyses and renders opinions on freedom-to-operate.



# SAFE HOST AND X10SYS ARE MAKING SENSE OF BIOTECH DATA

BY ELENA SIKIAS\* **IN PARTNERSHIP WITH SAFE HOST, X10SYS ASSOCIATIVE TECHNOLOGIES HAS DEVELOPED A NEW DATA MODEL TO HANDLE A TSUNAMI OF HEALTH SCIENCES INFORMATION**

The biotech industry faces challenges with “big and complex data” which the relational database model was never designed to accommodate. Newer NoSQL and other technologies are attempting to manage the problem but each have their own issues with managing structure – they are rigid and complicated, time-consuming and do not perform adequately or deliver the expected results.

## A new data science model

A new data science model is needed. X10SYS Associative Technologies, in partnership with Safe Host, has produced an evolution in data science that is able to handle data and information requirements going forward. It is much more than a database: it is a “database of databases”. And beyond that, it is an information and knowledge management system.

At the same time, the requirement for ultra-secure data hosting and storage by a trusted partner, the expansion of cloud services platforms and geo-location of data requirements bring challenges to

data centres to provide the most current technology and excellent support services.

X10SYS has found an excellent partner in Safe Host to deliver superior hosted solutions to our customers without having to worry about security and service.

## Breast cancer research

Research work done by General Electric R&D shows some of the benefits. A paper has been presented and published that used the X10SYS Associative Model for handling and analysing complex breast cancer data.

This new approach was designed to meet the needs of various communities dealing with big and complex data. The technology is unique in many ways. It includes a much easier method to create an instant data warehouse which aggregates any number of disparate structured or unstructured data sets. Its single data instance storage allows for no duplication in the data. It is easy to use and facilitates faster development and results. There is no query language and one filter function

returns all associated information.

Key areas of the associative model’s usefulness outlined in the paper include:

- Rapid integration and correlation of data from multiple data sources, allowing data source-agnostic aggregation and analysis – much faster and easier than traditional methods
- Bi-directional dynamic connections which allow addition of new associations as more data is ingested
- Real-time correlation analysis
- Less programming and implementation than SQL but with the same accuracy
- Allowance for unsuspected identification of clinical patterns

## Easy global research sharing

Because the model does not use tables and all permissions are associatively controlled, it is extremely easy for it to block all protected health information to everyone except users with appropriate access. This means we can share data with numerous sites which can use and manipulate it without concern for disruption or HIPAA/privacy issues.

The model’s associative information architecture is built on simple freeform bi-directional links that do not use tables but which contextualise, define and relate information at the data item level. Specialised applications can be developed much more quickly and maintained more

efficiently than traditional methodologies because new information sets can be added without disturbing the existing information or applications.

As an example from a genomics project, the Genomics Researcher’s Assistant aids in the automated and domain-expert-directed annotation correlation of a large number of mis-annotated, under-annotated and hypothetical proteins produced by all microbial genome projects. The Genomics Researcher’s Assistant systematically aggregates and correlates all the data from gene and protein structure/function databases with user-generated data, as well as data from the microbial genome databases within a single, associative information architecture providing for vastly improved annotation derivation and correlation. In addition, researchers’ thoughts and ideas about their research hypotheses and discoveries can be easily captured in full association with the relevant genomic data, making it possible to add perspective to system-derived correlations and annotations.

The revolutionary X10SYS associative information modelling technology on which the Genomics Researcher’s Assistant is based provides for the combining and re-combining of multiple data structures and sets in an almost unlimited number of dimensions. This provides a self-learning format analogous to how the

human brain works: a higher order computational approach which will vastly increase the productivity of scientists working on gene and genome annotations. The global utility of this novel associative information architecture will be further enhanced by our provision of multiple end-user designed, intuitive and interactive interfaces that provide truly unique and high value-added bio-computational tools for domain-expert users who are not themselves computational scientists. Target users include genomic scientists and metabolic modellers from academia and government research labs and bioprocess engineers developing microbially produced pharmaceuticals for the treatment of cancer, heart disease and other chronic conditions.

The overwhelming majority of digitally stored discrete data, where data is represented in cells as opposed to image and audio data, is kept in two-dimensional spreadsheets and relational databases. Both of these use the row and column structure which provides for a very limited number of associations and are highly inflexible with respect to integrating data from other sources. This ubiquitous 2D format for data storage is as limited in capability and understanding, compared to the X10SYS associative information architecture, as the world described by Edward Abbott in his classic

science fiction text Flatland is compared to Einstein’s 4D space-time universe.

## Agility of the associative model

The associative model encapsulates a single space where all concepts can be related to one another in any dimension, regardless of content. This means that user-produced content such as new sequence data, or annotation and meta-data, is as equally query-ready as the reference data and annotation sources. It is now possible for researchers to consider user-supplied data as an entry point into the query space, where known annotation information from multiple sources can simultaneously be used as an informational lens back onto their own data through which they may identify missing or significant elements. For example, this technique may be employed to deduce the function of a hypothetical protein based on placement within an operon and the exclusion of detected members of a known metabolic pathway.

While the system is quite complex, Safe Host and X10SYS have designed an architecture for easy usability and application. The technology will prove invaluable in the biotech arena.

\* ELENA SIKIAS, Marketing and Communications, Safe Host SA

PHOTO: DR



# NEUROSCIENCE MEDTECH GATHERS MOMENTUM

BY FABRICE DELAYE **BASED IN LAUSANNE, G-THERAPEUTICS AND ALEVA NEURO HAVE RECENTLY RAISED LARGE SUMS OF MONEY TO MOVE FROM LAB TO MARKET. OTHERS ARE FOLLOWING.**

**E**arlier this year Aleva Neurotherapeutics, a leading company developing next-generation implants for deep brain stimulation (DBS), and

G-Therapeutics, who develop implantable neuro-stimulation systems (INS) for electrical stimulation of specific areas of the spinal cord to improve rehabilitation, found investors willing to take the risk of putting huge amounts of cash behind their breakthrough technologies.

## Deep brain stimulation

A spin-off from Prof Philippe Renaud's Microsystems Laboratory at the Swiss Institute of Technology in Lausanne (EPFL), by May this year, Aleva Neurotherapeutics had raised \$18 million in a Series C financing round. In total, Aleva has raised \$42 million from renowned private and institutional investors such as BioMedPartners, BB Biotech Ventures, Banexi Ventures Partners and Initiative Capital Romandie. The last round was led by Greatbatch, a strategic lead investor contributing a total of \$5 million to the transaction. In February 2016, Aleva and Greatbatch announced they had closed a strategic development, supply and manufacturing agreement. In addition, Aleva will combine their innovative directional lead technology with the proprietary neurostimulation platform of Nuvectra, a recent spin-off from Greatbatch.

Aleva Neurotherapeutics' neurostimulation technologies and devices are designed to be more precise and more



**Aleva collaborates with Greatbatch to develop implants for deep brain stimulation.**

efficient than currently available DBS approaches, while causing fewer side effects. Based on its proprietary microDBS technology, Aleva has developed two novel brain stimulating products with different functionalities. The first, called directSTIM, is a complete directional deep brain stimulation system for

long-term therapy in Parkinson's disease and essential tremor. The second, spiderSTIM, is a full solution for intra-surgical placement of DBS electrodes. The successful results of Aleva's directSTN pilot study were published in *Brain* in 2014. The proceeds of the financing will be used to obtain the CE mark for Aleva's proprietary directSTIM directional deep brain stimulation system in 2017.

## Project rewind

Also a spin-off of research at Prof Grégoire Courtine's lab at the EPFL, G-Therapeutics raised €26 million in April in a Series A investment round co-led by LSP, INKEF Capital, Gimv and Wellington Partners. In addition, G-Therapeutics has secured a €10 million innovation loan from the Rijksdienst voor Ondernemend Nederland (RvO, part of Dutch ministry of economic affairs) to support the development of its innovative therapeutic solutions. The startup will be based in Lausanne and Eindhoven.

Professor Courtine has been working for 15 years on unravelling the mechanisms underlying an effective treatment for people with a spinal cord injury affecting the lower limbs. G-Therapeutics will use the funds to bring this unique new therapy for improved rehabilitation of spinal-cord injuries from lab to patients. In particular, the company is developing the implantable neuro-stimulation system for electrical stimulation while the treatment is also using specific drugs. G-therapeutics will perform a multi-centre clinical study to obtain regulatory approval.

Beyond Aleva and G-therapeutics an entire new generation of medtech startups focusing on neurosciences is now blooming in Western Switzerland. KB Medical, for example, is developing a robotic assistance system for use by surgeons during spinal surgery, while Sensars is creating neuroprosthetic devices which allow amputees to regain feeling from missing limbs by reconnecting artificial sensory feedback with the remaining nervous system.



# WHY U.S. BIOPHARMA COMPANY INCYTE CHOSE THE GREATER GENEVA BERN AREA

BY THOMAS BOHN **IN THE HEART OF EUROPE, WESTERN SWITZERLAND OFFERS A HIGHLY SKILLED LIFE SCIENCES WORKFORCE AND EFFICIENT ACCESS TO KEY CLINICAL TRIAL EXPERTS AND INSTITUTIONS - ALL MAJOR DRIVERS BEHIND INCYTE'S DECISION TO ESTABLISH ITS EUROPEAN HEADQUARTERS IN THE REGION.**

**W**estern Switzerland is one of the best places in the world to do business and is particularly attractive to foreign firms thanks to its international and multilingual environment. It is home to several dynamic clusters, or networks of expertise, which are catalysts in the fields of life sciences, IT, micro- and nanotechnology and cleantech. New companies move to the region every year, becoming part of this extraordinarily diverse business community and gaining access to a powerful network of venture capitalists.

## Strategic and practical services

As the investment promotion agency of Western Switzerland, the Greater Geneva Bern area (GGBa) supports them throughout the process, in close cooperation with the cantonal economic development agencies. From the evaluation of potential sites to the establishment of contacts with public and private sector partners, from advice on the Swiss business environment to the incorporation of the company: the services provided by the GGBa are of strategic and practical nature, as well as confidential and free of charge. Created in 2010 by the cantons of Bern, Fribourg, Vaud, Neuchâtel, Geneva and Valais, the GGBa has since advised and assisted around 400 companies from around the world in launching their activities in Western Switzerland.

Among them is Incyte, a U.S. biophar-



maceutical company focused on the discovery, development and manufacturing of proprietary therapeutics, primarily for oncology. Attracted by Western Switzerland's flourishing life sciences ecosystem and by the availability of a highly qualified workforce, Incyte opened a European office in Geneva in October 2015.

## Incyte's innovative, rich and diverse portfolio

"We chose the Greater Geneva Bern area because of its biotech heritage and the international talent pool that is available. The region is also centrally located in Europe, and Geneva has direct flights to many important locations globally",

explains Hervé Hoppenot, Incyte's President and CEO. "The presence of world-class universities and of a strong academic community, as well as of international organisations, further add to its appeal."

Today, the Geneva presence consists of a team of approximately 20 medical and clinical development professionals, and serves as the base for the company's European clinical development operations. In May 2016, Incyte announced the acquisition of ARIAD's European activities as part of its expansion strategy into Europe. ARIAD is working on small-molecule medicines against various forms of chronic and acute leukemia, lung cancer and other difficult-to-treat orphan tumors.

Ranked 4th on Forbes magazine's 2016 list of the World's Most Innovative Companies, Incyte is advancing an innovative, rich and diverse portfolio of large and small molecules comprised of 14 development candidates against 11 different molecular targets. The Geneva facility will play a crucial role in supporting the company's global drug development programs.



**GGB<sup>a</sup>**  
Invest  
Western  
Switzerland



\* THOMAS BOHN, General Director,  
Greater Geneva Bern area (GGBa),





FONGIT recently joined forces with EPFL Innovation Park to create the Campus Biotech Innovation Park (CBIP). It complements the Campus Biotech ecosystem and supports life science entrepreneurs in transforming ideas, research and discoveries into sustainable successful companies with a fully integrated innovation process.

The Vaud Biopôle, based in Lausanne, will catalyse oncology and immunotherapy research, grouping together the Ludwig Center for Cancer Research to host the wealth of talent and resources available, as well as a fully-fledged GMP cell production site in order to develop targeted therapeutic solutions. The Agora Swiss Cancer Centre Lausanne (SCCL), due to open in 2017, will house oncology physicians, researchers and bioengineers and become another hub of expertise of the Health Valley, with the CHUV, University of Lausanne, EPFL and ISREC, a leading research institute all within easy reach. Over 300 researchers will be onsite. The Campus Biotech Geneva and the Biopôle Lausanne are thus destined to become world class neuro-bio engineering and oncology centres of competence

Several other large scale centres of competence have been developed in different cantons. The Switzerland Innovation Park Network West EPFL, coordinated by the cantons of Fribourg, Geneva, Neuchâtel, Valais and Vaud, and linked to Campus Biotech Geneva, unifies skills and funds for innovation and transfer of advanced technologies. The University of Fribourg has launched its Swiss Integrative Center for Human Health (SICHH), with exciting competencies in big data, genomics and proteomics, and microscopy and materials. The canton of Neuchâtel has developed Microcity to take advanced manufacturing forward and promote technology transfer by providing a multidisciplinary environment. The BioArk campus in Valais offers an attractive infrastructure with clean rooms, shared equipment facilities and plug and play laboratories.

In addition to all the research and development activities, the region is the seat of high tech business incubators, tech transfer specialists, as well as seed, angel and

venture capitalists in each canton, providing a stimulating and closely-knit life sciences ecosystem to foster innovation and growth.

Also supported by the cantons of Western Switzerland, BioAlps is a platform created to federate all these multiple activities and create resources to support and promote innovation, start-ups and SMEs in the life science sector. This repository of information and economic promotion accelerates networking, creation of opportunities and economic promotion of the life science sector. Blue chip life science companies from all over the world such as Becton Dickinson, Celgene, CSL Behring, Covance, Ferring, Incyte, Merck Serono, Santen, UCB and Valtronic are located across the region. Cutting edge start-ups such as AC Immune, Obseva, Novimmune and Sophia Genetics are members of this tightly knit network.

Furthermore, the region boasts related health care competencies. Its academic institutions house National Centres of Competence in Research (NCCRs), i.e. interdisciplinary teams working on outstanding, internationally visible research. NCCR Affective Sciences sits in Campus Biotech Geneva; the University of Geneva and EPFL host NCCR Chemical Biology; and NCCR Synapsy is housed in the EPFL and the Universities of Geneva and Lausanne. The Swiss biobank network for human and non-human products is spearheaded by the CHUV and has state-of-the-art facilities in Western Switzerland. Corporations such as Nestlé are expanding capabilities into nutraceuticals and skin care. The digital or so-called e-health sector is growing fast with creative solutions for patients, governments, and healthcare professionals being developed. All of this adds to the existing vibrant innovation ecosystem.

The BioAlps Networking Day 2016 will take place on November 2, 2016, at Campus Biotech Geneva on the theme of Neurosciences. It will highlight the fact that Western Switzerland as a whole is poised for further growth and success, building on its unique talent for innovation, collaboration and coordination.

**MR. PIERRE MAUDET,**

State Councilor in charge of the Department of Security and Economy for the State of Geneva. Chairman of the Conference of Economic Departments of Western Switzerland

**MR. PHILIPPE LEUBA**

Minister of Economy and Sport, Canton of Vaud

“The Health Valley hosts state-of-the-art core life science facilities.”

# A wide angle view of one of the most vibrant life science hubs

SPANNING THE JURA AND PLATEAU REGIONS, Western Switzerland is the home of an intense and creative life science sector. Western Switzerland encompasses the cantons of Berne, Fribourg, Vaud, Neuchâtel, Geneva, Valais and Jura. Cantonal hubs carry out multiple life science activities and the different cantonal authorities have invested in innovation parks and incubators all over the region. With flagship campuses such as Campus Biotech Geneva and the Ecole Polytechnique Fédérale de Lausanne (EPFL), and leading institutions such as the Universities of Berne, Geneva and Lausanne, all linked to teaching hospitals Inselspital, Geneva University Hospitals (HUG) and Vaud University Hospital (CHUV) respectively, the region is a hotbed of research, innovation and business. Western Switzerland boasts prestigious for profit and start-up companies, where many world firsts have been developed, such as stents, brain surgery with a robot, and an implantable drug infusion system. It has, over the years, nurtured many Nobel prize winners, and is the region of Switzerland which earns 25% of all export income, i.e. one of every four Swiss francs, from pharmaceutical, biotechnology and medical technology (medtech) products.

This dynamic region comprises the so-called “Health Valley”, a dense network of universities, research institutions, incubators, venture capitalists, high tech laboratories, start-ups, small and medium size enterprises (SMEs) and multinational blue chip companies, all collaborating to further the life sciences. The Health Valley is amongst the most attractive regions in international rankings, due

primarily to the stability of the political system, the reliability of the administration, the peaceful social climate, the great quality of life and top quality education.

The Health Valley hosts state-of-the-art core life science facilities to carry out basic research, applied research and product development. Among them, Campus Biotech Geneva provides a one-stop shop which focuses on pure science and its translation into practical outcomes, while the Biopôle in Vaud groups together immunology specialties of world class quality.

Located on the former site of biotechnology company Merck Serono, the Campus is a world class neuroscience centre of competence and home to the Human Brain Project, a European Commission Future and Emerging Technologies Flagship. The Human Brain Project aims to put in place a cutting-edge, ICT-based scientific research infrastructure that will allow scientific and industrial researchers to advance knowledge in the fields of neuroscience, computing and brain-related medicine. The project is a striking example of the unique Western Swiss capacity to create public-private partnerships, to gather together resources and find innovative pathways. Within its 15'000m2, Campus Biotech Geneva houses over 1,200 researchers and employees from the University of Geneva, Geneva University Hospitals (HUG), Geneva Haute Ecole de Paysage, d'Ingénierie et d'Architecture (HEPIA), EPFL, Swiss Institute of Bioinformatics (SIB) and the Wyss Centre for Bio- and Neuro-Engineering. Geneva incubators Eclosion and

PHOTO: DR





**Platelet-rich plasma is a non-immunological and natural alternative to more invasive treatments.**

# REGEN LAB DRIVES THE GROWTH OF REGENERATIVE MEDICINE

BY ANTOINE TURZI\* **A GLOBAL LEADER IN PRODUCTS FOR AUTOLOGOUS REGENERATIVE MEDICINE BASED ON FRESHLY PREPARED PLATELET RICH PLASMA FROM THE PATIENT'S OWN BLOOD, REGEN LAB IS OPENING A NEW INDUSTRIAL FACILITY TO TREAT MORE THAN A MILLION PATIENTS A YEAR.**

Since 2003, Regen Lab has been committed to developing unique expertise in the design and manufacture of high quality medical devices for use in bedside cell therapy procedures and the preparation of autologous platelet-rich plasma (PRP) using the patient's own blood.

Platelet-rich plasma has become a key player in the field of regenerative medicine. It is based on the natural healing properties of growth factors released by blood platelets, and its growing popularity can be explained by the fact that it is a non-immunological and natural alternative to more invasive treatments.

## **A leader in platelet-rich plasma**

Regen Lab makes several CE-marked products for medical disciplines where PRP is a treatment option. Patients can expect very good outcomes for the treatment of their chronic and surgical wounds, dry eye syndrome and other

ophthalmic conditions, sports-related wounds and even alopecia, as demonstrated through the clinical studies Regen Lab has carried out in recent years.

For serious cartilage and bone defects, Regen Lab offers a dedicated medical devices for bone marrow processing (RegenKit Extracell BMC and Glue), one of the most cutting-edge technologies for mesenchymal stem cell preparation in the field of orthopedic surgery.

Candidates for plastic surgery procedures involving fat grafting such as small mammary augmentation or facial contouring will also benefit from Regen Lab products. Next year we launch the RegenKit Extracell Adipocyte Kit, designed for the preparation of fat transplant to be combined with PRP, leading to an increased fat survival rate at the implantation site and thus improved long-term volume correction outcomes.

## **A new industrial platform**

Finally, patients suffering from osteoarthritis can look forward to better treatments. In recent years, Regen Lab has concentrated its efforts on the development of Cellular Matrix-PRP-HA, an innovative technology intended for the preparation of platelet-rich plasma combined with a hyaluronic acid (HA) solution. This unique technology, protected by patents in the USA, Australia, Canada, the European Union, China and Russia, has been successfully used in patients to relieve pain and induce cartilage regeneration. It also delivers promising results for skin hydration.

In the last five years more than two million patients have been treated using Regen Lab products and a further 10,000 have benefited from bone marrow stem cell kits. The company has now invested in a new GMP (Good Manufacturing Practice) facility at Mont-sur-Lausanne in the canton of Vaud, where the production is set to start in 2017. This new peak performance industrial plant is expected to support the treatment of more than a million patients a year.

PHOTOS: DR

\* ANTOINE TURZI CEO, Regen Lab

# COSMOTEC: A NEW STRATEGY TO ENSURE SUCCESS

BY MARIE-CHRISTINE COMTE, **CHIEF EXECUTIVE OFFICER OF COSMOTEC SA COSMOTEC OFFERS A COMPLETE TAILOR-MADE SERVICE AND ASSISTS THE CUSTOMER STEP BY STEP THROUGH DEVELOPMENT FROM THE MARKETING BRIEF TO FINISHED PRODUCT, TO BRING SUCCESS FOR ALL THE CUSTOMER'S PROJECTS**



**Cosmotec's manufacture uses pure and natural mountain spring water.**

Since 1988, Cosmotec is a cosmetic company which offers the private label "made in Switzerland" and tailor-made services for many customers all around the world.

Due to its location in the foothills of the Alps, pure and natural mountain spring water is supplied to the manufacture. The research & development team is currently developing a new range formulated with it. Over the years, the research & development team have developed thousands of formulas, including organic

ones, in the laboratory which promote Swiss heritage by using natural ingredients made in Switzerland.

Cosmotec offer a wide range of cosmetic cares and textures to suit different markets. The customers also benefit from a wide catalogue of cosmetics cares adapted to meet their immediate needs. Ecofriendly and environmentally aware, Cosmotec follows professional ethics by providing high quality only and respecting high quality standards. The company is certificated for Good Manufacturing Practices as well as by leading organic inspection and certification body ECOCERT.

## **L'Ultime N°25, a global anti-aging cream**

For example, the company has recently developed L'Ultime N°25, a global anti-aging cream. This complete care with three high technology complex produces immediate and long lasting anti-aging action with proven results.

Cosmotec puts forward customers satisfaction by its know-how-to be. Its expertise in creating cosmetics products ensures a personalised OEM service and private label to bring success for all customer projects.

\* MARIE-CHRISTINE COMTE, chief executive officer of Cosmotec SA



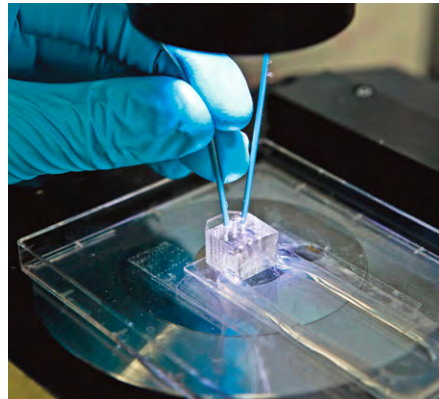
# EPFL LIFE SCIENCES: INTEGRATING BIOLOGY WITH TECHNOLOGY

BY PROFESSOR GISOU VAN DER GOOT\*  
**EPFL LIFE SCIENCES TRAINS  
INTERDISCIPLINARY STUDENTS.  
ITS RESEARCH OUTPUT HAS  
ALLOWED SIGNIFICANT  
TECHNOLOGY TRANSFERS AND  
GIVEN BIRTH TO MANY STARTUPS.**

**E**PF (Swiss Federal Institute of Technology Lausanne) is one of Switzerland's two Federal Institutes of Technology. Situated on the shores of Lake Geneva, EPFL currently hosts more than 10,000 students, representing over 120 different nationalities, as well as 300 professors from all over the world. Its appeal shows in its rankings: in 2015, the Times Higher Education put EPFL first among "young" universities worldwide.

## The first young university

In 2002, EPFL launched the School of Life Sciences to integrate its longstanding expertise in engineering with biomedical research through education, research, and technology transfer. Over a decade later, the 2016 Leiden Ranking named EPFL 1st in Biomedical and Health Sciences in Europe (top 10% of field publications). The success of the school is also reflected by the numerous awarded highly competitive research grants, in particular from European Research Council (ERC). EPFL Life Sciences trains a particular bread of interdisciplinary students. At the Bachelor level, students indeed undergo full training in engineering and biology. This leads to two Master degrees with students participating in international internships with partner industries and universities, including institutions such as



**Microfluidic chip to manufacture hydrogel microbeads for stem cell expansion.**

MIT, Harvard Medical School, Imperial College (London), NUS, NTU, etc.

EPFL Life Sciences consists of four research institutes, supported by cutting-edge technology platforms.

- The Brain Mind Institute aims to understand the fundamental principles of brain function in health and disease by using innovative experimental, technological, and computational approaches. It also works closely with EPFL's Center of Neuroprosthetics and it birthed the Human Brain Project.

- The Global Health Institute focuses on the understanding, diagnosis, and treatment of infectious diseases with global impact, e.g. tuberculosis, and cholera pandemics and is developing a novel interest in personalized health.

- The Institute of Bioengineering, a joint institute with the School of Engineering, exploits the interface of life sciences with engineering, physics, chemistry, and computer science to discover fundamental

biological principles and turn them into new biomedical tools. Research is highly interdisciplinary, spanning computational biology, bioimaging, micro/nano-engineering and tissue engineering.

- The Swiss Institute for Experimental Cancer Research investigates fundamental biological systems related to the development of cancer. It partners with the Lausanne university hospital CHUV and the University of Lausanne in the innovative Swiss Cancer Center Lausanne, which brings together cancer researchers and oncologists to streamline the development of new cancer therapies.

## Bench-to-bedside

The research output of EPFL Life Sciences has allowed significant technology transfer and given birth to multiple startups that transform fundamental research into commercial applications. One such startup is Mindmaze, which employs virtual and augmented reality, EEG scans and motion capture to create a medical-grade "neural virtual-reality platform". In 2016, Mindmaze raised more than \$250 million in funding, and is considered a "unicorn company". Supported by EPFL's experienced workflow and infrastructure, startups often attract additional funding from industrial partners and other foundations. A notable example is Innovative Medicines for Tuberculosis (iM4TB), an EPFL spin-off dedicated to the development of the new anti-tuberculosis drug PBTZ169. The drug has proven very efficient in vitro against multi-drug resistant strains and promises to shorten therapy timeframes for the disease; in 2015, iM4TB received financial support from the Gates foundation.

All together, these activities form a framework that implements EPFL Life Sciences "raison d'être" maximizing the synergy between biology and technology. This strategy is boldly poised to advance basic knowledge in biology and medicine, and to tackle societal issues.

\* PROFESSOR GISOU VAN DER GOOT Dean  
School of Life Sciences, Swiss Federal  
Institute of Technology Lausanne (EPFL)

PHOTO: LUTOLF'S LAB

# THE BIOFACTORY COMPETENCE CENTER: A FACTORY-SCHOOL

BY IAN MARISON\* **THE BIOFACTORY COMPETENCE CENTER IS A UNIQUE FACILITY  
BASED IN FRIBOURG, SWITZERLAND, WHICH PROVIDES THEORETICAL  
AND PRACTICAL TRAINING FOR THE BIOPHARMACEUTICALS INDUSTRY.**

**T**he continuing growth of biopharmaceuticals industries worldwide, particularly relating to the production of biosimilars and biobetters, monoclonal antibodies and antibody drug conjugates and a wide range of novel recombinant proteins for personalised medicine, has resulted in the need for a very well-educated workforce. Indeed the choice of a location to construct a new facility is often dictated by the tax regime and the ability to hire a workforce with the required knowledge. While schools and universities can provide basic education and specialised know-how, they cannot offer the practical hands-on training needed by today's biopharmaceuticals industries.

Most recent graduates require extensive training by their employer before they can be allowed into the production facility, as errors by new employees can be extremely expensive to correct.

## Quality by design

A further driving force is the increasing requirement of the US Federal Food and Drug Administration (FDA) for continuous professional training and the need to implement Quality by Design principles (QbD) which enable employees to increase their process understanding. Through extensive market research in Switzerland and internationally it became clear that the availability of a highly

trained workforce is potentially a major factor in a company's choice of a production site and its level of investment and development. As a result a new company, the bioFactory Competence Center was started in April 2015 and became operational from January 2016 on the site of the blueFactory in Fribourg, providing for the needs of the biopharmaceuticals and related industries.

Its aims are threefold: to provide training, to supply services to the sector and to construct new pharmaceuticals production facilities based on a novel modular construction principle.

It delivered its first training programmes to the Swiss biopharma industry in January 2016 and has already received acclaim for their quality. The training, using trainers with many years' experience in the biopharmaceuticals industry, under GMP (good manufacturing practice) conditions typical of those

found in industry, has allowed the BCC to become first-in-class in this novel approach to training requirements.

## Overcoming technical problems

In parallel the BCC has been involved in helping companies to design new processes, overcome technical problems in existing processes, develop and implement new analytical methods, identify causes of and overcome yield fluctuations and identify variations in raw materials to name a few of its activities. The ability to emulate a client production process and carry out the implementation of new technologies and improvements, as well as coordinating tech transfer to and from a CMO, are strong features of BCC activities.

In addition the modular construction systems which the BCC produce in a wide range of materials can be custom-manufactured to clients' specifications and be adapted to any building design. This means it is possible to take brownfield sites and modify them simply by incorporating a series of modular pre-constructed containers

which can provide for offices and GMP-compliant laboratories and production systems. Indeed production equipment can be pre-installed to provide for a turnkey biopharmaceuticals production unit. Such systems gain from rapidity of construction – 12-18 months instead of 4-5 years – and considerably reduced capital investment.

\* IAN MARISON, CEO, bioFactory  
Competence Center



**BioFactory constructs new pharmaceuticals production facilities.**

PHOTO: DR



# FOCUSING ON SUSTAINABLE PARTNERSHIPS

BY JULIEN ROUSSET\* **THE VIFOR PHARMA SITE IN VILLARS-SUR-GLÂNE ON THE OUTSKIRTS OF FRIBOURG PACKS AN IMPRESSIVE RANGE OF PHARMACEUTICAL CAPABILITIES UNDER ONE ROOF.**

In the context of the Swiss pharma industry, Vifor Pharma is a medium-size player with large ambitions to become a global specialty pharma company; it already is a global leader in the treatment of iron deficiency. As one of the company's two manufacturing facilities in Western Switzerland, Villars-sur-Glâne is the principal manufacturing and conditioning site for the Swiss market and an internal supplier for a part of the company's iron portfolio. It has a track

record in collaborative working and agile handling of complexity, with a diversified portfolio of prescription and OTC products. Altogether, production capability of the Vifor Pharma facilities network covers solid, semi-solid and liquid formulations for oral, topical and rectal administration and can also process biologicals. All this is supported at each location by on-site R&D for developing and testing new molecules and formulations as well as capability in up-scaling.

## Synergistic relationships

For several years now, the Villar-sur-Glâne site's Contract Development and Manufacturing (CD&M) team has been offering their large spectrum of services to external customers - from preliminary formulation to fully validated industrial manufacturing processes, including the necessary certifications and technical documentation for regulatory submissions. To begin with, CD&M was seen as a way to optimise capacity usage. But experience has demonstrated that this is a mutually beneficial arrangement - more synergistic partnership than conventional customer-supplier relationship.

Working with Villars-sur-Glâne, customers can access the wider world of Vifor Pharma, a company that has a well-earned reputation for punching above its weight in the areas of innovation, growth and speed to market. On the other hand, working for external customers has effectively expanded the site's capabilities in a number of areas, notably handling hazardous products. It also justified the time and effort it took to earn FDA approval.

## Scaling the mountain - together

Knowing that it can be a very long haul to get a new drug to market, the CD&M team see themselves as fellow alpinists, roped to their clients and working with them through the whole process to get to the top of the 'mountain'. It's a relationship that yields best results when it starts early in the development process, designing-in clearly defined quality standards from the beginning. Vifor Pharma recognises that this kind of long-term, sustained partnership is not for everyone. Current partners are drawn from national and international pharma companies, both large and small. But they all share a passion for getting a new product to market as quickly and safely as possible to meet a, so far, unmet patient need.

\* JULIEN ROUSSET, Key Account Manager, Contract Manufacturing

PHOTO: DR



Vifor Pharma's expertise is also attractive to a growing list of contract customers.



Celgene International Headquarters located in Boudry, Neuchâtel.

# CELGENE'S 10 YEARS IN EUROPE

BY JOHANNA JUNOD\* **HEADQUARTERED IN SWITZERLAND FOR ITS EMEA OPERATIONS, CELGENE INTERNATIONAL HAS ITS MANUFACTURING BASE IN THE CANTON OF NEUCHÂTEL AND IS BUILDING A SECOND FACTORY.**

Celgene is a multinational biopharmaceutical company focused on the discovery, development and commercialisation of innovative therapies for unmet medical needs in cancer and other severe immune and inflammatory conditions. Celgene is one of the leaders in Europe in developing therapies for rare diseases.

## Best possible treatments

Intensive research, development and commercialisation of innovations in the fields of chronic and rare diseases form the basis of Celgene's efforts to offer patients the best possible treatments. More than 30% of revenues are reinvested in research and development. More than 50% of all global clinical trials come from

the Europe, Middle East and Africa region. Research continues into next-generation therapies in the company's current disease areas of rare blood cancers, pancreatic, breast and lung cancers, psoriasis and psoriatic arthritis, as well as in other conditions with significant unmet needs.

More than 45 diseases are being studied at Celgene in addition to 18 rare conditions including acute myeloid leukemia, myelofibrosis, non-Hodgkin lymphoma, diffuse large B-cell lymphoma and chronic lymphoid or Behçet's leukemia. There are also numerous clinical trials taking place at major medical centres using compounds from Celgene.

"We are highly focused on disease areas which have the potential to make a very significant difference in improving patient lives. We are very active when it

comes to looking globally for partnerships to help achieve our mission", explains, Tuomo Pääsi, President EMEA. Celgene currently collaborates with approximately 30 companies.

## International Headquarters in Switzerland

The company employs around 7,000 people worldwide including 2,300 in the EMEA region. The international Headquarters and a global manufacturing site are located in Boudry, Switzerland where more than 650 employees are based. The site produces all oral formulations of Celgene's medications for hematological disorders and one new product in immunology and inflammation for the worldwide market. The active ingredient manufacturing site, with 20 employees, is in Zofingen, in the canton of Aargau. Celgene's affiliate is based in Zurich with close to 50 employees serving Swiss physicians, customers and patients.

An additional manufacturing site is being built in Couvet, also in the canton of Neuchâtel, and will create 100 more jobs when it becomes operational in 2019.

\*JOHANNA JUNOD, Associate Manager, Corporate Affairs Communications Celgene International

PHOTO: DR





T-shape handle equipped with a standard connection.

# AKABE CUSTOMIZES INSTRUMENTS TO FIT THE SURGEON'S NEEDS

BY PHILIPPE FEHLBAUM\* **GREAT ARTISTS PAY ATTENTION TO THEIR PENCILS; SURGEONS LOOK AFTER THEIR INSTRUMENTS. AKABE PLACES MODULARITY, DESIGN AND INNOVATION AT THE HEART OF PRODUCT DEVELOPMENT.**

**H**uge progress has been made in recent decades developing better and smarter implants, to customize them to fit every patient perfectly. Nowadays, hundreds of thousands of people have successful orthopaedic surgery each year to recover from injuries or restore lost functions.

While the patient lives with his prosthesis, the surgeon lives with his instruments: implants and instruments go together. In comparison to the tremendous progress made on the implants side, however, little effort has been made to optimize and customize instruments that perfectly fit the surgeon's needs.

## A fruitful collaboration

When as a weathered surgical expert, I met BAAT, a Netherlands-based company with more than twenty years' experience in the development of orthopaedic implants and instruments, we realized we could close that gap by joining our forces. With Didier Guélat, we founded AKABE in the technopark in Porrentruy, the heart of Western Switzerland's fine precision mechanics industry. Both of us have fifteen years of experience in developing and producing orthopaedic instruments and working closely with surgeons.

With BAAT, we form a team of 30 employees. This gives us substantial power for the development and

certification of new instruments. "We have to integrate the whole value chain from development, production and assembly to distribution including all the regulatory aspects required by the medical regulation to be effective in developing solutions for the surgeon", Didier Guélat explains.

## Supporting surgical perfection

BAAT and AKABE will focus on their complementarities. While BAAT's expertise is in the development of specific instruments, AKABE will concentrate on developing, with surgeons, the optimal toolbox for a given surgery and then producing the toolbox with the best partners. Surgeons seek surgical perfection and we want to serve them with the best adapted and most intuitive instruments.

We spend a lot of time with surgeons to understand precise surgical gestures and our dream is to develop instruments which he or she would perceive as if they

were his or her own fingers. BAAT will drive all the regulatory aspects related to the medical certification (ISO 13485, CE 95/42, FDA) to ensure timely delivery to the market.

## Innovation at the heart

Developing smart implants is a strong trend in orthopedics. In the future, orthopedic implants will monitor how well they are faring in the body and measure how well bone attaches to them while also detecting problems such as inflammation and infection. On the instrumentation side, we are still in the Stone Age today and we want to change this. New technologies offer tremendous opportunities to make better and smarter instruments.

As example, AKABE is working to bring to the market a new generation of smart instruments integrating electronic systems to assist the surgeon by providing real time information about bone quality and placement of screws. We believe this will make a breakthrough in increasing safety and the surgeon's

confidence during surgery. AKABE has started the development of a dynamometric screwdriver with electronic interface which will provide to the surgeon information about the torque applied to each screw.

\*PHILIPPE FEHLBAUM, Surgical Instrument Expert, co-founder of AKABE SA

Rod persuaders can be customised to fix screw.



Akabe's office within the technopark of Porrentruy.

# SINTETICA-BIOREN, A LEADER IN INJECTABLE PRODUCTS

BY OSCAR PANG\* **AN AFFILIATE OF TICINO-BASED SINTETICA, THE MANUFACTURING SITE AT COUVET IN THE CANTON OF NEUCHÂTEL IS SPEARHEADING THE COMPANY'S INTERNATIONAL EXPANSION.**

**I**n 1987 Bioren started its operations by producing injectable pharmaceutical products. The following year it began producing patented bags for infusions. A facility was built in Couvet with 20 employees - now there are 80. Over the years its products have become widespread in Swiss hospitals, establishing leadership in the field of infusion bags. In 2004 it was acquired by Sintetica, based in Mendrisio in the canton of Ticino, forming a new company: Sintetica-Bioren.

## A strategic move

Created in Chiasso in 1921, Sintetica is the oldest pharmaceutical company in Ticino, manufacturing injectable drugs - analgesics, local anaesthetics and narcotics - for hospital use. The acquisition of Bioren was a strategic move for the company, adding an important production site together with its related distribution channels while at the same time strengthening its expansion plans. The combined production capacity has now reached 20 million glass ampoules in the futuristic factory opened in Mendrisio in 2011. The output of the factory in Couvet is five million infusion bags and 5.5 million glass vials.

Sintetica is a rapidly growing group and is now one of the leading Swiss pharmaceutical companies. Sintetica-Bioren has proved a pillar of this expansion strategy thanks to its specialisation in manufacturing injectable products. Sintetica-Bioren's quality control was approved by the US

FDA in 2011. Overall, Sintetica's quality system is based on more than 300 standard operating procedures.

## People-based excellence

But according to group CEO Augusto Mitidieri, quality procedures are not the end of the story. "The quality of a product embodies the ability, desire, passion and intelligence of those who produce it," he explains. "If you work in a peaceful and pleasant professional environment, the product that will emerge will be the best possible." This belief motivates the com-



For CEO Augusto Mitidieri (center) the most important asset is people.

pany to continuously improve working conditions and environment. Consequently the predominant feature of the production site in Couvet is the passion and interest that employees show in their daily work, conscious of performing an important mission for civil society. This spirit is essential for the consistent achievement of Sintetica's growth objectives.

Sintetica is a for-profit company but with a strong ethical orientation and it has begun to develop alternative methods for governance and accountability. It requires that production processes do not pollute, it creates an atmosphere of serenity in the

workplace, it engages in tackling poverty in the world and pays close attention to its most important assets: its people.

This focus on patients as well as human resources has proved very valuable not only for product quality but also to drive innovation and conquer new markets with relatively limited resources.

On the innovation side, Mitidieri explains: "The inspiration for the company's strategy is a strong push toward one-day surgery and pain management with a focus on cost containment. Sintetica is also attentive to the development of rare and ethical products, which often do not interest multinational companies."

## 40 new products in five years

With that philosophy, the company has registered more than 40 new products in Switzerland in the last five years and is running more than 100 registration procedures worldwide. Among these products, two are emblematic of the company's vision. Intrathecal baclofen is a drug for chronic spasticity therapy and a world first because it is suitable for tropical climates and resistant to adverse storage conditions. Ampres is an anaesthetic of short duration, which, because it minimises the duration of anaesthesia, reduces hospital costs and maximises patient comfort.

Sintetica's customers are currently mainly hospitals in Switzerland. But in order to pursue its expansion plans the group is aiming at international customers, either directly or through partnerships with distributors. Sintetica already owns three subsidiaries in Italy, the UK and Germany. But Mitidieri is looking further afield. "A local partnership model has been chosen for global expansion."

\* OSCAR PANG, Site Director, Sintetica-Bioren





**The Institute of Life Technologies provides a wide range of services and consultancy.**

**diagnostic systems** research group combines theory with practice in immune diagnostics, molecular and cellular diagnostics, instrumental analytics and bio-sensor development, as well as compound and phyto extract activity screening. The scientists work closely with their colleagues at the Institute of Systems Engineering to focus on point-of-care diagnosis at home, at the doctor's office or in pharmacies for immediate test results.

#### A one-stop contact point

All four research groups make use of the expertise and modern infrastructure of the analytical platform which encompasses chemical, molecular, biological and micro-biological analysis. The laboratories are accredited in accordance with ISO 17025, while microbiology additionally has Swissmedic accreditation.

As to education and training, the Institute of Life Technologies offers a practice-oriented bachelor's course with consolidation in food technology, biotechnology and analytical chemistry. Within the master of sciences HES-SO in life sciences, a specialisation in applied biosciences helps students to pave the way to a cleaner future with sustainable biotechnology, develop analytical tools for the diagnostic industry and discover how to manufacture drugs, acquire knowledge in the field of genome analysis and discuss cases of quality management and regulatory affairs.

The Institute of Life Technologies is the one-stop contact point for industrial companies. The team is experienced in publicly-funded projects or projects for industrial clients and can open up access to state support such as the CTI and the Commission for Technology and Innovation.

The Institute of Life Technologies is the partner of choice for companies, especially SMEs looking to achieve major success with future-oriented innovations and secure a strong foothold in the market.

\* DR SERGIO SCHMID Head of Institute of Life Technologies

PHOTO: DENIS EMERY / PHOTO-GENIC.CH

## PARTNERSHIP FOR SUCCESS AT THE ITV

BY DR SERGIO SCHMID\* **THE INSTITUTE OF LIFE TECHNOLOGIES (ITV) AT HES-SO VALAIS/WALLIS PROVIDES A WIDE RANGE OF SERVICES AND CONSULTANCY THAT FULFILL THE HIGHEST QUALITY REQUIREMENTS.**

At the Institute Life Technologies at HES-SO Valais/Wallis, clever minds are at work developing genuine innovations to meet the individual requirements of their demanding customers from the pharmaceuticals, biotechnology, medical diagnostics, agri-food, cosmetics and chemistry sectors. Some 78 competent collaborators including 18 professors with industry experience are working as an interdisciplinary team in applied research and development, creating added value of CHF 4.6 million (2015) a year. The four research axes are clearly focused and designed to pool existing expertise and generate synergies.

As a unique example of its kind, the **peptide and protein technologies** (P2T) programme focuses on the discovery and optimisation of peptides and proteins for therapeutic, diagnostic and food applications. The industrial partners benefit from the development, characterisation and production of peptides and proteins,

while the experts are active in virology, peptide synthesis, peptide transporters, peptide conjugates, assay development, recombinant technologies and bio-analytics.

Researchers working in **biotechnology and sustainable chemistry** dedicate themselves to biotechnological and chemical innovation to address current challenges and work out sustainable solutions for social, industrial and academic needs. Priority is given to bioprocess engineering, biomaterials, bio resources, (bio)analytics, biocatalysis, sustainable energy and chemistry.

The specific demands of the economy and society determine the programme of the **food and natural products** research group. The remit involves a broad spectrum of expertise in food microbiology and food safety across the entire food chain, bioactive compounds and health as well as processing of food and natural products.

In order to create more added value, the

# SIB: SWISS DATA SCIENCE FOR BIOLOGICAL RESEARCH, AND HEALTH

BY RON APPEL AND CHRISTINE DURINX\* **SINCE 1998, THE SIB SWISS INSTITUTE OF BIOINFORMATICS HAS BEEN PROVIDING WORLD-CLASS DATA SCIENCE TO THE LIFE SCIENCES, ON THE NATIONAL AND THE INTERNATIONAL LEVEL**

Besides its core mission to provide the life science community with a state-of-the-art bioinformatics infrastructure, the SIB shares its expertise – storage, analysis and dissemination of large biological datasets – with many research institutes and industrial partners. SIB currently counts some 65 research and service groups, 150 resources, 19 institutional members and 11 core facilities; over the years, it has created a true bioinformatics culture in Switzerland which, today, has the highest concentration of bioinformaticians in the world. SIB's organisation and structure is a role model in the world of data science and the Institute, as such, has been chosen by important instances as a support to their own structure. Aware that the wealth of data produced by modern technologies and the growing self-awareness of patients will change the way of considering medical data, SIB is also deeply involved

in data science related to personalized health.

#### A unique organisation

SIB's structure is unique and depends on an intercantonal and interinstitutional model of collaboration. SIB thus became a key player in the creation of ELIXIR – the European Life Science Infrastructure for Biological Information – and is today its largest national node. ELIXIR is one of Europe's three priority research infrastructures whose mission is to implement Europe's life science data infrastructure. SIB is actively involved in the ELIXIR-EXCELERATE project for the integration of Europe's bioinformatics resources, supporting all sectors of life science R&D.

One of SIB's key developments is its growing involvement in personalised health. In 2013, the Institute created a Clinical Bioinformatics Group to set bridges between data science and the medical community. During 2015, and

with other health practitioners, SIB reached a national consensus on the diagnostic needs and expectations of hospitals. Strong bonds were developed with Swiss hospitals with an initial focus on oncology and hemato-oncology. Last May, the first diagnostic pipeline was installed for the Clinical Pathology Department in the Geneva University Hospital, and SIB will be collaborating closely.

#### A bioinformatics reference centre

SIB's activities are wide and varied. The industry regularly calls on the Institute to develop diagnostics tools. In 2013, one group wrote the algorithm of a non-invasive prenatal test which detects chromosomal anomalies in foetal DNA taken from the mother's blood. The test provides fast and safe results, and revolutionized prenatal testing. SIB is also partnering with Ariana Pharma to help develop early detection tools for gastric cancer.

In 2015 the Food and Agriculture Organisation of the United Nations (FAO) appointed SIB as FAO Reference Centre for Bioinformatics. SIB collaborates on the screening, monitoring and follow-up of zoonotic diseases by providing open-access virus resources. These resources provide information on the pathogens' genomes, their epidemiology, evolution and parenthood, and contribute to the fight against dangerous viral infections in farm animals and wildlife, including avian influenza and foot-and-mouth disease. This exciting development demonstrates the recognition of SIB's expertise beyond Switzerland's border.

\* RON APPEL (Executive Director),  
CHRISTINE DURINX (Associate Director)  
SIB Swiss Institute of Bioinformatics

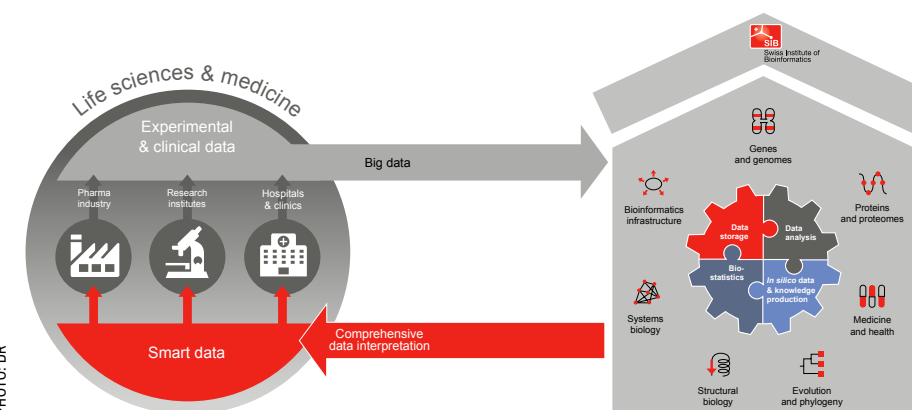


PHOTO: DR





Technicians and automated track with group of analyzers for Complete Blood Counts to analyse thousands samples per day.

#### Doubled testing capacity in Geneva

In April 2016, Covance expanded its central laboratory, doubling its testing capacity by increasing automation and improving workflow efficiency to meet growing demand. The expanded and renovated lab continues to bring solutions to clients in such rapidly developing areas as pathology, genomics and companion diagnostics, helping pharmaceuticals companies bring innovative medicines to patients faster and more efficiently.

Since its opening in 1992, the Geneva site has grown from 20 employees to more than 650. Covance's continued investment in the laboratory's capabilities and local R&D relationships demonstrates its commitment to support and implement innovative technology – and its commitment to the region, acknowledged by the Chamber of Commerce and the Canton of Geneva with the award of the Prix de l'Économie in 2014.

\* JEAN-MARC LEROUX General Manager and Chief Innovation Officer at Covance's Central Laboratory Europe (Meyrin/Geneva)



The automated line that allows Covance to register and dispatch tens of thousands samples per day.

PHOTOS: DR

## IMPROVING HEALTH AND IMPROVING LIVES

BY JEAN-MARC LEROUX\* FROM ITS EUROPEAN HEADQUARTERS IN GENEVA, COVANCE, THE DRUG DEVELOPMENT BUSINESS OF LABCORP, PROVIDES CRITICAL CENTRAL LAB SERVICES

Covance, the drug development business of LabCorp, the Laboratory Corporation of America, provides the pharmaceuticals industry with unique perspectives and precision delivery through every stage in the development of a drug from molecule discovery to commercialisation.

#### A platform towards FDA approvals

It takes about 10–15 years to develop a new medicine from the time it is discovered to when it becomes available for treating patients. The average cost of researching and developing a successful drug is estimated at \$800 million to \$1 billion. This doesn't include the cost of thousands of failures: for every 5,000–10,000 compounds entering the research and development (R&D) pipeline, only one will make it to market. Success requires immense resources – the best scientific minds, highly sophisticated technology and complex project management. Ultimately, though, the development of new, innovative therapies helps to improve the lives of millions of patients all over the world.

Covance helps companies make the process of drug development more efficient by providing services that generate high-quality and timely data to support new approvals and expand the use of existing therapies. Its value is evidenced by its many relationships with small and mid-sized biotech companies through to multi-billion-dollar, long-term research and development partnerships with world leaders such as Lilly, Sanofi, Bayer, Takeda and Merck. In 2015, Covance collaborated on 87% of the 45 new drugs – and 100% of those in oncology – approved by the US Food and Drug Administration (FDA).

Covance's Central Laboratory in Geneva provides services for global clinical trials in Europe, the Middle East and Africa, and plays a key role in the company's strategic vision to improve health and improve lives. Testing kits are sent to multiple investigator sites, where patient samples (usually blood, urine or tissue) are quickly collected, returned to the nearest central laboratory and tested within 24 hours. Every morning, Covance in Geneva receives enough samples for analysis to fill the equivalent of three-quarters of a passenger plane.

## DEBIOPHARM GROUP: FROM CANDIDATE DRUG TO PATIENTS

BY THIERRY MAUVERNAY\* THE GROUP SPECIALISES IN DRUG DEVELOPMENT FROM EARLY STAGE TO REGISTRATION, MAINLY IN ONCOLOGY AND INFECTIOUS DISEASES.

Based in Switzerland and founded in 1979, Debiopharm Group is a family-run biopharmaceuticals business active in drug development, GMP manufacturing of proprietary drugs and diagnostics. At the heart of the drug development process, the group in-licenses and develops promising compounds such as small molecules or biologics, generally in early-stage development, in order to transform them into valuable drugs for the patients. Debiopharm also acquires assets and takes options on compounds. Its main therapeutic areas are oncology, infectious diseases and orphan drugs.

We screen between 600 and 800 molecules each year, but only one or two are in-licensed. We have to be very selective and stay focused on projects which can add significant value. A scouting team travels around the world from congress to academia to find the gems – we believe the world is our lab and that strong and long-lasting partnerships with the originators are key to our success. As a middleman, Debiopharm takes a lot of risks but always collaborates with the originators at every step in the development process. We pay upfront fees and development milestones and share royalties on sales. If after evaluation a compound is not in-licensed, we may stay in touch with the researchers to follow the evolution of their project and give advice on its development.

PHOTO: DR

#### A leader in sustained-release technology

Debiopharm does not manufacture drugs, except Triptorelin which is made in its industrial development and production facility in Martigny in the Swiss canton of Valais. We are a world leader in PLGA-based injectables, with expertise in R&D, chemical synthesis, formulation improvement and hard-to-make pharmaceutical products.

Once a compound is in-licensed, Debiopharm works on optimising the molecule's properties and improving its efficiency. Triptorelin, which was originally approved as a one-month treatment for prostate cancer, has been developed in three sustained-release formulations, 1-, 3- and 6-month, reducing the frequency of injections and improving patients' quality of life. Today Triptorelin is available in more than 75 countries and can also benefit children suffering from central precocious puberty or women suffering from endometriosis. We keep improving our productivity and in September 2015 inaugurated our newly renovated production facility in Martigny.

With Triptorelin and Oxaliplatin, Debiopharm's two standard of care products in oncology, more than 1m patients have already been treated.

#### Patients at the centre

Every development we make is for the benefit of patients and their quality of life. Last December, we launched the "Quality of patients' life during their treatment in hospital" industry challenge that aims to stimulate innovation in the healthcare sector. The award will support projects dedicated to improving patients' comfort and quality of life.

Targeted treatments are the future of medicine. For this reason, Debiopharm has been working on the development of a new targeted antibiotic to tackle serious staphylococcal-related infections (Debio 1450) and has recently announced a phase II study evaluating project Debio 1143 in ovarian cancer. We continue to look for and develop tomorrow's treatments in oncology and infectious diseases.

\* THIERRY MAUVERNAY, Co-President and Delegate of the Board, Debiopharm Group







Femtosecond lasers are produced in Port in the canton of Bern.



# A SCALPEL MADE OF LIGHT

BY SANDRO PALUMBO\* **AT ZIEMER OPHTHALMIC SYSTEMS, SWISS-MADE HIGH TECHNOLOGY IS USING THE POWER OF PHOTONS FOR REFRACTIVE AND CATARACT SURGERY**

**F**rank Ziemer, CEO and President of Ziemer Ophthalmic Systems in Port, in the canton of Bern, has a clear and concise vision when it comes to the future of ophthalmology and its sub-specialities, cataract and refractive surgery. Laser technologies in eye surgery, femtosecond lasers, are just at the beginning of their life cycle and their best days are yet to come. Why the enthusiasm? As often in life, there is an entrepreneurial story behind the vision.

## A novel Swiss approach

In the mid-1990s Ziemer was involved in a company manufacturing blades for ophthalmic purposes. "I was wondering why a surgery requiring such a high degree of precision was still considered state-of-the-art when using a diamond shaped blade", he says. After founding his own company with just two employees back in 1998, he focused on a mechanical microkeratome to provide a Swiss solution to the rapidly growing laser refractive surgery market. A motor-guided blade was literally cutting a flap of tissue on the cornea's surface which was laid back so that an excimer laser could then remove a fixed amount of tissue which optimised the shape of the cornea for perfect vision that did not require glasses. It was the beginning of the well-known procedure called "Lasik".

Then, in the early years of the new

century when the first femtosecond laser generation was brought to the market to compete with the microkeratomes, the time had come to realise the vision of the laser scalpel. "We were not the first but we assessed this first generation femtosecond laser very critically and had our own ideas," says Ziemer. By the end of 2005, the vision became reality: Ziemer and his team presented their first femtosecond LDV laser for the refractive market, engineered in Switzerland.

Incorporating a novel method using a very low-energy emission combined with a high repetition rate, a very gentle tissue separation was achieved. This unique concept enabled Ziemer to design a compact and mobile laser, which allowed it to be moved between operating rooms and hospitals thus minimising the financial investment for the clinic.

## More than 3 million procedures

Today, three generations of femtolasers are in use on the global market, boasting the completion of more than 3 million procedures. Over innovation cycles, the range of surgical applications possible on the laser has significantly grown which gives surgeons the option to maximise product usage in their clinical practice. In the autumn of 2014, Ziemer Ophthalmic Systems stepped into the world of cataract surgery, unveiling the Femto LDV Z8 which remains the most versatile femto-

second laser on the market.

The drive to get rid of metal blades and hooks used in conventional ophthalmic surgery continues. "Again, we were not the first ones offering femtosecond laser-assisted cataract surgery to the community but the ones focusing on an easy-to-integrate device in the operating theatre," Ziemer says. "Benefiting from the experience gathered in the refractive world, we were able to provide the same gentle and precise approach".

The company founder also strongly believes that the best surgical device cannot maximise its value without a suitable diagnostic tool. In the early years of the company, Ziemer developed a tailor-made diagnostic device able to visualise the anterior segment of the eye which is required for precise surgical planning. The device, named after the famous Italian scientist Galileo Galilei, was brought to the market soon after the femtosecond laser and continues to evolve. The next fundamental advance the company envisages is to integrate captured diagnostic data with the femtosecond laser and by doing so help the surgeon in the planning and decision making process.

The company's efforts were recognised in 2011 when Ziemer was elected "Swiss Entrepreneur of the Year". Since its foundation, the company has grown to a size of almost 180 full-time equivalents as of 2016.

\* SANDRO PALUMBO, Vice President Marketing Ziemer Ophthalmic Systems





**The Meyrin site is the global hub of the company's infectious disease/OTX franchise.**

# A BIOTECH RESPONSE TO ANTIMICROBIAL RESISTANCE

BY JULIEN STORAI\* **PART OF THE GALENICA GROUP PHARMA BRANCH (VIFOR PHARMA) SINCE 2009, THE MANUFACTURING SITE OM PHARMA NEAR GENEVA HAS BECOME A GLOBAL HUB TO FIGHT INFECTIOUS DISEASES.**

**T**he Vifor Pharma manufacturing site in Meyrin is probably still better known locally as OM Pharma, even though it has been part of the Galenica Group pharma branch since 2009. The site, celebrating 80 years of continuous production in 2017, has benefited from almost 100 million francs of investment over the past 10 years, making it today a state-of-the-art, dedicated biotechnology centre operating to highest GMP standards from API management to finished products.

## Full service facility

Within the context of Vifor Pharma, Meyrin is the global hub of the company's Infectious Disease / OTX franchise, notably manufacturing the immuno-modulators Broncho-Vaxom and Uro-Vaxom. Both products are based on bacterial lysates and have well proven advantages in treating recurrent infections respiratory and urinary tract infections. In many developing pharma mar-

kets like Russia and Brazil, these products have become established as the gold standards in treating these conditions.

The Meyrin biotech centre is unique in being a full service facility covering the whole supply chain and supported by on-site R&D, Quality and Medico-Marketing teams. The manufacturing area incorporates the two key units for the production of live bacteria; fermentation and purification. Covering a total surface of 6'200 square metres, the manufacturing process is organised on four levels, proceeding from top to bottom with separation of work flows, materials and people. Recently, the site's production capacity was increased with the installation of a large capacity lyophilisator, together with a new packaging line incorporating next generation serialisation to ensure optimum traceability.

## Global reach

Also on site, the Quality and R&D teams prepare and evaluate active ingredients of

bacterial origin from fermentation to purification, developing biological processes from laboratory to industrial production. Working with preclinical and clinical colleagues, R&D is also looking at analytical techniques to determine immuno-pharmacological data that reinforce the body of scientific evidence supporting the efficacy and safety of the products with patients. Looking to the future, R&D focuses on the development of immuno-modulators of both synthetic and biological origins as well as the synthesis of new iron ligands.

The company currently has close to 700 authorisations to market products in around a hundred countries in Europe, Asia, Africa, Latin America and the Middle East. Vifor Pharma focus and capability in the area of immuno-modulators promise to expand its business volume considerably in the coming years given the urgent need to combat antimicrobial resistance, defined by the World Health Organisation as, "an increasingly serious threat to global public health".

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# A GUIDE TO LIFE SCIENCE COMPANIES

THE HEALTH VALLEY OF WESTERN SWITZERLAND HOSTS A LARGE NUMBER OF BIOTECH, MEDTECH AND PHARMA COMPANIES. THE FOLLOWING BUSINESS GUIDE LISTS ALL THE MEMBER COMPANIES OF THE BIOALPS NETWORK.

| COMPANY NAME   | MAIN SECTOR           | CANTON    | INTERNET                         |
|--|-----------------------|-----------|----------------------------------|
| 4cGroup  | Service               | GENEVE    | http://www.4cgroup.org           |
| 4FO Venture Partners   | investisseur          | GENEVE    |                                  |
| A3 Angels  | investisseur          | VAUD      | http://www.a3angels.ch           |
| AB2 Bio SA   | Biotech               | VAUD      | http://www.ab2bio.com            |
| ABC Orthodontics SA  | Medtech               | JURA      | http://www.abc-orthodontics.ch   |
| Abionic SA   | Biotech               | VAUD      | http://www.abionic.com           |
| ABL Analytics SA   | Service               | JURA      | http://www.abl-analytics.com     |
| ABMI SA  | Medtech               | VAUD      | http://www.abmintelligence.com   |
| ABMI SWITZERLAND SARL  | Service               | GENEVE    | http://www.abmi-groupe.com       |
| Abrema agence brevets et marques, Ganguillet                     | Service               | VAUD      | http://www.abrema.com            |
| AC Immune SA   | Biotech               | VAUD      | http://www.acimmune.com          |
| Accuratus AG   | Medtech               | BERNE     | http://www.accuratus.ch          |
| Accuray International  | Medtech               | VAUD      | http://fr.accuray.com            |
| Acrostak International Distribution Sarl                         | Medtech               | GENEVE    | http://www.acrostak.com          |
| Actigenomics SA  | Nutrition             | VAUD      | http://www.actigenomics.com      |
| Actimed SA   | Medtech               | VAUD      | http://www.actimed.ch            |
| ACTIVEN SA   | Cosmétique            | VAUD      | http://www.activen.ch/           |
| ADC Therapeutics SA  | Biotech               | VAUD      | http://www.adctherapeutics.com   |
| Addex Pharma SA  | Biotech               | GENEVE    | http://www.addexpharma.com       |
| Adipogen SA  | Biotech               | VAUD      | http://www.adipogen.com/         |
| Administrative Management Concept                                | Service               | GENEVE    | http://www.amc-b.com             |
| Adolphe Merkle Institute   | Recherche             | FRIBOURG  | http://am-institute.ch           |
| Aerni-Leuch AG   | Medtech               | BERNE     | http://www.aerni-leuch.ch        |
| Agilent Technologies SA  | Medtech               | GENEVE    | http://www.agilent.com           |
| AlGSV, Association industrielle genevoise des Sciences de la vie | Fondation/Association | GENEVE    | http://www.algsv.ch              |
| Aimago SA  | Medtech               | VAUD      | http://www.aimago.com            |
| Akenco Pharma SA   | Pharma                | GENEVE    | http://www.akenco-pharma.com     |
| Akka Switzerland SA  | Service               | VAUD      | http://www.akka.eu               |
| Alchilap SA  | Cosmétique            | VALAIS    | http://www.alchilab.ch           |
| Alchimie Forever Sarl  | Pharma                | GENEVE    | http://www.alchimie-forever.com  |
| Alcimed Sarl   | Service               | VAUD      | http://www.alcimed.com           |
| Alcon Management SA  | Service               | GENEVE    | http://www.alcon.com             |
| Alcon Pharmaceuticals Ltd  | Pharma                | FRIBOURG  | http://www.alcon.com             |
| Aleva Neurotherapeutics SA                                       | Medtech               | VAUD      | http://www.aleva-neuro.com       |
| Alliance   | Service               | VAUD      | http://www.alliance-tt.ch        |
| Almedica AG  | Medtech               | FRIBOURG  | http://www.almedica.ch           |
| Alpaderm Sarl  | Cosmétique            | VALAIS    | http://www.alpaderm.com          |
| Alpes Lasers SA  | Medtech               | NEUCHATEL | http://www.alpeslasers.com       |
| Alpine Institute for Drug Discovery SA                           | Pharma                | VAUD      | http://www.aidd.ch               |
| Alpro Swiss Sarl   | Nutrition             | VALAIS    |                                  |
| ALRO Engineering SA  | Service               | VALAIS    | http://www.alro.ch               |
| Altacare   | Service               | VAUD      | http://www.altacare.com          |
| Altran AG  | Service               | VAUD      | http://www.altran.ch             |
| Alys Technologies SA   | Medtech               | VAUD      | http://www.alys-technologies.com |
| Amal Therapeutics SA   | Biotech               | GENEVE    | http://www.amaltherapeutics.com  |
| Amazentis SA   | Biotech               | VAUD      | http://www.amazentis.com/        |
| American Orthodontics Switzerland Sarl                           | Medtech               | VALAIS    | http://www.americanortho.com     |
| Amires Sarl  | Service               | NEUCHATEL | http://www.amires.eu             |
| Amotec Technique de montage SA                                   | Medtech               | BERNE     | http://www.amotec.ch             |
| Amsonic AG   | Medtech               | BERNE     | http://www.amsonic.ch            |
| Analytecon SA  | Pharma                | NEUCHATEL | http://analytecon.com.au/        |
| Andre Roland SA  | Service               | VAUD      | http://www.andreroland.com       |
| Andrew Alliance SA   | Medtech               | GENEVE    | http://www.andrewalliance.com    |
| Andromis SA  | Medtech               | GENEVE    | http://www.andromis.ch           |

| COMPANY NAME                                       | MAIN SECTOR | CANTON    | INTERNET                             |
|--|-------------|-----------|--------------------------------------|
| Anecova SA   | Biotech     | VAUD      | http://www.anecova.com               |
| Anergis SA   | Biotech     | VAUD      | http://www.anergis.ch                |
| Angiotech Switzerland SA                           | Medtech     | VAUD      | http://www.angiotech.com             |
| Anokion SA   | Biotech     | VAUD      | http://anokion.com                   |
| Anteis SA (Merz)                                   | Biotech     | GENEVE    | http://www.anteis.com                |
| Antion BioSciences SA                              | Service     | GENEVE    | http://www.transcurebioservices.com/ |
| Antlia SA  | Medtech     | VAUD      | http://www.ithetis.com               |
| Anton Meyer & Co AG                                | Medtech     | BERNE     | http://www.meyco.ch                  |
| Apidel SA  | Pharma      | GENEVE    | http://www.apidel.com                |
| Applimed SA  | Medtech     | FRIBOURG  | http://www.applimed.ch               |
| Aproz Sources Minérales SA                         | Nutrition   | VALAIS    | http://www.aproz.ch                  |
| Aptissen SA  | Medtech     | GENEVE    | http://aptissen.com                  |
| Argenius Sarl                                      | Service     | VAUD      | http://www.argenius.com              |
| Ariad Pharmaceuticals SA (Incyte)                  | Pharma      | VAUD      | http://www.ariad.com                 |
| ArisGen SA   | Biotech     | GENEVE    | http://www.arisgen.com               |
| Arkimed SA   | Medtech     | VAUD      | https://arkimed.com/                 |
| Arnold Deppeler SA                                 | Medtech     | VAUD      | http://www.deppeler.ch               |
| Aromadis Sarl                                      | Cosmétique  | VALAIS    | http://www.aromadis.ch               |
| Arpasan Sarl                                       | Nutrition   | GENEVE    | http://arpasan.com                   |
| Arrayon Biotechnology SA                           | Service     | NEUCHATEL | http://www.arrayon.com               |
| Artefact SA  | Medtech     | VAUD      | http://www.artefact-sa.ch/           |
| ARTORG Center                                      | Recherche   | BERNE     | http://www.artorg.unibe.ch           |
| Asceneuron SA                                      | Biotech     | VAUD      | http://www.asceneuron.com            |
| ASQ Services SA                                    | Service     | VALAIS    | http://www.asq.ch                    |
| ASSCO Engineering Monthey SA                       | Medtech     | VALAIS    | http://www.assco.ch                  |
| Assut Medical Sarl                                 | Medtech     | VAUD      | http://www.assutsutures.com          |
| Aston Life Sciences Sarl                           | Service     | VAUD      | http://www.astongroup.ch             |
| Atelier mécanique René de Siebenthal & Fils SA     | Medtech     | VAUD      | http://www.desiebenthal.ch           |
| Atheris Laboratories SA                            | Biotech     | GENEVE    | http://www.atheris.ch                |
| Atracsys Sarl                                      | Medtech     | VAUD      | http://www.atracsys.com              |
| Attolight Sarl                                     | Medtech     | VAUD      | http://www.atto-light.com            |
| Augurix SA   | Biotech     | VALAIS    | http://www.augurix.com               |
| Auxyme SA  | Service     | VALAIS    | http://www.auxyme.ch                 |
| Avance Medical Sarl                                | Medtech     | VAUD      | http://www.avancemedical.com/        |
| Aximed SA  | Service     | JURA      | http://www.aximed.ch                 |
| Axis biodental SA                                  | Medtech     | JURA      | http://www.axis-biodental.ch         |
| Ayanda Biosystems SA                               | Biotech     | VAUD      | http://www.ayanda-biosys.com         |
| AZAD Pharma AG                                     | Pharma      | BERNE     | http://www.azadpharma.com            |
| Azurea Technologies Bévillard SA                   | Medtech     | BERNE     | http://www.azurea.ch                 |
| B Braun Medical SA                                 | Medtech     | VAUD      | http://www.bbraun.ch                 |
| B.C. Development SA                                | Medtech     | JURA      |                                      |
| Bacoinex SA  | Pharma      | JURA      | http://www.bacoinex.com              |
| Bachem SA, succursale de Vionnaz                   | Pharma      | VALAIS    | http://www.bachem.com                |
| Baldelli SA  | Medtech     | NEUCHATEL | http://www.baldelliautomation.com    |
| Balluff AG   | Medtech     | BERNE     | http://www.hytech.ch                 |
| Bangerter Microtechnik AG                          | Medtech     | BERNE     | http://www.ba-micro.com              |
| Barman Robert, IVA Biotechnology                   | Service     | VALAIS    | http://www.iva-biotechnology.ch      |
| Battelle Memorial Institute Geneva Research Center | Recherche   | GENEVE    | http://www.battelle.org              |
| Bausch Advanced Technology Group                   | Medtech     | JURA      | http://www.bausch-group.com          |
| Baxalta BioScience Manufacturing Sarl              | Pharma      | NEUCHATEL | http://www.baxter.ch                 |
| Baxalta Recombinant Sarl                           | Pharma      | NEUCHATEL | http://www.baxter.ch                 |
| BC Consulting & Solutions Sarl                     | Service     | GENEVE    | http://www.bcconsulting.eu.com       |
| be-Advanced  | Incubateur  | BERNE     | https://be-advanced.ch               |
| Be-Ceuticals SA                                    | Cosmétique  | VALAIS    | http://be-ceuticals.com              |
| Beckman Coulter Eurocenter SA                      | Biotech     | VAUD      | http://www.beckmancoulter.ch         |
| Becton, Dickinson and Company                      | Medtech     | VAUD      | http://www.bd.com                    |
| Bellus Health (International) Limited              | Pharma      | VAUD      | http://www.bellushealth.com          |
| Berdar Charles                                     | Medtech     | JURA      | http://www.charlesberdar.ch          |
| Bernafor AG  | Medtech     | BERNE     | http://www.bernafor.com              |
| Bern University of Applied Sciences                | Recherche   | BERNE     | https://www.bfh.ch                   |
| Berney Précision SA                                | Medtech     | VAUD      | http://www.berney-precision.ch       |
| Biar SA  | Medtech     | VALAIS    | http://www.biar.com                  |
| Bien-Air Dental SA                                 | Medtech     | JURA      | http://www.bien-air.ch               |
| Bien-Air Surgery SA                                | Medtech     | JURA      | http://www.bien-air.ch               |



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|--|-----------------------|-----------|--|
| Bio-Ur SA                              | Biotech               | JURA      | http://www.bio-ur.ch                         |
| BioAlliance Pharma Switzerland SA      | Pharma                | GENEVE    | http://www.bioalliancepharma.com             |
| BioAlps                                | Fondation/Association | GENEVE    | http://www.bioalps.org                       |
| BioArk SA                              | Incubateur            | VALAIS    | http://www.bioark.ch                         |
| BioBooster                             | Service               | VAUD      |  |
| Biocartis SA                           | Medtech               | VAUD      | http://www.biocartis.com                     |
| BioCell Interface SA                   | Medtech               | NEUCHATEL | http://www.biocell-interface.com             |
| Bioinnovation Solutions SA             | Biotech               | VAUD      | http://www.bioinnova.ch/                     |
| BioKaiZen Lab SA                       | Biotech               | VALAIS    |  |
| Biokema SA                             | Biotech               | VAUD      | http://www.biokema.ch                        |
| Biolabo Scientific Instruments SA      | Medtech               | FRIBOURG  | http://www.biolabo.ch                        |
| Biomedix SA                            | Medtech               | GENEVE    | http://www.thegard.com                       |
| BioMérieux (Suisse) SA                 | Medtech               | GENEVE    | http://www.biomerieux.com                    |
| Biomet Orthopaedics Switzerland GmbH   | Medtech               | NEUCHATEL | http://www.biometeurope.com                  |
| Bionactis International Group (BIG) SA | Pharma                | VAUD      | http://www.bionactis.com/                    |
| BioPack Medical Sarl                   | Medtech               | VAUD      | http://biopackmedical.ch                     |
| Biophos SA                             | Medtech               | VAUD      | http://www.biophos.com                       |
| Biopole SA                             | Incubateur            | VAUD      | http://biopole.ch                            |
| Biosafe SA                             | Biotech               | VAUD      | http://www.biosafe.ch                        |
| Biosensors Europe SA                   | Medtech               | VAUD      | http://www.biosensorsintl.com                |
| Biosmart GmbH                          | Medtech               | BERNE     | http://www.biosmart.ch                       |
| Biotech SA                             | Medtech               | JURA      |  |
| BioteLLigences Sarl                    | Service               | VAUD      | http://www.bioteLLigences.com                |
| Biowebspin SA                          | Service               | VALAIS    | http://www.biowebspin.com                    |
| BioXPress Therapeutics SA              | Biotech               | GENEVE    | http://www.bioxpress.com                     |
| Bista Consulting Sarl                  | Service               | VAUD      | http://www.bista-consulting.com              |
| BlackRock Asset Management             | investisseur          | GENEVE    | https://www.blackrock.com                    |
| Blue Ocean Ventures                    | investisseur          | GENEVE    | http://www.blueocean-ventures.com            |
| BM Laser, Broquet et Monin             | Medtech               | JURA      |  |
| Boiron SA                              | Pharma                | BERNE     | http://www.boiron.com                        |
| Bordier Affinity Products SA           | Biotech               | VAUD      | http://www.bordier.ch                        |
| Botta & Fils                           | Medtech               | BERNE     | http://www.bottaweb.ch                       |
| BPR Swiss GmbH                         | Medtech               | BERNE     | http://www.bpr-swiss.com                     |
| Bracco Suisse SA                       | Medtech               | GENEVE    | http://www.bracco.com                        |
| Bredam SA                              | Medtech               | VAUD      | http://www.bredam.ch                         |
| Bridgehead International Ltd           | Service               | VAUD      | http://www.bridgeheadinternational.com       |
| Brook Automation AG                    | Medtech               | BERNE     | http://www.remp.com                          |
| BT Bienne Special Tools Sarl           | Medtech               | BERNE     | http://www.btbienne.ch/                      |
| Büchi Optik AG                         | Medtech               | BERNE     | http://www.buechioptik.ch                    |
| Bumotec SA                             | Medtech               | FRIBOURG  | http://www.bumotec.ch/                       |
| Business & Decision (Suisse) SA        | Service               | GENEVE    | http://www.businessdecision-lifesciences.com |
| Businesssupport                        | Service               | VALAIS    | http://businesssupport.ch                    |
| BV Holding AG                          | investisseur          | BERNE     | http://www.bvgroup.ch                        |
| BVB consulting                         | Service               | VAUD      |  |
| CABI Bioscience Swiss Center           | Recherche             | JURA      | http://www.cabi.org                          |
| Caldiscon AG                           | Biotech               | BERNE     | http://www.caldisco.com                      |
| Calinasse                              | Cosmétique            | VALAIS    | http://www.calinasse.com                     |
| Calypso Biotech SA                     | Biotech               | GENEVE    | http://www.calypsobiotech.com                |
| Calypte Biomedical Corporation         | Medtech               | GENEVE    | http://www.calypte.com                       |
| Campus Biotech                         | Incubateur            | GENEVE    | http://www.campusbiotech.ch/                 |
| Campus Biotech Innovation Park         | Incubateur            | GENEVE    | http://www.campusbiotech.ch/                 |
| Capesal SA                             | Medtech               | VAUD      | http://www.capesal.ch                        |
| Capital Risque Fribourg SA             | investisseur          | FRIBOURG  | http://www.capitalrisque-fr.ch               |
| Capital Transmission SA                | investisseur          | GENEVE    | www.capitaltransmission.ch                   |
| Capsant Neurotechnologies SA           | Biotech               | GENEVE    | http://www.capsant.com                       |
| Carbagas AG                            | Service               | BERNE     | http://www.carbagas.ch                       |
| Carbogen Amcis SA                      | Service               | VALAIS    | http://www.carbogen-amcis.com                |
| Cardinal Health Switzerland Sarl       | Pharma                | VAUD      | http://www.cardinal.com/europe               |
| CareFusion Switzerland 317 Sarl        | Medtech               | VAUD      | http://www.carefusion.com                    |
| Carestream Health Suisse SA            | Medtech               | VAUD      | http://www.carestreamhealth.com              |
| CAScination AG                         | Medtech               | BERNE     | http://www.cascination.com                   |
| CCV (Centre Chimie Vouvry) Sarl        | Service               | VALAIS    | http://www.ccv-chimie.ch                     |
| Celgene International Sarl             | Pharma                | NEUCHATEL | http://www.celgene.com                       |
| CELLnTEC Advanced Cell Systems AG      | Medtech               | BERNE     | http://www.cellntec.com                      |

| COMPANY NAME  | MAIN SECTOR  | CANTON    | INTERNET                                |
|---|--------------|-----------|---|
| Cendres + Métaux Holding SA                                 | Medtech      | BERNE     | http://www.cmsa.ch                      |
| Centre de Recherche Nestlé                                  | Nutrition    | VAUD      | http://www.nestlenutrition.com          |
| Centredoc   | Service      | NEUCHATEL | http://www.centredoc.ch                 |
| Centre de Cautionnement et de Financement - Valais (CCF SA) | investisseur | VALAIS    | http://www.ccf-valais.ch                |
| Ceramaret SA  | Medtech      | NEUCHATEL | http://www.ceramaret.ch                 |
| Ceres Heilmittel AG   | Pharma       | VALAIS    | http://www.cereshellmittel.ch           |
| CERN  | Recherche    | GENEVE    | https://home.cern                       |
| Chirmat Sarl  | Service      | VALAIS    | http://www.chirmat.ch                   |
| Chord Therapeutics Sarl                                     | Biotech      | GENEVE    | http://chordtherapeutics.com            |
| CHUV  | Recherche    | VAUD      | http://www.chuv.ch                      |
| CimArk SA   | Service      | VALAIS    | http://www.cimark.ch                    |
| CIMO Compagnie industrielle de Monthey SA                   | Service      | VALAIS    | http://www.cimo.ch                      |
| CITIEFFE INTERNATIONAL SA                                   | Medtech      | VAUD      | http://www.eqval.ch                     |
| Claude Ammann Consulting                                    | Service      | VAUD      | http://www.claudeammann.com             |
| Clinical Laboratory Automation SA                           | Medtech      | JURA      | http://www.cla.ch                       |
| Clinique de Genolier  | Recherche    | VAUD      | http://www.genolier.net/fr/             |
| Clinopsis SA  | Service      | VAUD      | http://www.clinopsis.com                |
| Club Valaisan des Business Angels                           | investisseur | VALAIS    | http://www.bizangels.ch                 |
| Codan Argus AG  | Medtech      | BERNE     | http://www.codanargus.com               |
| Codman Neuro Sciences Sarl                                  | Medtech      | NEUCHATEL | http://www.codman.com                   |
| Comet AG  | Medtech      | FRIBOURG  | http://www.comet.ch                     |
| Commission for Technology and Innovation (CTI)              | Service      | BERNE     | https://www.kti.admin.ch                |
| Composites Busch SA   | Medtech      | JURA      | http://www.compositesbusch.ch           |
| Confrérie Clinique SA                                       | Medtech      | VAUD      | http://www.confrerie-clinique.com       |
| Contelec AG   | Medtech      | BERNE     | http://www.contelec.ch                  |
| CoPexis SA  | Service      | VAUD      | http://www.drdcpharma.com               |
| Coraflo Sarl  | Medtech      | VAUD      | http://www.smartcanula.com              |
| CordSavings SA  | Service      | VALAIS    | http://cordsavings.ch                   |
| Cosmotec SA   | Pharma       | VALAIS    | http://www.cosmotec.ch                  |
| Covance Central Laboratory Services SA                      | Pharma       | GENEVE    | http://www.covance.com                  |
| Covestro International SA                                   | Pharma       | FRIBOURG  | http://www.bayer.com                    |
| CPAutomation SA   | Medtech      | FRIBOURG  | http://www.cpaautomation.ch             |
| Creaholic SA  | Medtech      | BERNE     | http://www.creaholic.com                |
| Crealine SA   | Pharma       | JURA      | http://www.crealine.ch                  |
| Creapole SA   | Service      | JURA      | http://www.creapole.ch                  |
| Createch AG   | Medtech      | BERNE     | http://www.createch.ch                  |
| Crisalix SA   | Medtech      | VAUD      | http://www.crisalix.com                 |
| CSEM - Centre Suisse d'Electronique et de Microtechnique SA | Recherche    | NEUCHATEL | http://www.csem.ch                      |
| CSL Behring SA  | Pharma       | BERNE     | http://www.cslobehring.ch               |
| Cukierman & Co. Life Sciences                               | investisseur | VAUD      | http://www.cukiermanlifesciences.com    |
| DAC-Ortho SA  | Medtech      | GENEVE    | http://www.orthodeal.com                |
| Dassym SA   | Medtech      | NEUCHATEL | http://www.dassym.com                   |
| Data Mining Int. Inc  | Service      | GENEVE    | http://www.datamining-international.com |
| DBS System Sarl   | Medtech      | VAUD      | http://dbs-system.ch/                   |
| Debiopharm Diagnostics SA                                   | Pharma       | FRIBOURG  | http://www.debiopharm.com               |
| Debiopharm Intl. SA   | Pharma       | VAUD      | http://www.debiopharm.com               |
| Debiopharm Investment SA                                    | investisseur | VAUD      | http://www.debiopharm.com               |
| Debiopharm Research & Manufacturing SA                      | Pharma       | VALAIS    | http://www.debiopharm.com               |
| Debiopharm SA   | Pharma       | VAUD      | www.debiopharm.com                      |
| Debiotech SA  | Biotech      | VAUD      | http://www.debiotech.ch                 |
| Décovi SA   | Medtech      | JURA      | http://www.decovi.ch                    |
| Deerfield Institute for Healthcare Research Sarl            | Recherche    | VAUD      | http://www.deerfield.com/               |
| Dégonda-Rehab SA  | Medtech      | VAUD      | http://www.degonda.ch                   |
| Dégonda-Rehab SA  | Medtech      | BERNE     | http://www.degonda.ch                   |
| Déloa SA  | Medtech      | JURA      | http://www.borruat.ch                   |
| Dentsply IH SA  | Medtech      | VAUD      | http://www.dentsplyimplants.com/        |
| DePuy Motion Sarl   | Medtech      | NEUCHATEL | http://www.depuy.com/                   |
| DermoSafe SA  | Medtech      | VAUD      | http://www.dermosafe.com/               |
| Detech SA   | Medtech      | JURA      | http://www.detech.ch                    |
| DFB Pharmaceuticals Inc.                                    | Pharma       | VAUD      | http://www.dfb.com                      |
| Diacosa AG  | Pharma       | BERNE     | http://www.diacosa.ch                   |
| Diagnoplex  | Pharma       | VAUD      | http://www.diagnoplex.com               |
| DiagnoSwiss SA  | Pharma       | VALAIS    | http://www.diagnoswiss.com              |
| Diamed GmbH/Bio-Rad Laboratories AG                         | Pharma       | FRIBOURG  | http://www.diamed.ch/                   |



| COMPANY NAME                                   | MAIN SECTOR           | CANTON    | INTERNET                              |
|--|-----------------------|-----------|---------------------------------------|
| Diepharmex SA                                  | Pharma                | GENEVE    | http://www.audispray.com              |
| Digmesa Polyform AG                            | Medtech               | BERNE     | http://www.polyform.ch                |
| Dineras International SA                       | Service               | GENEVE    |                                       |
| Distal Motion SA                               | Medtech               | VAUD      | www.distalmotion.com                  |
| DJO Global Switzerland Sarl                    | Medtech               | VAUD      | http://www.djoglobal.eu/              |
| DM2TC Sarl                                     | Service               | VAUD      | http://www.dm2tc.ch                   |
| Dompe International SA                         | Pharma                | VAUD      | http://www.dompe.com                  |
| Dorix SA                                       | Medtech               | BERNE     | http://www.dorix.ch/                  |
| Dorphan SA                                     | Pharma                | VAUD      | http://www.dorphan.com                |
| Dr E Graub AG                                  | Pharma                | BERNE     | http://www.graub.com                  |
| Dräger Medical Suisse SA                       | Medtech               | VAUD      | http://www.draeger.com                |
| Drug Design Tech SA                            | Medtech               | GENEVE    | http://www.drugdesigntech.com         |
| Drugs for Neglected Diseases Initiative (DNDI) | Fondation/Association | GENEVE    | http://www.dndi.org                   |
| DuPont de Nemours Holding SA                   | Pharma                | GENEVE    | http://www.dupont.com                 |
| Dynamics Group SA                              | Service               | GENEVE    | http://www.dynamicsgroup.ch           |
| Dynatec SA                                     | Medtech               | VAUD      | http://www.dynatec.ch                 |
| Eclosion2 SA                                   | investisseur          | GENEVE    | http://www.eclosion.ch                |
| Ecole d'Ingénieurs de Changins                 | Recherche             | VAUD      | http://www.eichangins.ch              |
| Ecosafe SA                                     | Medtech               | VAUD      | http://www.ecosafesa.com              |
| Edel-for-Life SA                               | Medtech               | VAUD      | http://www.edeltherapeutics.com       |
| Edwards Lifesciences SA                        | Medtech               | VAUD      | http://www.edwards.com                |
| Egatec SA                                      | Medtech               | BERNE     | http://www.egatec.dk/                 |
| Elanix Technologies SA                         | Biotech               | VAUD      | http://www.elanix.ch/                 |
| Electro Medical Systems SA                     | Medtech               | VAUD      | http://www.ems-company.com            |
| Electro Müller AG                              | Medtech               | BERNE     | http://www.electro-mueller.ch/de/     |
| Electromag SA                                  | Medtech               | VAUD      | http://www.electromag.ch              |
| Eli Lilly (Suisse) SA                          | Pharma                | GENEVE    | http://www.lilly.ch                   |
| enoreTpixel                                    | Service               | VAUD      | http://www.enoretapixel.com           |
| Endeavour Vision SA                            | investisseur          | GENEVE    | http://www.endeavourvision.com        |
| Engqvist Consulting                            | Service               | VAUD      | http://www.engqvistconsulting.com     |
| EOC Partners                                   | investisseur          | VAUD      | http://www.eocp.com                   |
| EP Solutions SA                                | Medtech               | VAUD      | http://ep-solutions.ch                |
| EPFL   | Recherche             | VAUD      | http://www.epfl.ch                    |
| EPFL Fribourg                                  | Recherche             | FRIBOURG  | http://fribourg.epfl.ch/              |
| EPFL Neuchâtel                                 | Recherche             | NEUCHÂTEL | http://microcity.epfl.ch              |
| EPFL Valais Wallis                             | Recherche             | VALAIS    | http://valais.epfl.ch                 |
| EPFL Innovation Park                           | Incubateur            | VAUD      | http://www.parc-scientifique.ch       |
| Epithelix Sarl                                 | Biotech               | GENEVE    | http://www.epithelix.com              |
| ERAS Suisse SA                                 | Service               | VALAIS    | http://www.eras.fr                    |
| Ergomed Virtuoso Sarl                          | Service               | GENEVE    |                                       |
| Espace Création Renens                         | Incubateur            | VAUD      | http://www.republic-of-innovation.org |
| Espace Création Sion                           | Incubateur            | VALAIS    | http://www.espacec.ch                 |
| Espere Rare Foundation                         | Fondation/Association | GENEVE    | http://www.esperare.org               |
| Estoppey-Addor SA                              | Medtech               | BERNE     | http://www.estoppey-addor.ch          |
| Estoppey-Reber AG                              | Medtech               | BERNE     | http://www.estoppey.ch                |
| Etameca SA                                     | Medtech               | BERNE     | http://www.etameca.ch                 |
| Ethicon Sarl                                   | Medtech               | NEUCHÂTEL | http://www.ethiconinc.com             |
| Ethimedix SA                                   | Medtech               | GENEVE    | http://www.ethimedix.com              |
| Euro-Private Equity SA                         | investisseur          | GENEVE    | http://euro-pe.com                    |
| Eurosearch                                     | Service               | BERNE     | https://www.eurosearch.ch             |
| Exabone GmbH                                   | Medtech               | VAUD      | http://www.exabone.com                |
| ExcelGene SA                                   | Biotech               | VALAIS    | http://www.excellgene.com             |
| ExCellness Biotech SA                          | Medtech               | VAUD      | http://www.excellness.com             |
| EY (Ernst & Young)                             | Service               | GENEVE    | http://www.ey.com                     |
| Fabrial SA                                     | Medtech               | NEUCHÂTEL | http://www.fabrial.com                |
| Fasmed   | Fondation/Association | BERNE     | http://www.fasmed.ch                  |
| Fasteris SA                                    | Service               | GENEVE    | http://www.fasteris.com               |
| Ferring International Center SA                | Pharma                | VAUD      | http://www.ferring.com                |
| FIPA (Fonds Inartis de pré-amorçage)           | investisseur          | VALAIS    |                                       |
| Firmenich SA                                   | Service               | GENEVE    | http://www.firmenich.com              |
| Fischer Connectors SA                          | Medtech               | VAUD      | http://www.fischerconnectors.ch       |
| Fischer Soehne AG                              | Service               | BERNE     | http://www.fischersoehne.ch/          |
| FKG Dentaire SA                                | Medtech               | NEUCHÂTEL | http://www.fkg.ch                     |
| Fluid Automation Systems SA                    | Medtech               | GENEVE    | http://www.fas.ch                     |

| COMPANY NAME   | MAIN SECTOR           | CANTON    | INTERNET                           |
|--|-----------------------|-----------|------------------------------------|
| FME AG   | Medtech               | BERNE     | http://www.fme-ag.com              |
| Fondation «Olas Brochet»                                       | Incubateur            | NEUCHÂTEL |                                    |
| Fondation Artères  | Fondation/Association | GENEVE    | http://www.arteres.org/            |
| Fondation Eclosion   | Incubateur            | GENEVE    | http://www.eclosion.ch             |
| Fondation EssentialMed   | Fondation/Association | VAUD      | http://www.essentialmed.org        |
| Fondation Genevoise pour l'Innovation Technologique FONGIT     | Fondation/Association | GENEVE    | http://www.fongit.ch               |
| Fondation Genevoise pour la Formation et la Recherche Médicale | Fondation/Association | GENEVE    | http://www.gfmer.ch                |
| Fondation H. Dudley Wright                                     | Fondation/Association | GENEVE    | http://www.hdwright.org            |
| Fondation IM4TB  | Fondation/Association | VAUD      | http://im4tb.org                   |
| Fondation d'Impulsion économique et technologique (FITEC)      | investisseur          | JURA      | http://www.fitec.ch                |
| Fondation ISREC  | Fondation/Association | VAUD      | http://www.isrec.ch                |
| Fondation Jeantet  | Fondation/Association | GENEVE    | http://www.jeantet.ch              |
| Fondation Leenaards  | Fondation/Association | VAUD      | http://www.leenaards.ch            |
| Fondation pour l'Innovation Technologique (FIT)                | Fondation/Association | VAUD      | www.fondation-fit.ch               |
| Fondation The Ark  | Fondation/Association | VALAIS    | http://www.theark.ch               |
| Fonds de soutien à l'innovation du canton de Fribourg          | Investisseur          | FRIBOURG  | http://www.promfr.ch               |
| Fors AG  | Medtech               | BERNE     | http://www.fors.ch                 |
| Forteq Nidau AG  | Medtech               | BERNE     | http://www.forteq-group.com/       |
| Foundation for Innovative New Diagnostics (FIND)               | Fondation/Association | GENEVE    | http://www.finddiagnostics.org     |
| Frimorfo SA  | Service               | FRIBOURG  | http://www.frimorfo.com            |
| Fritz Gyger AG   | Medtech               | BERNE     | http://www.fgyger.ch               |
| FriUp  | Service               | FRIBOURG  | http://www.friup.ch                |
| FSC - Fondation Suisse pour les Cyberthèses                    | Medtech               | VALAIS    | http://www.fsc-sfc.org             |
| Future Health Biobank SA                                       | Service               | FRIBOURG  | http://www.futurehealthbiobank.ch  |
| Future Health Cell Bank SA                                     | Service               | GENEVE    | http://www.futurehealth.co.uk      |
| G-Therapeutics   | Biotech               | VAUD      | http://gtherapeutics.com/          |
| Gait Up Sarl   | Medtech               | VAUD      | http://www.gaitup.com/             |
| Galderma Pharma SA   | Pharma                | VAUD      | http://www.galderma.ch             |
| Galenica AG  | Pharma                | BERNE     | http://www.galenica.com            |
| Galexis AG   | Service               | BERNE     | http://www.e-galexis.com           |
| GAP Engineering SA   | Service               | VALAIS    | http://www.gap-engineering.ch      |
| GAVI Alliance  | Fondation/Association | GENEVE    | http://www.gavialliance.org        |
| Gene Predictis SA  | Service               | VAUD      | http://www.genepredictis.com       |
| Gene Signal International SA                                   | Biotech               | VAUD      | http://www.genesignal.com          |
| GeneBio - Geneva Bioinformatics SA                             | Service               | GENEVE    | http://www.genebio.com             |
| GeNeuro SA   | Biotech               | GENEVE    | http://www.geneuro.com             |
| Geneva Biotech Center SA                                       | Service               | GENEVE    | http://www.genevabiotechcenter.com |
| Geneva Health Forum  | Fondation/Association | GENEVE    | http://ghf.globalhealthforum.net   |
| Genevensis Sarl  | Service               | GENEVE    | http://www.genevensis.com          |
| Genge & Thoma AG   | Medtech               | BERNE     | http://www.gengethoma.com          |
| Genilem  | Service               | GENEVE    | http://www.genilem.ch              |
| GeniuSoft Sarl   | Service               | FRIBOURG  | http://www.geniusoft.ch            |
| GenKyoTex SA   | Biotech               | GENEVE    | http://www.genkyotex.com           |
| Genohm SA  | Medtech               | VAUD      | http://www.genohm.com/             |
| Genomic Health International Sarl                              | Biotech               | GENEVE    | http://www.genomichealth.com       |
| Gersteltec Sarl  | Medtech               | VAUD      | http://www.gersteltec.ch           |
| Gevaltec Sarl  | Medtech               | VALAIS    | http://www.revaltec.fr/            |
| GF Machining Solutions SA                                      | Medtech               | GENEVE    | http://www.gfms.com                |
| GGBA - La GREATER GENEVA BERNE area                            | Fondation/Association | VAUD      | http://www.ggba-switzerland.ch     |
| Gibaud (Suisse) SA   | Medtech               | GENEVE    | http://www.gibaud.com              |
| Ginko Ventures   | investisseur          | GENEVE    | http://www.ginkopartners.com       |
| Givaudan SA  | Cosmétique            | GENEVE    | www.givaudan.com                   |
| GlaxoSmithKline AG   | Pharma                | BERNE     | http://www.glaxosmithkline.ch      |
| Glenmark Pharmaceuticals SA                                    | Pharma                | NEUCHÂTEL | http://www.glenmarkpharma.com      |
| GMP SA   | Medtech               | VAUD      | http://www.gmp.ch                  |
| GMT Fine Chemicals SA  | Pharma                | NEUCHÂTEL | http://www.gmtchemicals.com        |
| Gomina AG  | Medtech               | VALAIS    | http://www.gomina.ch               |
| Gribi AG   | Medtech               | BERNE     | http://www.gribi.ch                |
| Groupe Genitec Holding SA                                      | Service               | JURA      | http://www.genitec.net             |
| Groupe PP Holding SA   | investisseur          | GENEVE    | http://www.groupe-pp.ch            |
| Gsell Medical Plastics AG                                      | Medtech               | BERNE     | http://www.gsell.ch/               |
| gyMetrics SA   | Medtech               | VAUD      | http://www.gymetrics.com           |
| H. Hilderbrand Cie & SA  | Medtech               | GENEVE    | http://www.hilderbrand.ch          |
| Haag-Streit Holding AG   | Medtech               | BERNE     | http://www.haag-streit.com         |



| COMPANY NAME   | MAIN SECTOR           | CANTON    | INTERNET                                 |
|--|-----------------------|-----------|--|
| Haemonetics SA   | Medtech               | VAUD      | http://www.haemonetics.com               |
| Hanco Schleiftechnik AG                                | Medtech               | FRIBOURG  | http://www.hanco.ch                      |
| Häni & Co. AG, Arch                                    | Medtech               | BERNE     | http://www.hanitec.ch/medizin-technik/   |
| Harald Nordin SA                                       | Medtech               | VAUD      | http://www.nordin-dental.com             |
| Harting AG   | Medtech               | BERNE     | http://www.harting-mitronics.ch          |
| Haslab GmbH  | Medtech               | BERNE     | http://www.haslab.ch                     |
| Health Systems and Technology                          | Service               | GENEVE    | http://www.hst consulting.ch             |
| Heig-vd  | Recherche             | VAUD      | http://www.hev.ch                        |
| Helbling Technik Bern AG                               | Service               | BERNE     | http://www.helbling.ch                   |
| Helvemed SA  | Medtech               | GENEVE    | http://www.helvemed.com                  |
| Helvetica Health Care Sarl                             | Medtech               | GENEVE    | http://www.helveticahealthcare.com       |
| HemaCore SA  | Medtech               | VALAIS    | http://www.hemacore.com/en/              |
| Henry Schein Medical AG                                | Medtech               | BERNE     | http://www.helland.ch                    |
| HEPIA  | Recherche             | GENEVE    | http://www.hesge.ch                      |
| Heraeus Materials SA                                   | Medtech               | VAUD      | http://www.heraeus-medicalcomponents.com |
| HES-SO Fribourg  | Recherche             | FRIBOURG  | http://www.hefr.ch                       |
| HES-SO Genève  | Recherche             | GENEVE    | https://www.hesge.ch                     |
| HES-SO Valais-Wallis                                   | Recherche             | VALAIS    | http://www.hevs.ch                       |
| Heska SA   | Biotech               | FRIBOURG  | http://www.heska.com                     |
| Highpoint Solutions                                    | Service               | GENEVE    | www.highpointsolutions.com               |
| Hilfsmittelstelle HMS Bern AG                          | Medtech               | BERNE     | http://www.hilfsmittelstelle.ch          |
| HL Technology SA                                       | Medtech               | NEUCHATEL | http://www.hl-technology.ch              |
| HMT Microelectronic AG                                 | Medtech               | BERNE     | http://www.hmt.ch                        |
| Hock'n Roll AG   | Medtech               | BERNE     | http://www.hocknroll.ch                  |
| Hoffmann Neopac AG                                     | Medtech               | BERNE     | http://www.hoffmannneopac.ch             |
| Hologic Europe Middle East and Africa SA               | Medtech               | VAUD      | http://www.hologic.com                   |
| Homedlab SA  | Pharma                | VALAIS    | http://www.pharmacievouilloz.ch          |
| Hôpital Jules Gonin                                    | Recherche             | VAUD      | http://www.ophtalmique.ch                |
| Hôpitaux Universitaires de Genève (HUG)                | Recherche             | GENEVE    | http://www.hug-ge.ch/                    |
| Hospiveda Sarl   | Medtech               | VAUD      |  |
| Brand Djevahirdjian SA (Djeva)                         | Medtech               | VALAIS    | http://www.djeva.com                     |
| Hucovision SA  | Medtech               | NEUCHATEL | http://www.hucovision.com                |
| Human Brain Project                                    | Recherche             | GENEVE    | https://www.humanbrainproject.eu         |
| HumanVet Sarl  | Pharma                | VAUD      | http://www.humanvet.com/                 |
| Hygie-Tech SA  | Medtech               | VAUD      | http://www.hygie-tech.ch                 |
| I-Dent Innovation For Dentistry SA                     | Medtech               | VAUD      | http://www.i-dent-dental.com             |
| ID Quantique SA  | Medtech               | GENEVE    | http://www.idquantique.com               |
| Idexx Switzerland AG                                   | Service               | BERNE     | http://www.idexx.com                     |
| Idiap Research Institute                               | Recherche             | VALAIS    | https://www.idiap.ch                     |
| IE Industrial Engineering Genève SA                    | Service               | GENEVE    | http://www.ie-group.com                  |
| IFPMA  | Fondation/Association | GENEVE    | http://www.ifpma.org                     |
| iForE  | investisseur          | GENEVE    |  |
| IHMA Europe Sarl                                       | Service               | VAUD      | http://www.ihmainc.com                   |
| IIG - Institut Informatique de Gestion - HES-SO Valais | Service               | VALAIS    | http://iig.hevs.ch/                      |
| IMG SA - Instruments, Industrial & Medical Group       | Medtech               | FRIBOURG  |  |
| ILP Lüthi + Partner AG                                 | Service               | BERNE     | http://www.ilp-switzerland.ch            |
| ILS Services Schweiz SA                                | Service               | GENEVE    |  |
| Inartis  | Fondation/Association | VALAIS    | http://www.inartis.ch                    |
| Inartis Network  | Fondation/Association | VAUD      | http://www.inartis-network.ch            |
| Include Sarl   | Service               | VAUD      | http://www.includeconsulting.com         |
| Incyte Europe Sarl                                     | Pharma                | GENEVE    | www.incyte.com                           |
| Index Ventures   | investisseur          | GENEVE    | http://www.indexventures.com             |
| Indigo Consulting Sarl                                 | Service               | GENEVE    | http://www.revaltec.fr/                  |
| Inflamalps SA  | Biotech               | VALAIS    | http://www.inflamalps.com                |
| Infomed SA   | Medtech               | GENEVE    | http://www.infomedsa.ch                  |
| InnoPeritus Sarl                                       | Service               | GENEVE    | http://www.innoperitus.com               |
| Innovation Lab Fribourg                                | Service               | FRIBOURG  | http://innolabfribourg.ch                |
| Innovative Solutions                                   | Service               | VAUD      | http://www.innovativesolutions.ch        |
| Innovaud   | Fondation/Association | VAUD      | http://www.innovaud.ch                   |
| Inomed Technology SA                                   | Medtech               | JURA      | http://www.inomed.ch                     |
| Inovorto Medical SA                                    | Medtech               | NEUCHATEL |  |
| Inselspital Universitätsspital Bern                    | Recherche             | BERNE     | http://www.insel.ch                      |
| Institut de Recherche en Ophtalmologie (IRO)           | Recherche             | VALAIS    | http://www.iro.vsnat.ch                  |
| Institut de Recherche en Réadaptation - Réinsertion    | Recherche             | VALAIS    | http://www.irt-valsais.ch                |

| COMPANY NAME   | MAIN SECTOR | CANTON    | INTERNET   |
|--|-------------|-----------|--|
| Instrumat AG   | Medtech     | VAUD      | http://www.instrumat.ch                                  |
| Insys Industriesysteme AG                                      | Medtech     | BERNE     | http://www.insys.ch/fr/                                  |
| Integra Lifesciences Services SA                               | Medtech     | GENEVE    | http://www.integralife.com                               |
| Intercosmetica Neuchâtel SA                                    | Cosmétique  | NEUCHATEL | http://www.intercosmetica.ch                             |
| Interdelta SA  | Pharma      | FRIBOURG  | http://www.interdelta.ch                                 |
| Interdigit SA  | Service     | VAUD      | http://www.interdigit.com                                |
| Interlabor Belp AG   | Service     | BERNE     | http://www.interlabor.ch                                 |
| InterMedService Sarl   | Service     | JURA      | http://www.intermedservice.org/about.php                 |
| Intersteri AG  | Service     | BERNE     | http://www.intersteri.ch                                 |
| Intrace Medical SA   | Service     | VAUD      | http://www.intrace-medical.com                           |
| Intrachem Bio SA   | Service     | GENEVE    | http://www.intrachembio.com                              |
| Intuitive Surgical Sarl  | Medtech     | VAUD      | http://www.intuitivesurgical.com                         |
| Invacare International Sarl                                    | Medtech     | VAUD      | http://www.invacare.eu.com                               |
| Ionight AG   | Service     | BERNE     | http://www.ionight.com                                   |
| Ipstudies Sarl   | Service     | FRIBOURG  | http://www.ipstudies.ch                                  |
| ISS AG, Integrated Scientific Services                         | Service     | BERNE     | http://www.iss-ag.ch                                     |
| ITV - Institut Technologies du vivant HES-SO Valais Wallis     | Service     | VALAIS    | http://tv.hevs.ch/                                       |
| Ivers-Lee AG   | Service     | BERNE     | http://www.ilmedtec.ch                                   |
| Ixeo Healthcare SA   | Service     | VAUD      | http://www.ixeo.com                                      |
| Jacques Allemann SA  | Medtech     | BERNE     | http://www.jacques-allemann.ch                           |
| JAG Jakob AG   | Medtech     | BERNE     | http://www.jag.ch  |
| JAG Jakob AG   | Medtech     | JURA      | http://www.jag.ch  |
| Jalon SA   | Service     | VAUD      | http://www.clinovo.com/                                  |
| Janssen Vaccines AG  | Pharma      | BERNE     | http://www.janssen.com                                   |
| Jardin Cosmetik  | Cosmétique  | VALAIS    | http://www.jardincosmetik.ch                             |
| Jet Medical SA   | Medtech     | NEUCHATEL | http://www.jetmedical.net                                |
| JetSolutions SA (ILC Dover)                                    | Medtech     | FRIBOURG  | http://www.jetsolutions.ch                               |
| Jinfo SA   | Medtech     | JURA      | http://www.jinfo.ch                                      |
| Juratec SA   | Service     | JURA      | http://www.juratec.ch                                    |
| Katzarov SA  | Service     | GENEVE    | http://www.katzarov.com                                  |
| KB Medical SA  | Medtech     | VAUD      | http://www.kbmedical.com                                 |
| Kemopharm SA   | Service     | GENEVE    |  |
| Kessler Prévoyance SA  | Service     | VAUD      | http://www.kessler.ch                                    |
| Kessler SA   | Service     | BERNE     | http://www.kessler.ch                                    |
| Kessler SA   | Service     | GENEVE    | http://www.kessler.ch                                    |
| KeySep Sarl  | Service     | GENEVE    | http://www.keysap.com                                    |
| Komax Systems LCF SA   | Medtech     | NEUCHATEL | http://www.komax.ch                                      |
| Kuhn und Bieri AG  | Medtech     | BERNE     | http://www.kuhnbiert.ch                                  |
| Kyburz & Cie SA  | Medtech     | NEUCHATEL | http://www.kyburz-cie.ch                                 |
| Kyowa Kirin Sarl   | Pharma      | GENEVE    | www.kyowa-kirin.com                                      |
| La Colline Cellular Research Laboratories SA                   | Cosmétique  | VALAIS    | http://www.lacolline-skincare.com                        |
| LA MANUFACTURE, ATELIERS PROTÉGÉS, fondation du Dr. A. Rollier | Medtech     | VAUD      | http://www.lamanufacture.ch                              |
| Laboratoire Dr. Bregnard SA                                    | Medtech     | JURA      |  |
| Laboratoire Gibro SA   | Cosmétique  | NEUCHATEL | http://www.laboratoiregibro.com/                         |
| Laboratoire Pauline Burgener Switzerland SA                    | Cosmétique  | VAUD      | http://drburgener.com/                                   |
| Laboratoires Anesa SA  | Service     | VALAIS    |  |
| Laboratoires Bailleul  | Pharma      | GENEVE    | www.bailleul.com   |
| Laboratoires Biologiques Arval SA                              | Cosmétique  | VALAIS    | http://www.arvalcosmetics.com                            |
| Laboratoires Plan SA   | Pharma      | GENEVE    | http://www.laboratoiresplan.com                          |
| Laborial (Suisse) SA   | Service     | VAUD      | http://www.laborial.com                                  |
| Labseed SaRL   | Medtech     | VAUD      | http://www.labseed.com                                   |
| Lacpure SA   | Medtech     | VAUD      |  |
| Lamineries Matthey SA  | Medtech     | BERNE     | http://www.matthey.ch                                    |
| Lascco SA  | Incubateur  | GENEVE    | http://www.lascco.com                                    |
| Laser-Automation Gekatronik SA                                 | Medtech     | NEUCHATEL | http://www.laser-automation.com                          |
| Laserix Sarl   | Medtech     | NEUCHATEL | http://www.tecvision.ch/laserix/                         |
| Lasermed SA  | Medtech     | BERNE     | http://www.lasermed.ch/fr/                               |
| Lastec AG  | Medtech     | BERNE     | http://www.lastec.ch                                     |
| Lautscher Präzision AG   | Medtech     | BERNE     | http://www.burde-metall.at/glc.htm                       |
| Lauener + Cie SA   | Medtech     | NEUCHATEL | http://www.lauener.ch                                    |
| Lausanne Région  | Service     | VAUD      | http://www.lausanneregion.ch/xml_1/Internet/fr/intro.cfm |
| Legacy HealthCare SA   | Cosmétique  | VAUD      | http://www.legacyhealthcare.ch/                          |
| Leitner SA   | Medtech     | BERNE     | http://www.leitner-ag.ch                                 |



| COMPANY NAME                                      | MAIN SECTOR           | CANTON    | INTERNET                               |
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| Leman Cardiovascular SA                           | Medtech               | VAUD      | http://www.lemancardiovascular.com     |
| Leman Consulting SA                               | Service               | VAUD      | http://www.lemanconsulting.ch          |
| Leman Micro Devices SA                            | Medtech               | VAUD      | http://www.leman-micro.com             |
| Lemo SA   | Medtech               | VAUD      | http://www.lemo.com                    |
| Lemur-Scouting Sarl                               | Service               | JURA      | http://www.lemur-scouting.ch           |
| Les Simples                                       | Nutrition             | VALAIS    | http://www.lessimples.ch               |
| Link Implants AG                                  | Medtech               | BERNE     | http://www.link-implants.ch            |
| Linkage Biosciences Sarl                          | Biotech               | GENEVE    | www.linkagebio.com/                    |
| Locatis SA  | Medtech               | JURA      | http://www.locatis-electronics.ch      |
| Logival SA  | Medtech               | VALAIS    | http://www.logival.ch                  |
| Lonza AG  | Pharma                | VALAIS    | http://www.lonza.com                   |
| Loroch CTLS                                       | Service               | VAUD      | http://www.loroch.ch                   |
| Louis Beler SA                                    | Medtech               | JURA      | http://www.beletsa.ch                  |
| LPS Services SA                                   | Medtech               | FRIBOURG  | http://www.lps-services.ch             |
| LSC consulting                                    | Service               | GENEVE    | http://www.lsc-consulting.fr/          |
| Ludwig Institute for Cancer Research              | Recherche             | VAUD      | http://www.ludwigcancerresearch.org    |
| Lugaia AG   | Service               | VALAIS    | http://www.lugaia.ch                   |
| Lunaphore Technologies SA                         | Medtech               | VAUD      | http://www.lunaphore.ch                |
| Lyncee Tec SA                                     | Medtech               | VAUD      | http://www.lynceetec.com               |
| Madep SA  | Service               | NEUCHATEL | http://www.madep-sa.com                |
| MaestroHeart SA                                   | Medtech               | GENEVE    |  |
| Mandatec AG                                       | Medtech               | BERNE     | http://www.mandatec.ch                 |
| Mane SA   | Cosmétique            | VALAIS    | http://www.mane.com                    |
| Manigley SA                                       | Medtech               | BERNE     | http://www.manigley.ch                 |
| Manufactures D'Outils Dumont SA                   | Medtech               | JURA      | http://www.dumonttools.com             |
| Manuplast SA                                      | Medtech               | VAUD      | http://www.manuplast.ch                |
| Mapag Maschinen AG                                | Medtech               | BERNE     | http://www.mapag.ch                    |
| MAPE Pharmaceutical and Industrial Engineering SA | Service               | JURA      | http://www.groupe-mape.com             |
| Marcel Blanc et Cie SA                            | Medtech               | VAUD      | http://www.marcel-blanc.ch             |
| Marcel Jaccard SA                                 | Medtech               | VAUD      | http://www.jaccard.ch                  |
| Marly Innovation Center (MIC)                     | Incubateur            | FRIBOURG  | http://www.marly-innovation-center.org |
| Masimo International Sarl                         | Medtech               | NEUCHATEL | http://www.masimo.com                  |
| MassChallenge Switzerland                         | Incubateur            | VAUD      | http://masschallenge.org               |
| Max Jung AG                                       | Medtech               | BERNE     | http://www.maxjung.ch                  |
| MaxiMed Sarl                                      | Service               | VAUD      | http://www.maximed.ch                  |
| Mayba.ch  | Medtech               | VALAIS    | https://www.mayba.ch/                  |
| MCE Swiss SARL                                    | Service               | VAUD      | http://www.mvlab.ch/                   |
| MCL Medizinische Laboratorien AG                  | Service               | BERNE     | http://www.mcl.ch                      |
| MCS Labordatensysteme AG                          | Medtech               | BERNE     | http://www.mcs-ag.com                  |
| MD-Clinicals SA                                   | Service               | VAUD      | http://www.md-clinicals.com            |
| Mecaplast SA                                      | Medtech               | FRIBOURG  | http://www.mecaplast.ch                |
| Mecha AG  | Medtech               | BERNE     | http://www.mecha.ch                    |
| Med Communications International Sarl             | Service               | GENEVE    | www.medcommunications.com              |
| Med Discovery SA                                  | Biotech               | VAUD      | http://www.med-discovery.com           |
| Medacta International SA                          | Medtech               | JURA      | http://www.medacta.ch                  |
| MedC. Partners Sarl                               | Service               | VAUD      | www.medmap.ch                          |
| Medeco-ch Sarl                                    | Service               | VAUD      | http://www.medeco-ch.com               |
| Medelec SA  | Medtech               | VAUD      | http://www.medelec-tubes.com           |
| Medexpansion Sarl                                 | Service               | VAUD      | http://medexpansion.ch                 |
| Medical Cluster                                   | Incubateur            | BERNE     | http://www.medical-cluster.ch          |
| Medical Device Solutions AG                       | Medtech               | BERNE     | http://www.mds-ag.ch                   |
| Medical Devices Lease SA                          | Medtech               | GENEVE    | http://www.mdlfinance.com              |
| Medical Titanium Sarl                             | Medtech               | GENEVE    | http://www.medicaltitanium.com         |
| MedioMicro SA                                     | Medtech               | VAUD      | http://www.medicmicro.ch/              |
| Medico-Technique CRM SA                           | Medtech               | NEUCHATEL |  |
| Medicontur International SA                       | Medtech               | GENEVE    | http://www.medicontur.com              |
| Medics Labor AG                                   | Service               | BERNE     | http://www.medics-labor.ch             |
| Medidee Services SA                               | Service               | VAUD      | http://medidee.com                     |
| Medilant SA                                       | Medtech               | NEUCHATEL | http://www.medilant.com/               |
| Medimaps Group SA                                 | Service               | GENEVE    | http://www.medimapsgroup.com           |
| Medinel Sarl                                      | Service               | VAUD      | http://www.medinel.com                 |
| Medinorma Sarl                                    | Service               | VAUD      | http://www.medinorma.ch                |
| Medos International Sarl                          | Medtech               | NEUCHATEL | http://www.jnj.ch                      |
| Mediplant   | Fondation/Association | VALAIS    | http://www.mediplant.ch                |

| COMPANY NAME                              | MAIN SECTOR           | CANTON    | INTERNET                                     |
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| Medipol SA                                | Biotech               | VAUD      | http://www.medipol.ch                        |
| Medirio SA                                | Medtech               | VALAIS    | http://www.medirio.com                       |
| MediSeeds Sarl                            | Nutrition             | VALAIS    | http://www.medisegs.ch                       |
| Medistri SA                               | Service               | FRIBOURG  | http://www.medistri.com/                     |
| Meditec Consulting GmbH                   | Service               | BERNE     | http://www.meditec-consulting.ch             |
| Medixi Ventures                           | investisseur          | GENEVE    | http://www.medixi.com                        |
| Medlight SA                               | Medtech               | VAUD      | http://www.medlight.com                      |
| Medos International Sarl                  | Pharma                | NEUCHATEL | http://www.jnj.com                           |
| MedPlast SA                               | Medtech               | VALAIS    | http://www.medplast.ch                       |
| Medtronic Biopharma Sarl                  | Pharma                | NEUCHATEL | http://www.medtronic.ch                      |
| Medtronic Europe Sarl                     | Medtech               | VAUD      | http://www.medtronic.ch                      |
| Meister & Cie AG Hasle-Ruegsau            | Medtech               | BERNE     | http://www.meister-ag.ch                     |
| Melet Schloesing Pharmaceuticals SA       | Pharma                | NEUCHATEL | http://www.mslabos.com/                      |
| Memedge Consulting Sarl                   | Service               | VAUD      | http://www.memedge-consulting.ch             |
| Menicon Co., Ltd                          | Pharma                | GENEVE    | www.menicon.com                              |
| Mensys Group SA                           | Service               | VAUD      | http://www.mensys-group.com                  |
| Meoc SA                                   | Service               | VALAIS    | http://www.meoc.ch                           |
| Merck Group                               | Pharma                | VAUD      | www.merckgroup.com                           |
| Merck Serono SA                           | Pharma                | VAUD      | http://www.merckserono.com                   |
| Merck Sharp & Dohme (Switzerland) GmbH    | Pharma                | VALAIS    | http://www.merck.com                         |
| Meridian AG                               | Medtech               | BERNE     | http://www.meridian.ch                       |
| Metafil-Lagrolle SA                       | Medtech               | JURA      | http://www.metafil-lagrolle.ch               |
| Meyer Sintermetall AG                     | Medtech               | BERNE     | http://www.sintermetall.ch                   |
| MH LOG Martin Hochuli                     | Service               | BERNE     |  |
| Michael Page Healthcare & Life science SA | Service               | GENEVE    | http://www.michaelpage.ch                    |
| Micro Precision Systems AG                | Medtech               | BERNE     | http://www.mpsag.com                         |
| MicroLeman SaRL                           | Medtech               | GENEVE    | http://www.microleman.com                    |
| Microscan Service SA                      | Service               | VAUD      | http://www.microscan.ch                      |
| Microsens SA                              | Medtech               | NEUCHATEL | http://www.microsens.ch                      |
| Mikron Holding AG                         | Medtech               | BERNE     | http://www.mikron-tg.com                     |
| Milian SA                                 | Medtech               | GENEVE    | http://www.milian.com                        |
| Milupa SA (Danone)                        | Nutrition             | FRIBOURG  | http://www.milupa.ch                         |
| Mindmaze SA                               | Medtech               | VAUD      | http://www.mindmaze.ch                       |
| Mintaka Medical Research Foundation       | Fondation/Association | GENEVE    | http://www.mintakafoundation.com             |
| MMV Medicines For Malaria Venture         | Fondation/Association | GENEVE    | http://www.mmv.org                           |
| Moinas & Savoye Sarl                      | Service               | GENEVE    | http://www.msc-ip.com                        |
| Monnier & Zahner AG                       | Medtech               | BERNE     | http://www.monnier-zahner.ch                 |
| Mosimann Développement                    | Medtech               | VAUD      |  |
| Motilis Medica SA                         | Medtech               | VAUD      | http://www.motilis.com                       |
| MPS Precimed SA                           | Medtech               | BERNE     | http://www.mps-precimed.com                  |
| Multiple Dimensions AG                    | Medtech               | BERNE     | http://www.multipledim.com                   |
| Mycotec SA                                | Service               | NEUCHATEL | http://www.mycotec.ch                        |
| Mymetics SA                               | Biotech               | VAUD      | http://www.mymetics.com                      |
| MyoPowers Medical Technologies SA         | Medtech               | VAUD      | http://www.myopowers.com                     |
| Myotest SA                                | Medtech               | VALAIS    | http://www.myotest.ch                        |
| Nano Bridging Molecules SA                | Medtech               | VAUD      | http://www.nbmolecules.com                   |
| Nanolive SA                               | Medtech               | VAUD      | http://www.nanolive.ch                       |
| Nanologica Pure Sarl                      | Service               | JURA      |  |
| NanoWorld Technologies Sarl               | Medtech               | NEUCHATEL | http://www.nanoworldtechnologies.com         |
| Naturalps Sarl                            | Cosmétique            | VAUD      | http://www.naturalps.ch/                     |
| NayaMed International Sarl                | Medtech               | VAUD      | https://www.nayamed.com                      |
| NBB Biotech GmbH                          | Service               | FRIBOURG  | http://www.nbbbiotech.com                    |
| Neo Medical SA                            | Medtech               | VAUD      | https://neomedicalinc.com/                   |
| Neocutis SA                               | Cosmétique            | VAUD      | http://www.neocutis.com                      |
| Neode Parc technologique et Industriel SA | Incubateur            | NEUCHATEL | http://www.neode.ch/                         |
| Neomed Medical SA                         | Medtech               | GENEVE    | http://www.neomedmedical.ch                  |
| NeoMed Sarl                               | investisseur          | GENEVE    | http://www.neomed.net                        |
| Nestlé Health Science SA                  | Biotech               | VAUD      | https://www.nestlehealthscience.fr/          |
| Nestlé Institute of Health Sciences SA    | Biotech               | VAUD      | http://www.nestleinstitutehealthsciences.com |
| Nestlé SA                                 | Nutrition             | VAUD      | http://www.nestle.ch                         |
| NetModule AG                              | Medtech               | BERNE     | http://www.netmodule.com                     |
| Neurix SA                                 | Service               | GENEVE    | http://www.neurix.ch                         |
| NeuroAssets sarl                          | Service               | VAUD      | http://www.neuroassets.com                   |
| Neurolite AG                              | Medtech               | BERNE     | http://www.neurolite.ch                      |



| COMPANY NAME                             | MAIN SECTOR  | CANTON    | INTERNET  |
|--|--------------|-----------|---|
| Nitto Denko Europe Technical Centre SARL | Medtech      | VAUD      | <a href="http://www.nitto.com/">http://www.nitto.com/</a>                                 |
| Novagraaf International SA               | Service      | GENEVE    | <a href="http://www.novagraaf.ch">http://www.novagraaf.ch</a>                             |
| Novartis Consumer Health SA              | Pharma       | VAUD      | <a href="http://www.consumer-health.ch">http://www.consumer-health.ch</a>                 |
| Novassay SA                              | Pharma       | VAUD      | <a href="http://novassay.com/">http://novassay.com/</a>                                   |
| Novimmune SA                             | Biotech      | GENEVE    | <a href="http://www.novimmune.com">http://www.novimmune.com</a>                           |
| Novipart Sarl                            | Service      | VALAIS    | <a href="http://www.novipart.com">http://www.novipart.com</a>                             |
| Novo Business Consultants AG             | Service      | BERNE     | <a href="http://www.novo-bc.ch">http://www.novo-bc.ch</a>                                 |
| Novoglas AG                              | Medtech      | BERNE     | <a href="http://www.novoglas.ch">http://www.novoglas.ch</a>                               |
| Nr1club                                  | Service      | VAUD      | <a href="http://www.nr1club.ch">http://www.nr1club.ch</a>                                 |
| Nufer Medical AG                         | Medtech      | BERNE     | <a href="http://www.nufer-medical.ch">http://www.nufer-medical.ch</a>                     |
| Numelec SA                               | Medtech      | GENEVE    | <a href="http://www.numelec.com">http://www.numelec.com</a>                               |
| Nutricia SA                              | Nutrition    | FRIBOURG  | <a href="http://www.nutricia.ch">http://www.nutricia.ch</a>                               |
| Nutrimedis SA                            | Nutrition    | FRIBOURG  | <a href="http://www.nutrimedis.ch">http://www.nutrimedis.ch</a>                           |
| NV Log SA                                | Service      | GENEVE    | <a href="http://www.nvlogistics.com">http://www.nvlogistics.com</a>                       |
| ObsEva SA                                | Biotech      | GENEVE    | <a href="http://www.obseva.com">http://www.obseva.com</a>                                 |
| Obtech Medical Sarl                      | Medtech      | NEUCHÂTEL | <a href="http://www.jnj.com">http://www.jnj.com</a>                                       |
| Odlander Fredrikson SA/ HealthCap        | Investisseur | VAUD      | <a href="http://www.healthcap.eu">http://www.healthcap.eu</a>                             |
| Odinelixr SA                             | Cosmétique   | VALAIS    | <a href="http://www.odinelixr.ch">http://www.odinelixr.ch</a>                             |
| Odysis SA                                | Service      | VAUD      | <a href="http://www.odysis.com">http://www.odysis.com</a>                                 |
| Omega Statistical Consulting             | Service      | VAUD      | <a href="http://www.omegastatoo.ch">http://www.omegastatoo.ch</a>                         |
| OmniScience SA                           | Service      | GENEVE    | <a href="http://www.omniscience-ltd.com">http://www.omniscience-ltd.com</a>               |
| OMPI                                     | Service      | GENEVE    | <a href="http://www.wipo.int">http://www.wipo.int</a>                                     |
| OncoEthix SA                             | Biotech      | VAUD      | <a href="http://www.oncoethix.com">http://www.oncoethix.com</a>                           |
| ONCommit Sarl                            | Service      | VAUD      | <a href="http://oncommit.ch/home-francais.html">http://oncommit.ch/home-francais.html</a> |
| One Drop Diagnostic Sarl                 | Medtech      | NEUCHÂTEL | <a href="http://www.onedropdiagnostics.com">http://www.onedropdiagnostics.com</a>         |
| OPI                                      | Service      | GENEVE    | <a href="http://www.opi.ch">http://www.opi.ch</a>   |
| Orphee SA                                | Medtech      | GENEVE    | <a href="http://www.orphee-medical.com">http://www.orphee-medical.com</a>                 |
| Ortho-Team AG                            | Medtech      | BERNE     | <a href="http://www.ortho-team.ch">http://www.ortho-team.ch</a>                           |
| Ortho.Kern SA                            | Medtech      | VAUD      | <a href="http://www.ortho-kern.ch">http://www.ortho-kern.ch</a>                           |
| Orthoglobal Sarl                         | Service      | VAUD      | <a href="http://www.orthoglobal.ch">http://www.orthoglobal.ch</a>                         |
| Oscimed SA                               | Medtech      | NEUCHÂTEL | <a href="http://www.oscimedsa.com">http://www.oscimedsa.com</a>                           |
| Osterwalder AG                           | Medtech      | BERNE     | <a href="http://www.osterwalder.com">http://www.osterwalder.com</a>                       |
| Outcome Europe Sarl                      | Service      | VAUD      | <a href="http://www.outcome.com">http://www.outcome.com</a>                               |
| P Niklaus SA                             | Medtech      | GENEVE    | <a href="http://www.niklaus-sa.com">http://www.niklaus-sa.com</a>                         |
| P&TS SA                                  | Service      | NEUCHÂTEL | <a href="http://www.patentattorneys.ch">http://www.patentattorneys.ch</a>                 |
| Pact & Partners International            | Service      | VAUD      | <a href="http://www.pactpartners.com">http://www.pactpartners.com</a>                     |
| PACTT                                    | Recherche    | VAUD      | <a href="http://www.pactt.ch/">http://www.pactt.ch/</a>                                   |
| PAP Cosmetics Sciences SA                | Cosmétique   | VALAIS    |   |
| PaxVax Berna GmbH                        | Pharma       | BERNE     | <a href="http://paxvax.com">http://paxvax.com</a>   |
| PB&B SA                                  | Cosmétique   | VAUD      | <a href="http://www.pbtech.ch">http://www.pbtech.ch</a>                                   |
| Pearlwater Mineralquellen AG             | Nutrition    | VALAIS    | <a href="http://">http://</a>   |
| Pen-fix Sarl                             | Medtech      | JURA      | <a href="http://www.pen-fix.ch">http://www.pen-fix.ch</a>                                 |
| Petipierre SA                            | Medtech      | NEUCHÂTEL | <a href="http://www.petipierre.ch">http://www.petipierre.ch</a>                           |
| Petz Industries AG                       | Medtech      | FRIBOURG  | <a href="http://www.petz-industries.com/">http://www.petz-industries.com/</a>             |
| PFL Antralux SA                          | Medtech      | NEUCHÂTEL | <a href="http://www.precel.ch/">http://www.precel.ch/</a>                                 |
| PFM Medical CPP SA                       | Medtech      | NEUCHÂTEL | <a href="http://www.cpps-wiss.ch">http://www.cpps-wiss.ch</a>                             |
| PGT Healthcare                           | Pharma       | GENEVE    | <a href="http://www.pg.com">http://www.pg.com</a>   |
| Pharma Consulting Marion Senn GmbH       | Medtech      | BERNE     | <a href="http://www.pharmaconsulting.ch">http://www.pharmaconsulting.ch</a>               |
| Pharma Futura SA                         | Service      | VALAIS    | <a href="http://www.nutritionidusport.ch">http://www.nutritionidusport.ch</a>             |
| Pharmadev SA                             | Cosmétique   | GENEVE    | <a href="http://www.pharmadev.ird.fr/">http://www.pharmadev.ird.fr/</a>                   |
| PharmAlp SA                              | Nutrition    | VALAIS    | <a href="http://www.pharmalp.ch">http://www.pharmalp.ch</a>                               |
| PharmaSys                                | Service      | NEUCHÂTEL | <a href="http://www.pharmasys.fr">http://www.pharmasys.fr</a>                             |
| Pharmatic AG                             | Service      | BERNE     | <a href="http://www.pharmatic.ch">http://www.pharmatic.ch</a>                             |
| Phasis Sarl                              | Medtech      | GENEVE    | <a href="http://www.phasis.ch">http://www.phasis.ch</a>                                   |
| PhenoSystems SA                          | Service      | VAUD      | <a href="http://www.phenosystems.com">http://www.phenosystems.com</a>                     |
| Phonak Communication AG                  | Medtech      | FRIBOURG  | <a href="http://www.phonak-communications.com">http://www.phonak-communications.com</a>   |
| Photoderma SA                            | Medtech      | VAUD      | <a href="http://www.photoderma.com">http://www.photoderma.com</a>                         |
| PHT Corporation Sarl                     | Service      | GENEVE    | <a href="http://www.phtcorp.com">http://www.phtcorp.com</a>                               |
| Phyt-Inov SA                             | Cosmétique   | JURA      | <a href="http://www.phyt-inov.com">http://www.phyt-inov.com</a>                           |
| Phyto Concept Conseil SA                 | Service      | VALAIS    | <a href="http://">http://</a>   |
| PhytoArk SA                              | Incubateur   | VALAIS    | <a href="http://www.phytoark.ch">http://www.phytoark.ch</a>                               |
| Phytomed AG                              | Cosmétique   | BERNE     | <a href="http://www.phytomed.ch">http://www.phytomed.ch</a>                               |
| Phytopharma SA                           | Pharma       | FRIBOURG  | <a href="http://www.phytopharma.ch">http://www.phytopharma.ch</a>                         |
| Pibor Iso SA                             | Medtech      | JURA      | <a href="http://www.pibor.ch">http://www.pibor.ch</a>                                     |

| COMPANY NAME                   | MAIN SECTOR           | CANTON    | INTERNET  |
|--------------------------------|-----------------------|-----------|---|
| Picodrill SA                   | Medtech               | VAUD      |   |
| Pictet Alternative Advisors SA | Investisseur          | GENEVE    | <a href="http://www.pictet.ch">http://www.pictet.ch</a>                               |
| Piguet Frères & Cie SA         | Medtech               | VAUD      | <a href="http://www.piguet-freres.ch">http://www.piguet-freres.ch</a>                 |
| Pixon Engineering SA           | Service               | VALAIS    | <a href="http://www.pixon-ch.com">http://www.pixon-ch.com</a>                         |
| Plaspaq SA                     | Medtech               | FRIBOURG  | <a href="http://www.plaspaq.ch">http://www.plaspaq.ch</a>                             |
| Platinn                        | Service               | FRIBOURG  | <a href="http://www.platinn.ch">http://www.platinn.ch</a>                             |
| Polar Electro Europe B.V.      | Medtech               | NEUCHÂTEL | <a href="http://www.polar.com">www.polar.com</a>                                      |
| Polydec SA                     | Medtech               | BERNE     | <a href="http://www.polydec.ch">http://www.polydec.ch</a>                             |
| Polytech Ventures              | investisseur          | VAUD      | <a href="https://polytechecosystem.vc">https://polytechecosystem.vc</a>               |
| Precipart SA                   | Medtech               | BERNE     | <a href="http://www.precipart.ch">http://www.precipart.ch</a>                         |
| Preclin Biosystems AG          | Service               | VAUD      | <a href="http://www.preclnbiosystems.com">http://www.preclnbiosystems.com</a>         |
| Predige SA                     | Cosmétique            | VAUD      | <a href="http://www.les-naturelles.com">http://www.les-naturelles.com</a>             |
| PreenTec AG                    | Medtech               | FRIBOURG  | <a href="http://www.prentec.ch">http://www.prentec.ch</a>                             |
| PregLem SA (Gedeon Richter)    | Biotech               | GENEVE    | <a href="http://www.preglem.com">http://www.preglem.com</a>                           |
| Pretec AG Metrology            | Medtech               | BERNE     | <a href="http://www.pretec.ch">http://www.pretec.ch</a>                               |
| Prexton Therapeutics           | Biotech               | GENEVE    | <a href="http://www.prextontherapeutics.com">http://www.prextontherapeutics.com</a>   |
| Primequal SA                   | Medtech               | GENEVE    | <a href="http://www.primequal.com">http://www.primequal.com</a>                       |
| Pro Valplantes SA              | Nutrition             | VALAIS    | <a href="http://www.valplantes.ch">http://www.valplantes.ch</a>                       |
| Produits Dentaires SA          | Medtech               | VAUD      | <a href="http://www.pdsa.ch">http://www.pdsa.ch</a>                                   |
| Protec Medical Sarl            | Medtech               | GENEVE    | <a href="http://www.protec-shop.ch">http://www.protec-shop.ch</a>                     |
| Proxilab Analyses Médicales SA | Service               | VAUD      | <a href="http://www.proxilab.ch">http://www.proxilab.ch</a>                           |
| PulmonX International Sarl     | Medtech               | NEUCHÂTEL | <a href="https://www.pulmonx.com/">https://www.pulmonx.com/</a>                       |
| Pure by Switzerland SA         | Cosmétique            | JURA      |   |
| PX Dental SA                   | Medtech               | NEUCHÂTEL | <a href="http://www.pxdental.com">http://www.pxdental.com</a>                         |
| QGel SA                        | Service               | VAUD      | <a href="http://www.qgelbio.com">http://www.qgelbio.com</a>                           |
| Qloudlab SA                    | Medtech               | VAUD      | <a href="http://qloudlab.com">http://qloudlab.com</a>                                 |
| Qualimatest SA                 | Medtech               | GENEVE    | <a href="http://www.qmt.ch">http://www.qmt.ch</a>                                     |
| Qualimetro SA                  | Medtech               | VAUD      |   |
| Quantum Pharmaceuticals SA     | Cosmétique            | NEUCHÂTEL | <a href="http://quantumpharmaceuticals.com">http://quantumpharmaceuticals.com</a>     |
| Quartz Bio SA                  | Service               | GENEVE    | <a href="http://www.quartzbio.com">http://www.quartzbio.com</a>                       |
| Quotient Suisse SA             | Service               | VAUD      | <a href="http://www.quotientbd.com">http://www.quotientbd.com</a>                     |
| Qwane Bioscience SA            | Medtech               | VAUD      | <a href="http://www.qwane.com">http://www.qwane.com</a>                               |
| R-Action Distribution Sarl     | Medtech               | VAUD      | <a href="http://www.radistribution.com">http://www.radistribution.com</a>             |
| Realtech Consulting            | Service               | VAUD      | <a href="http://www.realtch.com/en/index.cfm">http://www.realtch.com/en/index.cfm</a> |
| Recomatic SA                   | Medtech               | JURA      | <a href="http://www.grouperecomatic.ch/">http://www.grouperecomatic.ch/</a>           |
| Regen Lab SA                   | Biotech               | VAUD      | <a href="http://www.regenlab.com">http://www.regenlab.com</a>                         |
| RegenHU SA                     | Medtech               | FRIBOURG  | <a href="http://www.regenhu.com">http://www.regenhu.com</a>                           |
| RehaxOne SA                    | Medtech               | VALAIS    | <a href="http://www.rhaxone.com">http://www.rhaxone.com</a>                           |
| Republic of Innovation         | Service               | VAUD      | <a href="http://republic-of-innovation.ch">http://republic-of-innovation.ch</a>       |
| ReseaChem GmbH                 | Service               | BERNE     | <a href="http://www.reseachem.ch">http://www.reseachem.ch</a>                         |
| Reuteler & Cie SA              | Service               | VAUD      | <a href="http://www.reuteler.net">http://www.reuteler.net</a>                         |
| RF Pharmaceuticals Sarl        | Service               | GENEVE    |   |
| Rheon Medical SA               | Medtech               | VAUD      | <a href="http://www.rheonmedical.com/">http://www.rheonmedical.com/</a>               |
| RiboVax Biotechnologies SA     | Service               | GENEVE    |   |
| Ridepharm Consulting Sarl      | Service               | VALAIS    | <a href="http://www.ridapharm.com">http://www.ridapharm.com</a>                       |
| Riotex AG                      | Cosmétique            | BERNE     | <a href="http://www.riotex.ch">http://www.riotex.ch</a>                               |
| RNI Consulting Healthcare Sarl | Service               | VALAIS    | <a href="http://www.rni-conseil.com/">http://www.rni-conseil.com/</a>                 |
| Rodanotech Sarl                | Service               | GENEVE    | <a href="http://www.rodanotech.ch">http://www.rodanotech.ch</a>                       |
| Roewasys AG                    | Medtech               | BERNE     | <a href="http://www.roewasys.com">http://www.roewasys.com</a>                         |
| Rofin Lasag AG                 | Medtech               | BERNE     | <a href="http://www.lasag.ch">http://www.lasag.ch</a>                                 |
| Romédic SA                     | Medtech               | VAUD      |   |
| Rosin Entreprise Sarl          | Medtech               | VAUD      | <a href="http://www.rosin-ent.com">http://www.rosin-ent.com</a>                       |
| Ruetschi Technology AG         | Medtech               | VAUD      | <a href="http://www.ruetschi.com">http://www.ruetschi.com</a>                         |
| Rüfenacht AG                   | Medtech               | BERNE     | <a href="http://www.starbowl.ch">http://www.starbowl.ch</a>                           |
| S&S Sarl                       | Medtech               | BERNE     | <a href="http://www.ssgmit.com">http://www.ssgmit.com</a>                             |
| Safrima AG                     | Medtech               | BERNE     | <a href="http://www.safrima.ch">http://www.safrima.ch</a>                             |
| Sage Products Sarl             | Medtech               | GENEVE    | <a href="http://www.sageproductsglobal.com">http://www.sageproductsglobal.com</a>     |
| Sanakvo Fondation              | Fondation/Association | VALAIS    | <a href="http://www.sanakvo.org">http://www.sanakvo.org</a>                           |
| Sanaro SA                      | Nutrition             | VALAIS    | <a href="http://www.sanaro.ch">http://www.sanaro.ch</a>                               |
| Sandozmedica Ltd               | Service               | VAUD      | <a href="http://www.sandozmedica.com">http://www.sandozmedica.com</a>                 |
| Saniswiss SA                   | Service               | GENEVE    | <a href="http://www.saniswiss.com">http://www.saniswiss.com</a>                       |
| Sanitex SA                     | Medtech               | JURA      | <a href="http://www.sanitex.ch">http://www.sanitex.ch</a>                             |
| Sankom SA                      | Nutrition             | JURA      | <a href="http://www.sankom.com">http://www.sankom.com</a>                             |
| Sanofi-Aventis (Suisse) SA     | Pharma                | GENEVE    | <a href="http://www.sanofi-aventis.ch">http://www.sanofi-aventis.ch</a>               |



| COMPANY NAME   | MAIN SECTOR | CANTON    | INTERNET   |
|--|-------------|-----------|--|
| Santen Switzerland SA                                | Pharma      | GENEVE    | www.santen.com                                   |
| Saphetor SA  | Service     | VAUD      | http://saphetor.com                              |
| Saphirwerk AG  | Medtech     | BERNE     | http://www.saphirwerk.com                        |
| SATYAtek SA  | Medtech     | VAUD      | http://www.satyatek.com                          |
| SAV-IOL SA   | Medtech     | NEUCHATEL | http://www.sav-iol.com/                          |
| SBG - Healthcare Strategic Marketing & Communication | Service     | VAUD      | http://www.sbg-marcom.ch                         |
| Schaerer Medical AG                                  | Medtech     | BERNE     | http://www.schaerermayfield.com                  |
| Schlafli Engineering AG                              | Medtech     | BERNE     | http://www.schlafli.ch                           |
| Schneider Intellectual Property                      | Service     | VAUD      | http://www.sv-ip.com                             |
| ScienceVisuals Sarl                                  | Service     | VAUD      | http://www.visualbiotech.ch                      |
| Scientis Pharma SA                                   | Pharma      | GENEVE    | http://www.scientispharma.ch/fr/cysteamine_cream |
| Scitec Research SA                                   | Service     | VAUD      | http://www.scitec-research.com                   |
| SDI Surgical Device International Sarl               | Medtech     | BERNE     | http://www.sdigmbh.ch                            |
| Second Sight Medical Products Sarl                   | Medtech     | VAUD      | http://www.secondsight.com/?lang=fr              |
| Sedia Medizintechnik AG                              | Service     | FRIBOURG  | http://www.sedia.ch                              |
| Selexis SA   | Biotech     | GENEVE    | http://www.selexis.com                           |
| Semadeni AG  | Medtech     | BERNE     | http://www.semadeni.com                          |
| SensArs Neuroprosthetics Sarl                        | Medtech     | VAUD      | http://www.sensars.com/                          |
| Sensimed SA  | Medtech     | VAUD      | http://www.sensimed.ch                           |
| Sensogram Technologies AG                            | Medtech     | BERNE     | http://www.sensogram.com                         |
| Serolab SA   | Pharma      | VAUD      | http://www.serolab.ch                            |
| SeroMer Holding SA                                   | Biotech     | VAUD      | http://www.merckserono.net                       |
| Servicos AG  | Cosmétique  | BERNE     | http://www.servicos.ch                           |
| Servier (Suisse) SA                                  | Pharma      | GENEVE    | http://www.servier.com                           |
| Seyonic SA   | Medtech     | NEUCHATEL | http://www.seyonic.com                           |
| SFM SA   | Service     | VALAIS    | http://www.sfm-magnesium.ch                      |
| SGS M-Scan SA  | Service     | GENEVE    | http://www.sgs.com/en/life-sciences              |
| SGX Sensortech SA                                    | Medtech     | NEUCHATEL | http://www.sgsensortech.com                      |
| SICHH - Swiss Integrative Center for Human Health SA | Recherche   | FRIBOURG  | www.sichh.ch                                     |
| SIE AG Surgical Instrument Engineering               | Medtech     | BERNE     |  |
| Siegfried (Evionnaz)                                 | Pharma      | VALAIS    | http://www.siegfried.ch                          |
| Siemens Suisse SA                                    | Medtech     | VAUD      | http://www.siemens.ch                            |
| Sigatec SA   | Medtech     | VALAIS    | http://www.sigatec.ch                            |
| Signal Processing SA                                 | Medtech     | VAUD      | http://www.signal-processing.com                 |
| SimplicityBio SA                                     | Biotech     | VALAIS    | http://www.simplicitybio.com                     |
| Sintetica-Bioren SA                                  | Pharma      | NEUCHATEL | http://www.sintetica.com                         |
| Sirad SA   | Medtech     | NEUCHATEL | http://www.sirad.ch                              |
| SISPha SA  | Service     | VALAIS    | http://www.sispha.com                            |
| Skin Cell Technologies, Benathan                     | Service     | VALAIS    |  |
| Smartcanula Sarl                                     | Medtech     | VAUD      | http://www.smartcanula.com                       |
| SmartCardia SA                                       | Medtech     | VAUD      | http://www.smartcardia.com                       |
| SmartGene Services Sarl                              | Medtech     | VAUD      | http://www.smartgene.ch                          |
| Smile Line SA  | Medtech     | BERNE     | http://www.smileline.ch                          |
| SMR Engineering & Development SA                     | Medtech     | BERNE     | http://www.smr.ch                                |
| Snortec Sarl   | Medtech     | GENEVE    | www.snortec.ch/                                  |
| Socar Research SA                                    | Service     | VAUD      | http://www.socar-research.com                    |
| Société industrielle de Sonceboz SA                  | Medtech     | BERNE     | http://www.sonceboz.com/en/medtech               |
| Socorex Isba SA                                      | Medtech     | VAUD      | http://www.socorex.com                           |
| Solae Europe SA                                      | Nutrition   | GENEVE    | http://www.solae.com                             |
| Solid Drug Development SA                            | Service     | GENEVE    | http://www.soliddrugdevelopment.com              |
| Sompharmaceuticals SA                                | Pharma      | VAUD      | http://www.sompharmaceuticals.com                |
| Sophia Genetics SA                                   | Service     | VAUD      | http://www.sophiagenetics.com                    |
| Spagyros SA  | Service     | JURA      | http://www.spagyros.ch                           |
| SpineArt SA  | Medtech     | GENEVE    | http://www.spineart.ch                           |
| Spinomix SA  | Medtech     | VAUD      | http://www.spinomix.com                          |
| SpirAlps SA  | Nutrition   | VALAIS    | http://www.spiralps.ch                           |
| SP Solutions SA                                      | Service     | VALAIS    | http://www.spsolutions.ch                        |
| St. Jude Medical GVA Sarl                            | Medtech     | GENEVE    | https://www.sjmglobal.com                        |
| Staar Surgical AG                                    | Medtech     | BERNE     | http://www.staar.com                             |
| Startech Consulting - Lai                            | Service     | VAUD      | http://www.startech-consulting.ch/               |
| Station de recherche Agroscope Changins-Wädenswil    | Service     | VALAIS    | http://www.agroscope.admin.ch                    |
| Steiger Galvanotechnique SA                          | Medtech     | FRIBOURG  | http://www.innosurf.ch                           |
| Stemedica International SA                           | Biotech     | VAUD      | http://www.stemedica.com                         |
| Stemergie Biotechnology SA                           | Biotech     | GENEVE    | http://www.stemergie.com                         |

| COMPANY NAME  | MAIN SECTOR           | CANTON    | INTERNET                                 |
|---|-----------------------|-----------|--|
| Stericenter SA  | Medtech               | VAUD      | http://www.steriswiss.ch                 |
| StenSwiss Sarl  | Medtech               | GENEVE    | http://www.steriswiss.ch                 |
| Stiftung Competence Center for Medical Technology (CCMT)              | Recherche             | BERNE     | http://www.comedtech.ch                  |
| Stiftung für Technologische Innovation                                | Fondation/Association | BERNE     | http://www.sti-stiftung.ch               |
| Stoppani AG   | Service               | BERNE     | http://www.stoppani.com                  |
| Stragen Pharma SA   | Pharma                | GENEVE    | http://www.stragen-pharma.com            |
| Stratarium Sarl   | Service               | VAUD      | http://www.stratarium.com                |
| Straumann Villeret SA   | Medtech               | BERNE     | http://www.straumann.com                 |
| Stryker Osteonics SA  | Medtech               | VAUD      | http://www.stryker.ch                    |
| Stryker Spine SA  | Medtech               | NEUCHATEL | http://www.stryker.ch                    |
| Suisse Med Technologies SA  | Medtech               | VALAIS    | http://www.suissemt.com                  |
| Suisselle SA  | Cosmétique            | VAUD      | http://www.suisselle.ch                  |
| Sunrise Medical AG  | Medtech               | BERNE     | http://www.sunrisemedical.ch             |
| Sunstar Suisse SA   | Cosmétique            | VAUD      | http://www.sunstar.com                   |
| Supply Chain Operations SA  | Service               | VAUD      | http://supplychainoperations.ch          |
| Surcotec SA   | Medtech               | GENEVE    | http://www.surcotec.ch                   |
| SUSS MicroOptics SA   | Medtech               | NEUCHATEL | http://www.suss-microoptics.com          |
| Swiss Arab BioPharma  | Pharma                | GENEVE    |  |
| Swiss Beauty Technologies SA  | Cosmétique            | VALAIS    | http://                                  |
| Swiss Biotech Center  | Service               | VALAIS    | http://www.swissbiotech.org              |
| Swisscom Ventures   | investisseur          | VAUD      | https://www.swisscom.ch/en/ventures.html |
| Swiss Dental Material SA  | Medtech               | VALAIS    | http://www.sdm-sa.com                    |
| Swiss Digital Health  | Service               | VALAIS    | http://www.swissdigitalhealth.com        |
| Swiss Federal Institute of Intellectual Property                      | Service               | BERNE     | https://www.ige.ch                       |
| SIB Swiss Institute of Bioinformatics                                 | Recherche             | GENEVE    | http://www.sib.swiss/                    |
| Swiss Institute of Cell Therapies (SICT)                              | Fondation/Association | GENEVE    | http://www.swiss-ict.ch/                 |
| Swiss Malaria Foundation  | Fondation/Association | VAUD      | http://www.swissmalaria.ch               |
| SWISS TM SA   | Medtech               | GENEVE    | http://www.swiss-tm.com                  |
| Swiss-Medical-Consultants Sarl  | Medtech               | VAUD      | http://www.swiss-medical-consultants.com |
| Swissatec Sarl  | Medtech               | JURA      |  |
| Swissaustral Biotech SA   | Biotech               | VALAIS    | http://www.swissaustral.ch               |
| Swissderm AG  | Cosmétique            | FRIBOURG  | http://www.swissderm.ch                  |
| Swissfillon AG  | Service               | VALAIS    | http://swissfillon.ch                    |
| SwissInnov Product Sarl   | Medtech               | VAUD      | http://www.swissinnov.com/               |
| SwissLens SA  | Medtech               | VAUD      | http://www.swisslens.ch                  |
| Swissmedbank SA   | Medtech               | VAUD      | http://www.swissmedbank.ch/              |
| Swissurgical Sarl   | Medtech               | VAUD      | http://www.swissurgical.com              |
| Switzerland Global Enterprise Lausanne                                | Service               | VAUD      | https://www.s-ge.com                     |
| Switzerland Innovation Park Biel/ Bienne                              | Incubateur            | BERNE     | https://www.switzerland-innovation.com   |
| Swortec SA  | Medtech               | VALAIS    | http://www.swortec.ch                    |
| Symbion Medical Systems Sarl  | Medtech               | VAUD      | http://www.symbion-medical.com           |
| Symbios Orthopédie SA   | Medtech               | VAUD      | http://www.symbios.ch                    |
| Symetis SA  | Medtech               | VAUD      | http://www.symetis.com                   |
| Syngenta Crop Protection Monthey AG                                   | Nutrition             | VALAIS    | http://www.syngenta.com                  |
| Synthes Produktions GmbH  | Medtech               | VALAIS    | http://www.synthes.com                   |
| Sysmex Suisse SA  | Medtech               | VAUD      | http://www.sysmex.ch                     |
| Systems Assembling SA   | Medtech               | NEUCHATEL | http://www.sysa.ch                       |
| Swiss Vitamin Institute   | Service               | VAUD      | www.swissvitamin.ch                      |
| Tagator SA  | Service               | FRIBOURG  | http://www.tagator.com                   |
| Tasly Europe Co., Ltd   | Pharma                | GENEVE    | www.tasly.com                            |
| TauDerma SA   | Cosmétique            | VALAIS    | http://www.tauderma.com/fr/              |
| Tavernier Tschanz   | Service               | GENEVE    | http://www.taverniertschanz.com/         |
| TC Metrix Sarl  | Biotech               | VAUD      | http://www.tcmatrix.ch/                  |
| Techma Consult Sarl   | Service               | VAUD      | http://www.techma-consult.com            |
| TechniCAD Engineering SA  | Service               | VALAIS    | http://www.technicad.ch                  |
| Technilab SA  | Medtech               | GENEVE    |  |
| Techno-Lens SA  | Medtech               | VAUD      | http://www.technolens.ch                 |
| TechnoCut SA  | Medtech               | JURA      | http://www.technocutsa.ch                |
| Technology Park of Saint-Imier  | Incubateur            | BERNE     | https://www.saint-imier.ch               |
| Technology transfer office of the University of Neuchâtel (TTO UniNE) | Recherche             | NEUCHATEL | https://www2.unine.ch                    |
| Techtransfer Fribourg   | Recherche             | FRIBOURG  | https://www.tt-fr.ch                     |
| Temmentec AG  | Cosmétique            | BERNE     | http://www.temmentec.ch                  |
| Tenax SA  | Medtech               | JURA      | http://www.jic.ch/tenax                  |
| The Global Fund to fight Aids, Tuberculosis and Malaria               | Fondation/Association | GENEVE    | http://www.theglobalfund.org             |



| COMPANY NAME   | MAIN SECTOR  | CANTON    | INTERNET                             |
|--|--------------|-----------|--------------------------------------|
| Thermo Fisher Scientific (Ecublens) SARL                   | Medtech      | VAUD      | http://www.thermofisher.com          |
| Tissot Medical Research SA                                 | Medtech      | NEUCHATEL | http://www.tissotmedical.com/        |
| Topotarget Switzerland SA                                  | Biotech      | GENEVE    | http://www.topotarget.com            |
| Tornos SA  | Medtech      | BERNE     | http://www.tornos.com                |
| Toizke & Dreher Scientific SA                              | Service      | GENEVE    | http://www.td-s.com                  |
| Trabold & Co AG  | Medtech      | BERNE     | http://www.trabold.ch                |
| Transcot SA  | Service      | GENEVE    |                                      |
| TRB Chemedica International SA                             | Pharma       | GENEVE    | http://www.trbchemedica.com          |
| TRB Chemedica SA   | Pharma       | VALAIS    | http://www.trbchemedica.com          |
| Trifo Medical Switzerland Sarl                             | Service      | NEUCHATEL | http://www.trifomedical.ch           |
| Trimastek Sarl   | Medtech      | NEUCHATEL | http://www.trimastek.com             |
| Triskel Integrated Services SA                             | Service      | GENEVE    | http://www.triskel.com               |
| UCB Farchim SA   | Pharma       | FRIBOURG  | http://www.ucbsuisse.ch/             |
| UNIBE  | Recherche    | BERNE     | http://www.unibe.ch                  |
| UNIFR  | Recherche    | FRIBOURG  | http://www.unifr.ch                  |
| UNIGE  | Recherche    | GENEVE    | http://www.unige.ch                  |
| UNIL   | Recherche    | VAUD      | http://www.unil.ch                   |
| Unilabs  | Pharma       | VAUD      | http://www.unilabs.ch                |
| Unimed SA  | Medtech      | VAUD      | http://www.unimed.ch                 |
| UNINE  | Recherche    | NEUCHATEL | http://www.unine.ch                  |
| Unitec   | Recherche    | GENEVE    | http://www.unige.ch/unitec           |
| United BioSource (Suisse) SA                               | Service      | GENEVE    | http://www.unitedbiosource.com       |
| UniverCité   | Incubateur   | VAUD      | http://www.univercite.ch             |
| University of Engineering and Management of Vaud (HEIG-VD) | Recherche    | VAUD      | www.heig-vd.ch                       |
| USF Healthcare SA  | Service      | GENEVE    | http://usfhealthcare.com/            |
| V-Watch SA   | Medtech      | GENEVE    |                                      |
| V.I.P.S. Viral Inactivated Plasma Systems SA               | Medtech      | FRIBOURG  | http://www.vipsmedical.com           |
| Valley Road Capital  | investisseur | VAUD      | http://valleyroadcapital.com         |
| Valmed SA  | Medtech      | VALAIS    | http://www.valmed.ch                 |
| Valpharmex SA  | Service      | VALAIS    |                                      |
| Valsynthese SA (Société Suisse des Explosifs Group)        | Pharma       | VALAIS    | http://www.valsynthese.ch            |
| Valtronic Technologies SA                                  | Medtech      | VAUD      | http://www.valtronictechnologies.com |
| Valucept Sarl  | Cosmétique   | GENEVE    | http://www.valucept.com              |
| Vaxeal Holding SA  | Biotech      | VAUD      | http://www.vaxeal-group.com          |
| Vector LifeSciences SA                                     | Biotech      | GENEVE    | http://www.vectorlifesciences.com    |
| VeinPress GmbH   | Medtech      | BERNE     | http://veinpress.com                 |
| Veldana Medical SA   | Medtech      | VAUD      | http://www.pnnmedical.ch             |
| Venner Medical (Suisse) SA                                 | Medtech      | VAUD      | http://www.vennermedical.com         |
| VentureKick  | Service      | VAUD      | http://www.venturekick.ch            |
| Venturelab   | Service      | VAUD      | http://www.venturelab.ch             |
| VeoSource SA   | Medtech      | VAUD      |                                      |
| VI Partners AG   | investisseur | VAUD      | http://www.vipartners.ch             |
| Vifor Pharma   | Pharma       | FRIBOURG  | http://www.viforpharma.ch            |
| Vifor Pharma (OM Pharma)                                   | Pharma       | GENEVE    | http://www.ompharma.ch               |
| Vigisense SA   | Medtech      | GENEVE    | http://www.vigisense.com             |
| Vinci Capital  | investisseur | VAUD      | http://www.vincicapital.ch           |
| Viroblock SA   | Medtech      | GENEVE    | http://www.viroblock.com             |
| Viso Médical SA  | Medtech      | NEUCHATEL |                                      |
| Vivactis (Suisse) SA                                       | Service      | VAUD      | http://www.vivactis.com              |
| Vivier Hi-Tech Park  | Incubateur   | FRIBOURG  | www.vivier.ch                        |
| VIVOS-Dental AG  | Medtech      | FRIBOURG  | http://www.vivosdental.com           |
| Voisin Consulting Sarl                                     | Service      | VAUD      | http://www.voisinconsulting.com      |
| VTU Engineering Schweiz SA                                 | Service      | VALAIS    | http://www.vtu.com                   |
| Vuilleumier Technology SA                                  | Medtech      | BERNE     | http://www.vui-tec.ch                |
| VWR International AG                                       | Service      | VAUD      | http://www.vwr.com                   |
| Vygon Suisse Sarl  | Medtech      | BERNE     | http://www.vygon.ch                  |
| Walgreens Boots Alliance Development GmbH                  | Pharma       | BERNE     | http://www.wbadev.com                |
| Waypoint Capital   | investisseur | GENEVE    | http://www.waypointcapital.net       |
| WestRock Switzerland SA                                    | Biotech      | VALAIS    | http://www.mwvaardex.com             |
| Wibemo SA  | Medtech      | FRIBOURG  | http://www.wibemo.ch                 |
| Willemin-Macodel SA  | Medtech      | JURA      | http://www.willemin-macodel.com      |
| Witech Bassecourt SA                                       | Medtech      | JURA      | http://www.witech-sa.ch              |
| World Medical Device Organization                          | Service      | VAUD      | http://www.wmdo.org                  |
| World Health Organization (WHO)                            | Service      | GENEVE    | http://www.who.int                   |

| COMPANY NAME                              | MAIN SECTOR           | CANTON    | INTERNET                      |
|---|-----------------------|-----------|-------------------------------|
| Wyss Center for Bio and Neuro Engineering | Fondation/Association | GENEVE    | http://www.campusbiotech.ch   |
| Xcelens SA                                | Medtech               | GENEVE    |                               |
| Xigen SA                                  | Biotech               | VAUD      | http://www.xigenpharma.com    |
| Xitact SA                                 | Medtech               | VAUD      | http://www.mentice.com        |
| Y-Parc SA                                 | Incubateur            | VAUD      | http://www.y-parc.ch          |
| Ypsomed AG                                | Medtech               | BERNE     | http://www.ypsomed.com        |
| Yttermed SA                               | Medtech               | VAUD      | http://www.yttermed.ch/       |
| Zanin Swiss Cosmetics                     | Cosmétique            | VALAIS    | http://www.zanin-cosmetics.ch |
| Zermatten Dental                          | Medtech               | VALAIS    |                               |
| Zestagen SA                               | Biotech               | VAUD      | http://www.zestagen.com       |
| Ziemer Ophthalmic Systems AG              | Medtech               | BERNE     | http://www.ziemergroup.com    |
| Zilooa - Ethical Skin Care                | Cosmétique            | NEUCHATEL | http://www.zilooa.com         |
| Zimmer Schweiz GmbH                       | Medtech               | BERNE     | http://www.zimmer.com         |
| Zimmer Surgical SA                        | Medtech               | GENEVE    | http://www.zimmer.com/        |
| Zorion Medical                            | Medtech               | VAUD      | http://www.zorionmedical.com  |
| ZTC Technology SA                         | Medtech               | NEUCHATEL | http://www.ztc-techno.com     |

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