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

technology

BY Bilan

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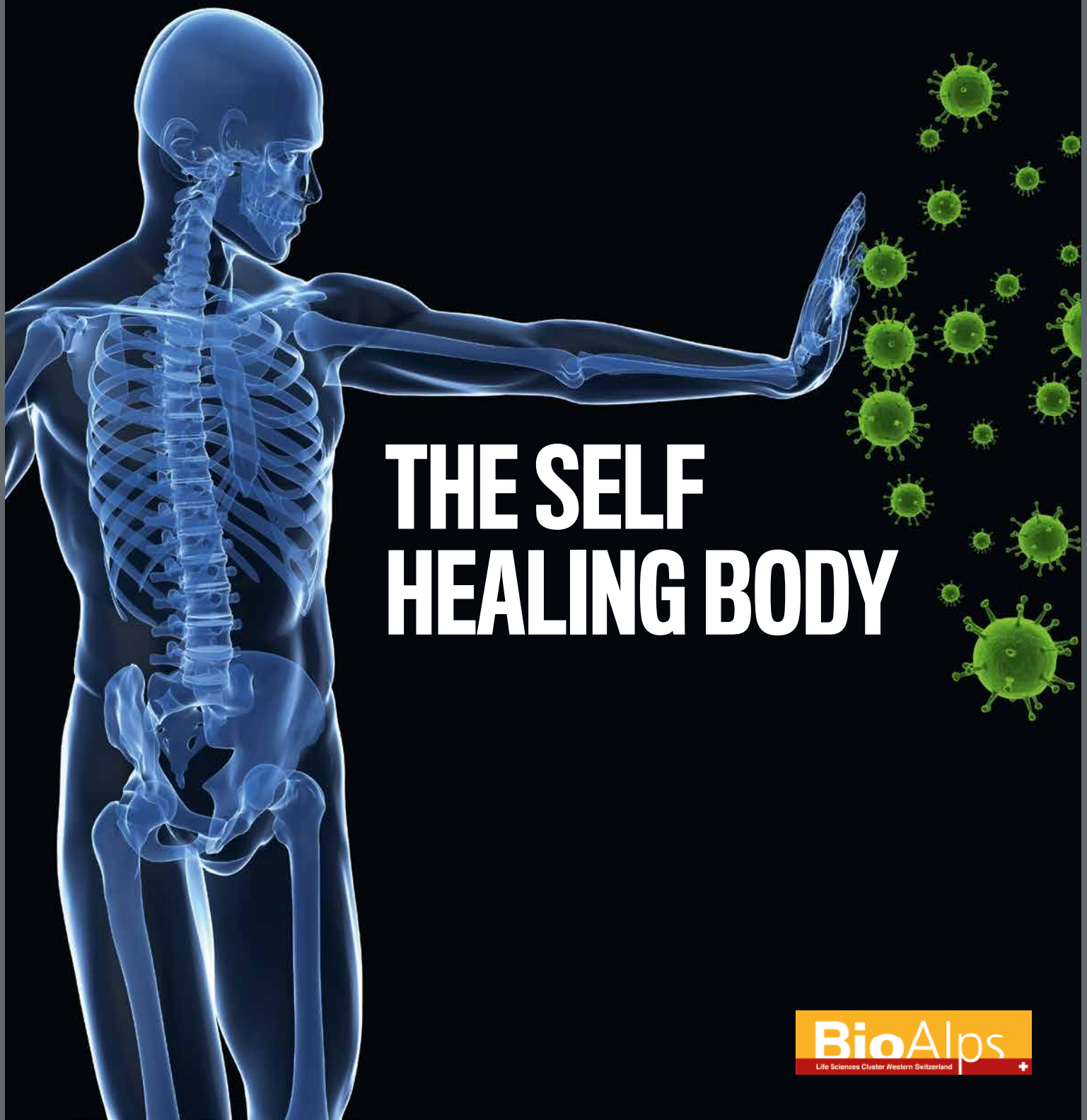


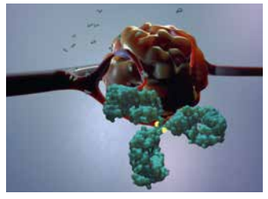
THE SELF HEALING BODY

BioAlps
Life Sciences Cluster Western Switzerland

Immunotherapies: a cure for cancers?

Novel therapies training T-cell in the body to detect and kill cancers are providing new hopes for patients. In Western Switzerland, they are also a field where academic institutions and biopharma companies are fast converging. **BY FABRICE DELAYE**

NEWS & VIEWS



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COUVER: SHUTTERSTOCK

Unleashing the body's own immune system to cure cancer

When the 2018 Nobel Prize in Physiology or Medicine was presented to James Allison of the University of Texas MD Anderson Cancer Center in Houston and Tasuku Honjo of Kyoto University in Japan, it was not only a reward for research that has given cancer patients hope for the future. It was also recognition of therapies that are already curing many of them.

PHOTO: DR

In Western Switzerland, the extraordinary potential of immunotherapies has been embraced enthusiastically by researchers, clinicians, academia and companies. It has triggered all kinds of initiatives gathering forces from academia, pharma and biotech in the Lake Geneva region. After the creation of a Tumour board, where researchers share information with oncologists from the whole region, the Swiss Cancer Centre Leman brings together more than 80 research groups.

This led to Agora a new centre at the CHUV where partners such as the ISREC Foundation, the CHUV, the University of Lausanne, the Swiss Institute of Technology of Lausanne (EPFL), the Ludwig Institute for Cancer Research, the University Hospital of Geneva (HUG) and the University of Geneva gather together 300 researchers and clinicians to develop and apply new cancer therapies under one roof. With about 10,000 new cases of cancer every year in Western Switzerland, this gathering of forces has allowed the region to reach a critical mass for establishing a comprehensive cancer centre as recommended by the US National Institute of Cancer.

For patients, it means the possibility of benefiting faster through novel cancer therapies including during the early phases of clinical trials when all other treatments have failed. For pharma and biotech, it also means better access to cutting edge novel treatments such as T-cell therapies. This has already attracted major pharma such as Roche and Bristol Myers Squibb to the region, and more recently Incyte (see page 26) which is building a new facility to produce immunotherapies.

They add to the efforts by both established local players including Debiopharm and Merck as well as start-ups such as Amal Therapeutics (see p.47) and ADC Therapeutics (see p. 22) which has raised 445 million francs, making it the second unicorn (a start-up valued at more than a billion dollars) to be based in French-speaking Switzerland after neurorehabilitation specialists MindMaze.

That is not to say that immunotherapy is the long expected magic bullet against cancer. The Nobel Prize-awarded checkpoint immunotherapies still only work for a limited number of patients. Activating the immune system may also trigger autoimmune side effects. So there is still a great deal of research to be done, if only to make such therapies more accessible, including in terms of pricing.

That is where the cluster effect of the Health Valley of Western Switzerland plays a major role. As readers will discover in this issue of Technology by Bilan the region is home to many institutions and companies which are translating research from the labs to the patient's bedside in various fields beyond cancer.

From enabling technologies such as Genomsoft's compression technologies for genetic data (see p. 8) to new treatments for inflammatory diseases (see p. 28), medical and pharma research is thriving from Geneva to Bern. The region's knowhow in microtechnologies is also fertile soil for innovation in medtech as illustrated by companies such as aktiia (see p. 42) and Sav-Iol (see p. 45). And with new or expanding infrastructures such as the Marly Innovation Center (see p. 39), the Biopôle (see p. 14) and BioArk (see p. 48), there is more to come.

We hope you will enjoy the many promising discoveries and innovations presented in this issue of Technology by Bilan. Not least because beyond the many opportunities they offer for business, they are already offering effective therapies for millions of patients worldwide.

> "The promises of immunotherapies gather forces from academia, pharma and biotech in the Lake Geneva region."

FABRICE DELAYE
Editor of Technology by Bilan

Health Valley: Driving Evolution, Infusing Revolutions.

Physicists have long sought out their grand "theory of everything". However, it will be biology that provides the single grand concept that brings most aspects of human health, wealth, and happiness together in the upcoming decades. The strength of our economy, our children's resistance to diseases, our lifespan, and even more profound questions, such as what is life and who (or what?) is human, are all subject to the effects of the paradigm shift in life sciences, emerging technologies, and the business acumen of those building industries to extract value from these sciences.

On a more fundamental level, life sciences are being transformed by the global nature of R&D. Like-minded or similar efforts are moving at different rates and locations, with different values, levels of government regulation, different elements of integration, incentives and cost structures. This is where Health Valley comes in, even if we sometimes compete against ourselves. We have to manage these factors and strive to be the best in order to drive evolution and infuse revolutions.

In a sense, we became secure in Switzerland's position as a great life sciences location.However, globalisation is challenging this position. Nations that were once seen as simply producers are becoming creative. Their research targets excellence, they attract and retain the best minds, and, above all, are setting a pace that is unfamiliar to us.

As such, we have to acknowledge that our R&D spend is a very small percentage of global R&D investment. To attract global companies, we need to propose new arguments including cutting-edge, ambitious research capable of breaking down the scientific barriers that still separate us from the solutions the medical world wants. We need to attract the brightest minds, and above all, instill a pioneering and winning spirit among the Health Valley community.

BioAlps has proven an excellent vehicle for promoting our region, but we still need to go further and establish our companies so that they benefit from our fertile environment. We need to launch a new partnership dynamic to involve every stakeholder, including basic & clinical research, start-ups, SMEs, and larger companies. This is Health Valley and I am fully dedicated to helping to energize our community, because we need to evolve and Switzerland needs to change to make the most of its strengths.

This is a fantastic time to be involved in our industry because everyone has recognized both the potential and need for new thinking in Switzerland.

As such, I'm very excited about the future of Health Valley and its core business in biotech & medtech, but particularly about fulfilling the potential of emerging advanced therapies leveraging living cellular or active genetic materials to offer novel treatment modalities. I am pleased to see our government investing heavily in biobanks, genomics programs, immuno-oncology R&D, and gene therapy platforms, meaning we are at the forefront when it comes to understanding the potential of these revolutionary approaches.

It's taken us some time to see some of that work translate into new medicines, but I think we're eventually going to be able to cure certain intractable diseases. Advanced therapies leverage living cells or genetically active compositions to induce metabolic, immunological, or genetic modes of action. The complexity of cell products enables the use of novel approaches, including regenerating damaged tissues, targeting cancers accurately, or modulating the immune system, while gene therapies aim to target the fundamental cause of genetic diseases to fully reverse them. The word "cure" is finally increasingly being used about interventional treatments. This is just the beginning and it's tremendously exciting to be a part of it – it's almost like a space race... why not join us?

> "We need to propose cutting-edge, ambitious research capable of breaking down the scientific barriers that still separate us from the solutions the medical world wants."

PROF. BENOIT DUBUIS
www.healthvalley.ch

PHOTO: DR

Let's look up!

Health Valley and BioAlps: two denominations with typically Swiss geographical characteristics. Valleys and mountains are part of our DNA, of our identity. Our physical environment is in 3D. Don't forget that Switzerland is several hundreds of kilometres away from the sea, but the stratosphere starts only 100km above us. The leading role of Western Switzerland in the fields of Biotechs and Medtechs should also integrate the ambition of growing in the third dimension. Let's look up!

The existence of a valley is tightly linked to surrounding mountains and to rivers flowing through it. The strengths of the Health Valley are the power of research, clinical, industrial and business rivers, creating jobs, fostering local activities and contributing, through substantial exports, to the GHVP (Gross Health Valley Product). The big river is the gathering of thousands of small waterfalls and creeks, the innovation blood of our world. Surrounding mountains are no walls, no borders, but our solid frame. Climbing on the summits of BioAlps gives us opportunities to get the global picture. By the way, when you are at the top, have a look on the other side of the mountain. You will see new colours, different shades, which you can take home as inspirations for improving your business.

The rocks of the mountains provide the stability we need, while keeping enough flexibility to resist earthquakes. This is what BioAlps is for: to give a structure to the Health Valley community, while preserving the agility of ever-changing rivers. In the last two decades, Western Switzerland has been very successful in the health care sector, precisely because we know how to gather small rivers (start-ups), how to extract the power of the high waterfalls (universities, high schools and research institutes) and how to funnel them through the solid rocks of Swiss industry. Yes, we have been smart. We are now leading the way. Let's leverage these successes by integrating the new dimensions of technologies.

It is not often realised that Medtechs is a strong sector of Swiss Industry, with worldwide leaders in dental implants, bone repairs and replacements, hearing aids, cardiac pacemakers and other sophisticated devices. The reasons for this success are to be found in our high level of education, in the skills of our watch makers, in the precision of the machine industry, in the expertise in miniaturisation and automation, in the mastering of material sciences, and certainly in our capacity to cleverly gather all this in innovative synergies. New technologies are emerging or becoming mature enough to be integrated in active implants. For example, we are now able to insert sophisticated electronic devices in the human body to repair dysfunctions of the nervous system. Several research and clinical groups, start-ups and industrial companies of the Health Valley are leaders in deep brain stimulation for alleviating the symptoms of Parkinson's disease, in the management of movement disorders, in rehabilitation after stroke, or in other technologies for the restoration of hearing, seeing or touch. The competencies available in the Health Valley are fertile soil for the quick growth of neuro-technologies. Campus Biotech in Geneva has now become an international focal point in this promising field.

Recent years have seen an explosion of new technologies, disruptive ideas and concepts, mainly arising from the digital revolution. Today's buzz words are Big Data, Artificial Intelligence and Machine Learning. Born to satisfy other technological needs, these powerful tools are now providing unprecedented capabilities to the medical world. Our region is well positioned to leverage our solid experience in health care by integrating these new concepts. We have an opportunity to grow in the third dimension of health.

Let's look up!

> "Our region is well positioned to leverage our solid experience in health care by integrating new concepts."

CLAUDE CLÉMENT
President BioAlps Association
& Chief Technology Officer,
Wyss Center for Bio and Neuroengineering, Campus Biotech Geneva

PHOTO: DR

A flagship building for cancer research in Western Switzerland

Initiated by the ISREC Foundation in 2013, AGORA is the result of a partnership between the University Hospital of Canton of Vaud (CHUV), the University of Lausanne, the Swiss Federal School of Technology in Lausanne (EPFL), the Ludwig Institute for Cancer Research, the University Hospitals of Geneva and the University of Geneva.
Built in 33 months, between October 2015 and June 2018, the AGORA cluster will bring together nearly 300 scientists and clinicians. Most of these specialists in cancer research come from the partner institutions. Physicians, biologists, geneticists, immunologists, bioinformaticians and bioengineers will work together to take on the many challenges posed by this disease, in order to develop and implement novel therapeutic options for cancer patients.
Created by the architectural firm Behnisch Architekten, the AGORA building offers 11'500 m2 of laboratories, technology platforms, offices, conference rooms, a large auditorium and a restaurant. The architecture of the building fosters interactions between disciplines, among researchers, and between established scientists and students. AGORA will also contribute to the community at large and play an important role in helping patients. Communal spaces such as an atrium near the entrance of the building will enable scientists and clinicians to explain treatment processes and the value of ongoing research to the public.

PHOTOS: DR

The Netflix of genomics data

A newly formed start-up has developed big data compression technologies offering the key to genetic medicine for all.

BY FABRICE DELAYE

The cost of sequencing the complete human genome has decreased in 15 years from $1billion to just $1,000 – and a $100 price tag is in sight. At the same time geneticists have discovered thousands of markers – genetic sequences with nucleotide abnormalities – that signal diseases or the risk of developing them. This has opened the door to personalised medicine, the idea of adding a genetic diagnosis to a drug so that it can be prescribed only to patients with the genome characteristics for whom it will be efficient or will have no side effects.

This kind of genetic medicine and its spin-offs based on the presence of certain proteins, particularities of metabolism and so on, is crucial for the pharma industry which sees it as a way to resuscitate drugs abandoned in clinical trials because they were dangerous or inefficient. The estimated market could reach $232 billion by 2025. The US Food and Drug Administration (FDA) has already approved more than 200 therapies associated with genome testing while a further 250 are in the final phase of development.

Claudio Alberti founded GenomSoft to adapt data compression technologies to genetics.

Eight times Facebook for Swiss genomes

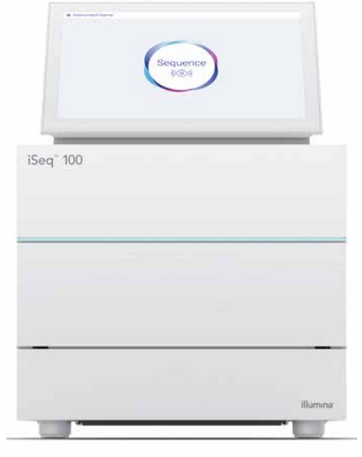
However, the promise of this kind of personalised medicine is limited by technical and economic barriers which block its distribution to a larger population. Sequencing each person's genome produces up to two terabytes of data. Sequencing the genomes of the Swiss population alone would create a staggering 2,400 petabytes of data, eight times bigger than the whole Facebook operation. For the entire human population this corresponds to a five million kilometre-high tower of DVDs. Storing this data, costing around $1,000 per year per terabyte, is already a challenge. But to make the data relevant for personalised medicine, you also have to be able to circulate it reliably and quickly on telecommunications networks.

This problem appeared four years ago on the radar of researcher Claudio Alberti and his team at the Swiss Federal Institute of Technology in Lausanne (EPFL). There, they have been participating for years with the Geneva-based International Organisation for Standardisation (ISO) in the development of data compression technologies that have spawned five generations of MPEG standards from MP3 to ultra HD. "Basically the problem today in health is the same as in digital media 25 years ago," says Alberti. "Standardised compression technologies have enabled massive storage and distribution of music and films. Today these compressed files represent 80% of all that's circulating on the web." But today gigantic genetic data are still stored on discs that are moved by trucks between research centres and hospital laboratories – clearly not a satisfactory solution.

If data compression is the key that enabled Spotify, YouTube and Netflix, Claudio Alberti thinks he has created the equivalent for personalised medicine – GenomSoft, developed with the support of Alberto de Min, a venture capitalist at Preon Capital, part of the family office of Finnish entrepreneur Jari Ovaskainen who made a fortune when he sold its shares in mobile games editors Supercell for several billion euros to SoftBank some years ago.

GenomSoft has just moved to Campus Biotech, a vast science park in the former Merck Serono headquarters in Geneva, and is now starting to deploy its strategy. Since 2014 when the need to compress genomic files was identified, Claudio Alberti and his team have chosen to follow the same open standard path that proved successful for media with MPEG. This brought them back to the international heart of Geneva at the ISO.

Gigantic genetic database are still today stored on discs and moved by trucks.



DNA sequencing machines like the Illumina 100 are producing petabyte of data.

Two years in advance

In this context, a new draft standard called MPEG-G (for genomics) was created under ISO. It comprises a team of international experts, a third of them already based near Lake Geneva. In October 2017, the ISO committee drafted the first version of the standards for genomic file formats and compression. "These are the most critical part of the future agreed standards", Alberti says. "And they should not change significantly until the official publication of the standard next year."

GenomSoft's founders see their intimate familiarity with the future standard as an opportunity for a head start – therefore the launch of Genomsoft.

Alberti continues: "Our advantage is in knowing all the details of a technology that compresses data by a factor of five compared to the best." The company is targeting three segments: next-generation sequencer manufacturers like Illumina and Chinese BGI to encode and thus compress data, hosting facilities where genomic data are stored in various formats that will compress them to reduce their cost, and developers of analytic tools for health professionals.

At Preon Capital, Alberto de Min is optimistic. "We introduce a streaming logic so that users, researchers and doctors will be able to exploit this data even before the file is fully loaded," he explains.

The projected explosion of medical data beyond genomics also offers a wealth of opportunities. From IBM to Google, the big data giants have realised this and are rushing into the health sector. Some of them have spotted GenomSoft and started to discuss partnerships.

With GenomSoft, the biomedical cluster in French-speaking Switzerland has a potential game changer in medical big data comparable to Netflix in the media world.

However, while the company has the advantage of the pioneer, the competition will not sit still and there are many challenges ahead – while GenomSoft's technology removes a major obstacle to the development of personalised medicine, there are still other challenges such as the integration of data analysis, security and compliance with the standards of different health systems.

S-GE helps Biokema conquer China one step at a time

Florence Cousté-Bémer, Head of International Activities at Biokema SA, a veterinary pharmaceutical company based in Crissier (canton of Vaud), asked S-GE for help to enter the Chinese market. **BY SYLVAIN JACCARD, HEAD OF S-GE WESTERN SWITZERLAND**

Sylvain Jaccard, Head of S-GE Western Switzerland.

BIOKEMA is well established in Europe and Japan. For its expansion, the company wanted to conquer other strategically important Asian markets. China has excellent potential for its products, but is very challenging in terms of prices, cultural differences and product registration.

The first step towards China was to commission Switzerland Global Enterprise (S-GE*) to carry out a market study to assess competition, needs in terms of products and the price elasticity of the Chinese market. Result: despite weak prices, there is a place for Biokema in the Chinese market because volumes are promising.

Finding partners

The market study showed that it was necessary to find a local partner to set up in China. S-GE helped the company find potential partners to register and distribute its products. Registering pharmaceutical products in China takes at least two to five years and obtaining an import authorisation can take three years. Based on the profile of the partner sought by BIOKEMA, S-GE and its Swiss Business Hub China selected a handful of Chinese companies. After further discussions, BIOKEMA made its choice. "Finding a Chinese partner on our own would have required a crazy amount of energy. That's why we asked S-GE for help."

Then contract negotiations started. Biokema was then helped by a China-based lawyer provided by S-GE. It took eight months to successfully conclude the contract. What lessons did Biokema's export manager learn from this initial experience in China? "China forces us to take a different approach to improve efficiency and profitability. And this is preparing us to enter other emerging markets!"

*S-GE offers SMEs any type of services relating to business development abroad: individual export strategy consulting, market analysis, business partnering, business trips,

Skills integration, the key to R&D

The Swiss Integrative Center for Human Health (SICHH) in Fribourg is integrating skills to meet the requirements of Industry 4.0

BY DR. JEAN-MARC BRUNNER, CEO OF SICHH

Digital transformation represents both an opportunity and a challenge for companies . It means the work environment is becoming more complex, and requires interdisciplinary knowledge.

The Swiss Integrative Center for Human Health (SICHH) adopts an open-ended way of working. Our private and public clients rely on us for complex R&D mandates which require a wide range of specialised skills.

The integration of skills at SICHH is played out on two levels. Internally, our specialists in bioinformatics, physics, chemistry and biology work closely together to provide innovative solutions tailored to the needs of our clients.

Tailored solutions

Externally, SICHH has created a network of industrial and academic partners to strengthen its internal expertise. Thanks to our six industrial partners, clients benefit from a large network of professors affiliated to academic institutions in Switzerland and get access to the latest generation of research equipment in our laboratories.

We also recognise the central importance of networking in decompartmentalising knowledge and creating new synergies. SICHH Forum organises thematic events several times a year in order to connect the actors of innovation and in October we inaugurated our first Integrative Human Health Day.

We also regularly organise events with our partners including BioAlps and Micronarc. SICHH will be hosting the BioAlps Networking Day 2018, a key event in the life sciences cluster of Western Switzerland.

"Bioinformatics a truly Swiss asset"

What do recent advances in medicine and Switzerland's leading position on the international science scene have in common? A surprising unifying theme, a discipline without which neither would be conceivable, and which also connects many of my life's interests: bioinformatics And it so happens that the institute that federates this discipline in Switzerland is also celebrating its 20th birthday this year.

PHOTO: DR

There are times for pushing relentlessly forward and getting work done. And there are times for looking back at what has been driving you for so long. After 16 years in the Swiss Parliament, I recently shed my politician's skin, but I did not shed the questions and themes I have always had at heart for the country.

Ensuring Switzerland's presence on the international scene is one of these. My years, both on the seats of Parliament and as President of the Commission for Science, Culture and Education, convinced me that, when it comes to Science and Innovation, our country must do all it can to maintain and develop its position abroad. And not only to remain attractive for world-class scientists but also to remain a desirable partner, as recently witnessed with the positive outcome of the Horizon2020 saga.

As a doctor and epidemiologist, public health is another theme that has naturally always been at the heart of my concerns. Epidemiologists are usually preoccupied by the dynamics of diseases in populations taken as a whole: to me, the prospect of adapting treatments to the unique molecular profile of patients is therefore particularly fascinating.

With the growing digitalization of health data and the onset of personalized health, doctors and patients have entered an era of partnership, where decisions are taken together. A drastic change of paradigm blew away hierarchical medicine as we knew it, and with new actors entering the health ecosystem – such as clinical data science experts – working in siloes is no longer an option. Challenges ahead are plentiful, from finding a common language between health actors to transforming research findings into concrete solutions for the benefit of patients.

Twenty years ago, the word "bioinformatics" was not on my agenda. Today, and after 5 years as President of the Foundation Council of the SIB Swiss Institute of Bioinformatics, I have come to realize that this interdisciplinary field, at the crossroads between biology and informatics, actually holds the keys to many of the above-mentioned issues.

Bioinformatics stands out as a truly Swiss asset – in barely two decades, it has become one of the country's gateways to the world. First and foremost, thanks to the country's pioneering act when it created Europe's first national bioinformatics infrastructure in 1998 to support life science research. SIB's remarkable decentralized structure enables it to gather all the highly competitive actors of the domain in a truly collaborative way. Several institutions – including the European organization ELIXIR – followed suit by adopting the same organizational model.

Bioinformatics is also an enabler of personalized health. The Big Data on which individual approaches rely cannot be apprehended without bioinformatics tools, resources, computing power and expertise. As an illustration, the first European non-invasive prenatal test was developed in Switzerland, thanks to algorithms developed at SIB.

When Switzerland decided to create a leading infrastructure for personalized health through its SPHN* initiative, it gave SIB the responsibility of making health data both interoperable and securely accessible for research purposes.

In 2018, SIB is celebrating its twenty years of existence, and I am particularly proud to be lending my support to a major scientific field and an important institution for our country, and be a witness of their development.

"In barely two decades, bioinformatics has become one of the country's gateway to the world."

FELIX GUTZWILLER
President, Swiss Institute of Bioinformatics Foundation Council, Former Senator and Professor Emeritus at the University of Zurich

** Swiss Personalized Health Network*

Protontherapy: a non-invasive way to treat abnormal heart rhythms

A Swiss company is developing a technology to target and destroy tissues responsible for arrhythmia – without the need for anesthetics or hospitalisation **BY FABRICE DELAYE**

Conventional radiotherapy uses beams of electrons or photons to irradiate tissue at different depths in order to destroy cancer cells, but despite their progress these therapies do not prevent beam scattering so that healthy tissue is also destroyed.

Proton therapy, though, using a proton beam – particles carrying a positive charge – has had a great deal of success in recent years because it is much more precise.

It exploits a phenomenon of physics, the Bragg peak, discovered by the British physicist of the same name, in which ionising radiation concentrates in a very specific region while minimising the effect on the surrounding healthy tissue.

Thanks to particle accelerators associated with imaging obtained by MRI, protontherapy exploits this phenomenon to irradiate cancer tissue with exceptional accuracy – to the nearest cell.

These very effective systems for treating certain cancers such as those of the eye or brain has begun to spread, with 64 protontherapy centres in operation worldwide and 43 under construction.

Newly established in Geneva, EBA-Med is poised to exploit this growing infrastructure with technology that opens the field for cardiovascular applications for protontherapy including within the heart.

Non-invasive technology

The researchers who founded the company, Giovanni Leo, who is also a co-founder of Endosense, recently acquired by Saint Jude, and Adriano Garonna, a physicist at CERN, have developed a protontherapy which can selectively target and destroy the tissue responsible for abnormal heart rhythms, a condition known as arrhythmia.

This affects more than 2 per cent of the population – 15 million people in Europe and North America.

With EBA-Med technology, a proton beam mimics the effect of an invasive manual catheter procedure without requiring many hours of procedure by specialised staff and discomfort for the patient.

Its non-invasive and automated treatment means the patient can be treated while lying on a table for 30 minutes without pain and without requiring anesthesia or hospitalisation.

In vivo testing at the in vitro scale

Nagi Bioscience has developed an organism-on-chip technology that could replace animal testing

BY FABRICE DELAYE

A new substance is registered on average every 2.3 seconds, and the efficacy of these new products as well as their safety for human being and environment must be tested. But while in vivo animal testing is increasingly resource-consuming

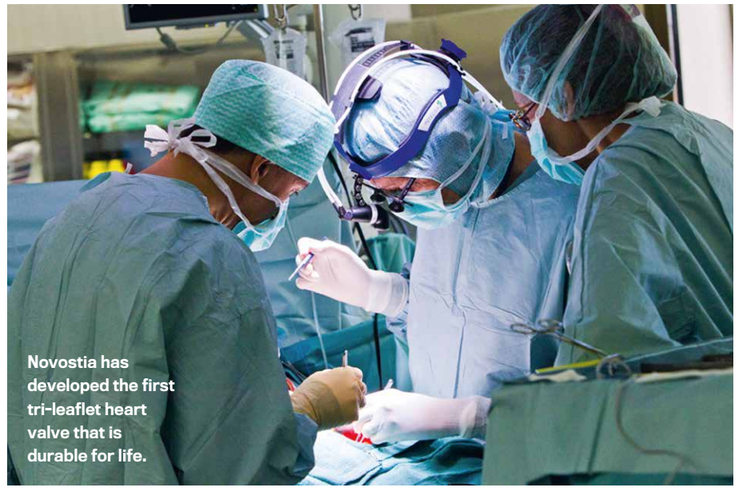
and ethical-issue-prone -- at least 115 million animals are used each year for biomedical research and toxicological testing of chemicals -- alternative in vitro models cannot predict complex organismal responses.

Nagi Bioscience, a spin-off from the Swiss Federal Institute of Technology in Lausanne (EPFL) and funded for its research by the Gebert Ruf Foundation and the European Union, has developed an alternative to animal experiments by filling the gap between in vitro and in vivo tests.

A much needed solution for cosmetics, this first "organism-on-chip" technology allows automated and analysis of microscopic worms (C.Elegans) within miniturised disposable cartridges and their standardised use as alternative model organisms for high-throughput drug or chemical screening. Composed of an analysis device and a patented microfluidic cartridge, this technology allows up to 96 parallel tests.

While animal testing costs the pharma industry more than 7 billion dollars a year, the start-up is primarily aimed in its first phase at the cosmetics industry where these tests have been banned in the European Union since 2013.

In May 2018, Nagi Bioscience won the Lausanne Region Business Award (PERL) in the biotech category.



Novostia has developed the first tri-leaflet heart valve that is durable for life.

An anticoagulation-free durable heart valve

Novostia has developed the first tri-leaflet heart valve that lasts for life and does not require anticoagulation treatment **BY FABRICE DELAYE**

In 2017, 800,000 people worldwide received a mechanical or biological heart valve to prevent a cardiovascular event, the leading cause of death. It is a $3 billion market which is growing by more than 12% a year. However, current heart valves have two defects: mechanical valves are implanted for life but require lifelong anticoagulation therapy that can cause bleeding or thrombosis, while biological valves must be replaced every 10 to 12 years.

The French cardiac surgeon Didier Lapeyre has devoted 25 years of his life to the development of a biocompatible valve which can be implanted for life but whose fluid mechanics make it unnecessary to take anticoagulants. A year ago this innovation became Novostia, a company based in the Neode technology park in Neuchâtel, Switzerland.

Key academic partners

Novostia collaborates with EPFL researchers who have confirmed the choice of materials, in particular a polymer that replaces the carbon of the leaflets, and with the bioengineering centre of the University of Bern (Artorg).

With patents on the sixth generation of its technology and more than 100 positive animal experiments, it is preparing clinical trials with humans within five years, with a commercial objective.

For patients unable to tolerate anticoagulation therapies such as woman of child-bearing age, as well as young patients suffering from Aortic Valve Stenosis due to congenital abnormalities as well as a growing number of people suffering from rheumatic fever in emerging economies, Novostia 's heart valve meets the requirements of these population.

3 questions to Karolyn Chamberlin

Karolyn Chamberlin is the U.S. director of the GGBa, the official investment promotion agency of the cantons of Bern, Fribourg, Vaud, Neuchâtel, Geneva and Valais. As such, she offers tailor-made, confidential, and free of charge support to companies interested in setting up a presence in Western Switzerland. The GGBa has a network of 13 representatives located around the world.

Why is Western Switzerland attractive to U.S. life science companies?

Our region attracts life science entrepreneurs due to its excellent business conditions: the favorable tax environment, the flexible labor laws and the strong availability of R&D, production and management talent. Its central location within Europe is also a big plus.

Since the GGBa established a presence at swissnex Boston and its NYC outpost, how are you splitting your time between both cities?

I am based in New York and visit Boston once or twice a month for a few days. I usually plan my visits around a swissnex event as they provide great networking opportunities. The thriving tech ecosystem of the Boston and New York areas is a fertile ground for my activities; I get to connect with innovative companies on a daily basis.

What do Western Switzerland and the Boston area have in common?

They are among the world's most competitive and dynamic ecosystems for life science. They both have a buzzing start-up scene, with pioneering players in the fields of biopharma, medtech and digital health. Attracted by the strong technological expertise and the presence of innovative companies, the Boston-based start-up accelerator MassChallenge set up camp in Lausanne in 2016 with the support of the GGBa.

Biopôle Lausanne: the campus where immunology scales up

A glimpse behind the community model that enables company development and inter-organisational collaboration and innovation.

BY NASRI NAHAS, CEO BIOPÔLE SA

Shaping new products, designing new efficient immunotherapies, introducing nutritional goods to cancer research… these are just few of the inspiring business projects that visitors will find at Biopôle Lausanne. They all attempt to foster research in life sciences and quickly turn it into solutions for patients.

At Biopôle Lausanne, life sciences companies and academic institutions cover, among other things, the vast field of immunology, with an emphasis on vaccines, antibodies, cell therapies and immune modulators. Leading companies include ADC Therapeutics, Novigenix, Anergis, Mymetics, Gnubiotics and Abionic (see box). Though immuno-oncology represents one of the most important research fields at Biopôle, our community members' expertise spans an impressive number of therapeutic areas, fostering increased exchange and cross-fertilisation of ideas. Further, our corporate and academic members are increasingly aware of the need to act as a community to make a difference. Not only do they share costs including access to core facilities, technology platforms and discounted service offers, but, in particular, they also actively build synergies and long-lasting partnerships.

Nasri Nahas believes in innovation through exchange, experience sharing and proximity.

Multi-discipline to serve innovation

Thanks to the presence of leading research institutes, a lively life sciences industry and a growing portfolio of start-ups, the Health Valley and particularly the Canton of Vaud are a playground for life sciences. Biopôle is at the epicentre of this dynamic region and mirrors the diversity of its stakeholders. Additionally, the campus fosters inter-organisational collaboration that encourages members to learn from each other and come up with novel out-of-the-box solutions. The more pairs of eyes you have looking at a problem, the better the chances of a solution. Because of this community model, whose strength lies in the network, companies can not only develop common business and research projects but, most importantly, can seamlessly liaise to share key learnings and insights.

Access to potential business and research partners

One of the most important features when getting established on campus and becoming a member of the Biopôle community is the access to the privileged network of industry and academic members of the community.

> "Lausanne is the vibrant and growing place to be for innovation in life sciences"

This is easy because of the proximity on site and participation in a variety of networking events organised to help the community stay in touch. We like to think of our role at Biopôle as the enablers of these exchanges and we put a lot of effort into constantly developing additional networking venues, programmes and events to share and challenge research and business insights.

In 2018 two Biopôle companies in the field of immunology, Mymetics Corporation and Anergis, entered into a research collaboration project. The pre-clinical study programme, planned to last until the end of 2019, will evaluate the immunogenicity profile of the Anergis peptides which are designed to treat birch allergy when presented on Mymetics' proprietary virosomes, and will compare the results to Anergis' AllerT product combination. This collaboration perfectly illustrates the community spirit present at Biopôle Lausanne.

In addition, we are especially proud to host leading academic institutes and research groups including the Department of Oncology of the University Hospital of Canton Vaud (CHUV), the Centre of Infection and Immunity (CIIL) of the University of Lausanne and the Ludwig Institute for Cancer Research. In addition, we are near the CHUV medical centre, the Swiss Cancer Centre Léman and the Swiss Federal Institute of Technology (EPFL). The presence of the research laboratories of the Faculty of Biology and Medicine of the University of Lausanne provides opportunities for community members to work near academic and clinical folks, their discoveries and their research platforms.

Start-ups have a place to experiment and grow

The Swiss Biotech Report 2018 states that while Basel maintains its position as leader for big established pharmaceutical companies, Lausanne is "the" vibrant and growing place to be for innovation in life sciences. This is due, among other things, to a high concentration of start-ups, a unique educational offer in the region, second-to-none infrastructure invested in by the Canton of Vaud and a plethora of supporting institutions and partners. In Switzerland, a serious life sciences company can reasonably raise up to 1 million CHF in seed funding. Yet we are all aware of the high level of investment needed to build a laboratory and how discouraging this can be for entrepreneurs who are then often left with the option of staying in their academic laboratories instead of developing their ideas in entrepreneurial set-ups. To create a comprehensive offer to life sciences companies in the Canton of Vaud, Biopôle decided to close the loop and introduce Startlab, an incubator exclusively dedicated to life sciences. How does it differ from the others? Startlab is based on a flexible pay-as-you-play model where all the initial investments have been taken over by Biopôle, thus transforming the majority of our incubated start-ups' fixed costs into variable costs. Start-ups are thus enabled to better allocate their resources and grow in a thriving and inspiring life sciences ecosystem. Meanwhile, investors are reassured that the entrepreneurs are not only coached and accompanied by seasoned entrepreneurs, but can grow and experiment in a safe context while focusing purely on their own business and research. The incubator is physically located at the centre of the Biopôle Campus and allows full integration of the entrepreneurs into the Biopôle community.

Aerial view of Biopôle Lausanne, the growing urban life sciences campus overlooking lake Geneva.

PHOTOS: DR

Digital is the new black

After several years attending conferences on the consequences of the digital revolution, it was time to act and create a hub where digitalisation in life sciences can shape future developments. The Biopôle Digital Health Hub gathers together innovative companies that integrate digital technologies into the life sciences sector. With different sectors of operations, it represents a reference for digital integration for the community and a leading think tank to raise awareness in the digital health field. For example, immunology-oriented companies can profit from the experience of the companies working at the Digital Health Hub to fully integrate digital products into their research, patient centricity and business models.

HOW SOME COMPANIES AT BIOPÔLE LAUSANNE COVER DIFFERENT IMMUNOLOGY AREAS

abionic	ADC THERAPEUTICS	Anergis	Glenmark	GNUBIOTICS SCIENCES	MYMETICS	novigenix
COMPANIES ABIONIC develops a technology that uses the properties of adsorbed immunoglobulins to specifically recognize biomarkers present in a drop of blood in a nanofluidic setting.	ADC Therapeutics employs monoclonal antibodies specific to tumour antigens conjugated to a novel class of highly potent pyrrolobenzodiazepine (PBD) – based warheads to selectively kill cancer cells.	ANERGIS has developed a set of specific protein fragments that rapidly desensitizes the body towards allergens by efficiently down-regulating exaggerated immune response.	GLENMARK develops bispecific antibodies that help immune cells to get in contact with cancer cells to better fight them. These antibodies are currently tested for breast cancer, myeloma and colorectal cancer.	GNUBIOTICS has developed a set of sugars that specifically feed the good bacteria present in the gut while starving the bad ones, subsequently reinforcing the immune system.	MYMETICS uses modified viral shells to stimulate the immune system without triggering infection as a novel vehicle for vaccination.	Thanks to NOVIGENIX's technology it is possible to detect early phases of colorectal cancer by recognizing a specific gene activation signature of immune cells present in the blood.
IMMUNOLOGY AREA Diagnostics	Therapeutics	Therapeutics	Therapeutics	Therapeutics	Therapeutics	Diagnostics
FOCUS Allergies/sepsis	Oncology	Allegies	Oncology	Nutrition	Vaccines	Oncology

In Western Switzerland immunotherapy is providing the leverage for a massive scaling-up in life sciences

Immunotherapy, which trains T-cells in the body to detect and kill cancer cells, is a growing field in which academic institutions and biotech-pharma companies in Western Switzerland are fast converging. It is creating a forward-looking hub in oncology and beyond.

BY FABRICE DELAYE

On October 3rd 2018, a futuristic new building , the Agora, became home to 300 researchers and clinicians in 25 different specialties . Their objective: to discover and accelerate the transition of novel oncology treatments from labs to patients.

Located at the heart of the Lausanne University Hospital (CHUV) campus, Agora brings together multi-disciplinary teams of doctors, biologists, immunologists, bioinformaticians and bioengineers from the different partner institutions: the Swiss Institute for Experimental Cancer Research (ISREC), the University of Lausanne (UNIL), The Swiss Federal School of Technology (EPFL), the Lausanne University Hospital (CHUV), the University Hospital of Geneva (HUG), the University of Geneva (UNIGE) and the Ludwig Institute for Cancer Research Lausanne.

The microenvironment of Professor Coukos

Immunotherapies, both at research and clinical levels, have been instrumental in creating this new facility -which is the flagship of a network of academic institutions, pharma and biotech in the domain of immuno-oncology. It is creating the critical mass for the region to become a world class hub in the fight against cancer.

Professor George Coukos, who is both the head of oncology at CHUV and director of the Ludwig Institute for Cancer Research in Lausanne, explains: “For research and therapies that were predominant until 10 years ago, cancer was seen as the result of genetic alterations and the tumour cells themselves as privileged targets. It drove chemotherapies and later targeted therapies. But we came to realise that these approaches were largely not curative but palliative.”

In other words, these therapies were playing a major role in slowing tumour growth, but cancers were finding ways to overcome this suppression. Cancer research then started to make important progress towards understanding how the disease works and what could provide important leverageto gain therapeutic momentum.

Bioreactors used for the production of Merck’s immuno-oncology compounds in Vevey.

“We came to realise that, in fact, there are all kinds of mechanisms that support the survival and growth of tumour cells”, says Coukos. “One of the major breakthroughs has been the understanding of the role of the tumour microenvironment.”

This microenvironment is made of the body’s own cells that naturally populate tumours, like those from the immune system, the vascular system or the stroma, the connective tissues that support the tumour. That is because the tumour and its surrounding microenvironment interact constantly.

“Central to this,” explains Coukos, “is the fact that the tumour cells co-opt other cells and ‘hack’ them to change their functions for their own advantage.”

Hacking the immune system

The first therapies to reach clinic from that holistic new logic are immunotherapies or treatments that solicit certain parts of a patient’s immune system to fight the cancer.

SWISS START-UPS BUILD LEADERSHIP IN PERSONALISED IMMUNOTHERAPIES

Intercepting colon cancer in its earliest stages and years before the appearance of symptoms could help eradicate the disease. From its offices at the Biopôle in Lausanne, Novigenix is developing non-invasive blood tests for early detection of cancer in collaboration with hospitals and clinics in Switzerland.
Its technology platform combines blood transcriptomics with advanced data analysis using machine learning and artificial intelligence to decrypt specific patterns of immune system reaction to the onset of disease. Changes in the expression profile of circulating immune cells that are exposed to tumours can be measured in blood and interpreted as early indicators of cancer.
The first-generation test Colox for detection of colorectal cancer is currently available in Switzerland and a second generation is being developed for global roll-out. Novigenix is also exploring other applications of its technology platform such as patient stratification and monitoring of immunotherapies.

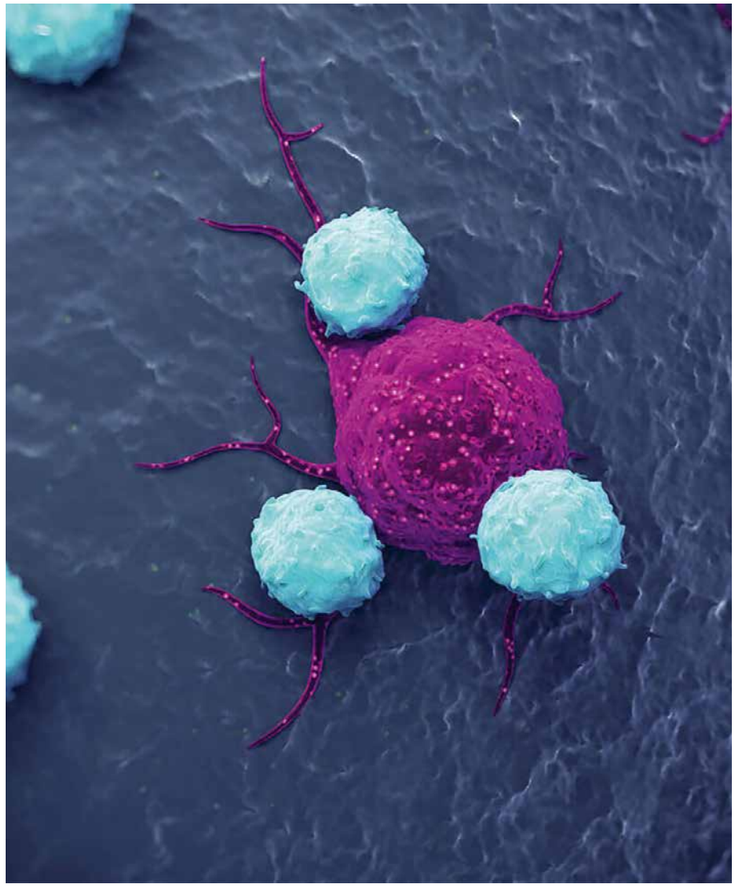
In search of cancer markers

Lunaphore is a Swiss-based spin-off of the EPFL developing tissue staining devices for cancer diagnostics. It is recognized as one of the most innovative companies nationally and internationally.
Immunostainings are widely used biomarker tests which reveal presence of relevant cancer markers through coloration of tissue samples. Nowadays, techniques called multiplexing, allow testing several markers on the same sample to get a full understanding of how immune cells interact together against cancer.
Immunophenotyping is key to understand each case and offer patients personalised therapies. Lunaphore is developing a technology based on a microfluidic chip which aims to perform those tests much faster and with higher precision than standard techniques. Ultra-rapid multiplexing may enable same-day patient cases, with better outcomes. With its first product to be launched in the upcoming months, Lunaphore's vision is to bring cutting-edge solutions to the tissue cancer diagnostics field. (FD)

With biologicals such as man-made proteins, immunotherapies stimulate the immune system to work harder or smarter to attack cancer cells.

One of the main reasons cancer cells thrive unchecked is that they are able to hide from the immune system. So, certain immunotherapies mark cancer cells to make it easier for the immune system to find and destroy them. Others boost the immune system to work better against the cancer. In all cases, they help the body to heal itself.

Today there are several types of immunotherapies used to treat cancer. Checkpoint inhibitors work by releasing the brakes that keep T-cells – a type of white blood cell – from killing cancer cells. Adoptive cell transfer is a treatment that attempts to boost the T-cells' natural ability to fight cancer. Finally, monoclonal antibodies are immune system proteins created in lab. With targeted therapies they are designed to attach to specific targets found on cancer cells and stop them growing. But some monoclonal antibodies also mark cancer cells so that they will be more easily seen and destroyed by the immune system.



Monoclonal antibody, Avemulab is approved since March 2017 for Merkel-cell carcinoma.

While at the University of Pennsylvania in the early 2000s, George Coukos's laboratory was among the first to demonstrate that the immune system plays a key role in the growth of tumours. At the time, the first approaches to immunotherapy were vaccines. "It did not go far because these vaccines were too soft weapons," he explains. "They take time to work and did not provoke strong immune responses, so tumours had time to adapt. We changed our approach but not the goal to mobilise the immune system."

Immune checkpoint therapies

The failure of the first cancer vaccines fuelled more research into understanding how to activate spontaneous immune responses in the tumour microenvironment. To avoid autoimmune diseases, the immune system has some mechanisms that weaken or suppress the power of the immune response. This is one of the mechanisms tumours hacked to become invisible to the immune system. American immunologist James Allison then discovered that such a mechanism can be overcome.

Specifically, the antibody blockade of a T-cell inhibitory molecule, known as CTLA-4, could lead to enhanced anti-tumour immune responses. This laid the foundation for the development of other drugs that target T-cell inhibitory pathways, labelled "immune checkpoint therapies". The discovery of the CTLA-4 inhibitory mechanism itself led to the clinical development by Medarex of the drug Ipilimumab, acquired in 2009 by Bristol Myers Squibb. The drug was approved in 2011 by the FDA for the treatment of metastatic melanoma and has since demonstrated remarkable results (see the interview with Professor Michielin, page 24).

"The success of antibodies developed against CTLA-4 proved the strength of this approach", Coukos says. Soon, a second wave of immune checkpoint therapies was approved against other types of cancer. Known as PD-1 (programmed cell death-1, a receptor expressed on the surface of the activated T-cell) and PD-L1 (its ligands commonly expressed on the surface of dendritic cells or macrophages), these immune checkpoint proteins became biomarkers for new immunotherapies.

At Lausanne University Hospital, Professors George Coukos (l. to r.), Solange Peters and Olivier Michielin translate immuno-oncology discoveries to the patients bedside.

Nivolumab (an anti-PD-1 drug developed by Bristol-Myers Squibb) was approved by the FDA in 2014 (first for previously treated metastatic melanoma and squamous non-small cell lung cancer) while Pembrolizumab, developed by Merck, was approved for previously treated metastatic melanoma. Similar strategies have been explored targeting PD-L1 to treat other cancer types including renal cell carcinoma and bladder cancer by AstraZeneca (MEDI4736) and Roche (Atezolizumab).

Not a straightforward road

BMS's Nivolumab is already a blockbuster, but it is hard to predict whether other checkpoint therapies will be as efficient as they have been, first for melanoma and then lung cancers. "There is a long list of targets", explains Coukos. "How successful will they be? We don't know yet." That is because the field has also experienced setbacks. For example, a trial with a combination of anti CDLA-4 and anti-PD-1 by BMS, as well as a clinical trial led by Incyte to block another target (an enzyme called indoleamine dioxygenase or IDO) to increase the efficiency of checkpoint inhibitors showed negative results last year. "It was the realisation that the road will not be as straightforward as expected", says Coukos.

Far from discouraging researchers, though, these setbacks have triggered all kinds of initiatives to improve immunotherapies. For example, Lausanne-based pharma Debiopharm is developing various approaches to enhancing anti-tumour immune response. "Cancer immunotherapy has significantly improved the survival rate for certain cancer types such as melanoma and lung cancer," explains Thierry Mauvernay, president of Debiopharm Group. "However, the proportion of patients who respond to this type of treatment is still low, between 20% and 50%."

LEGACY HEALTHCARE SUPPORTS ONCOLOGY CARE WITH PLANTS

While cancer treatments contribute to saving lives, most cause side effects. The US National Cancer Institute's Common Terminology Criteria for Adverse Events (CTCAE) lists no fewer than 1,000 types. Patients' quality of life is worsened and there is a long-term impact on survivors. Hence, oncology supportive care has become an integrated part of cancer care.

Addressing side effects

Side effects like hair loss and fatigue can be addressed. Botanical drugs, regulated by the FDA and EMA since 2004, originate from non-synthesised botanical extracts. Humans having co-evolved with plants, they are "recognised" in their natural state by the human body, making botanical drugs very safe in general. Botanical drugs are therefore more suitable for treating chronic issues, such as in oncology supportive care, compared to drugs with side effects. Legacy Healthcare aspires to become the leader in botanical drug development, including for oncology supportive care. Its most advanced candidate is in Phase II/III. With a Chinese partner on board, it has started to explore the massive botanical drug leads potential Chinese medicine offers. (FD)

One of the approaches to enhance immune response followed by Debiopharm is to exploit the properties of a new molecule, Debio 1143, which has the potential to act both directly on the cancer cells and on the immune system, thus improving the effect of the immunotherapy. "This molecule has shown very encouraging results in experimental models of cancer as well as on human immune cells," explains Bertrand Ducrey, CEO of Debiopharm International. "Clinical studies are currently underway to test its potential in combination with immunotherapy. The first results are expected in 2019."

Boosting immune response

With the vast majority of its immuno-oncologic drugs produced or developed at its sites near the Lake of Geneva in Aubonne and Corsier-sur-Vevey, Merck, as part of the Merck-Pfizer Alliance, has co-developed and co-commercialized its anti-PD-L1 monoclonal antibody Avelumab for the treatment of metastatic Merkel cell carcinoma (a rare but aggressive skin cancer) as well as for the treatment of pre-treated patients with locally advanced or metastatic urothelial carcinoma (bladder cancer) in the US.

Merck is also engaged in various development programmes often targeted to enhance immune response. For example, it recently presented the results of phase I clinical trials of its M7824's dual approach to fight cancer at the American Society of Clinical Oncology (ASCO) 2018 Annual Meeting. It brings together a transforming growth factor-bêta (TGF-bêta) trap (to inhibit a mutated pathway involved in the proliferation of cancer cells) and 'fuses' it with the anti-PD-L1 mechanism.

Boosting the immune response is also the core of the technology developed by Geneva-based biotech MaxiVax. Its technology consists of a very small encapsulating device which is placed under the skin. It is composed of irradiated tumour cells from the patient as the target for the immune response and a strong immunity booster (GM-CSF: granulocyte-macrophage colony stimulating factor), released from an encapsulated, genetically modified cell line.

"The two main advantages of this approach is that all antigens of the cancer are targeted and that the immune-booster is delivered continuously over a one week period instead of a bolus injection", explains MaxiVax's CEO Dimitri Goundis. The FDA has recently granted an Investigational New Drug Application for MaxiVax's novel active immunisation anti-cancer therapy MVX-ONCO-1 which is also being tested in a phase 2 clinical trial for head and neck cancer in Switzerland.

Doug Hanahan, director of ISREC, is following the same kind of combinatory approach in his lab. "The fact that about half of patients do not respond to anti-CTLA4 or anti-PD-1 administration suggests the presence of resistance to checkpoint inhibitor therapy," he explains. "We've long suspected that tumours can develop multiple and diverse barriers to avoid infiltration and killing by immune cells. By breaking these barriers it may be possible to empower the immune system to kill cancers". His lab is developing mechanism-guided immunotherapy strategies to disrupt multiple tumour barriers operative in cervical carcinomas in order to effectively unlock tumour immunity.

But while this research and development are key to improving and enlarging the scope of immunotherapies, there are still challenges. For example, there is no doubt that checkpoint inhibitors are very efficient with highly mutated cancers such as lung cancer because of smoking, but new strategies are required when there are less targetable mutations as in the case of brain cancers.

Professor Pierre-Yves Dietrich, head of the oncology department of University Hospital in Geneva, has been leading research at the Tumour Immunology Laboratory of the University of Geneva to develop immunotherapies in an organ which is difficult to access and where any mistake could have huge consequences.

After establishing the existence of anti-glioma immunity, his team discovered ten novel glioma-associated antigens with high expression on tumour cells. Importantly they do not express on normal tissues, an

Professor Pierre-Yves Dietrich, Head of the Oncology department of University Hospitals in Geneva, is conducting clinical trials of peptide vaccination in patients with gliomas.

indispensable feature to avoid autoimmunity. "This advance has allowed us to initiate clinical trials of peptide vaccination in patients with gliomas that is currently under way", explains Dietrich. But his group is also active in the development of T-cell therapies in collaboration with Professor Carl June's lab at the University of Pennsylvania

Towards T-Cell therapies

"This new approach of cancer immuno cell therapies is, in my opinion, the future" says Coukos. T-Cell therapy, also called adoptive T-cell therapy, is based on generating artificial T-cells in the laboratory or to improving extracted T-cells to infuse them back in the patient to fight the tumour. Based on the research conducted at the Ludwig Institute, the CHUV has designed a leading programme for such adoptive T-cell therapies. It has started to treat patients for melanoma and is about to launch a vast trial for all solid tumours.

"We can harvest T-cells in the tumour and analyse them in the lab to understand what they recognise and expand the most efficient ones with specific methods we developed and others we adapted, before reinjecting them", continues Coukos. One of these methods is called Tumour Infiltrating Lymphocyte (TIL). In this, T-cells are extracted from tumours, selected and multiplied in the lab before reinjection in the patients to attack the tumour, in combination with other immunotherapies or chemotherapies.

Another approach is called CAR-T (Chimeric Antigen Receptor) where T-cells are re-engineered in the laboratory, with the addition of a gene for a special receptor that binds to a specific protein on the patient's cancer cells, so that they will attack cancer cells after reinjection.

At the Institute of Life Technologies at the University of Applied Sciences in Wallis, Professor Gerrit Hagens is developing a CAR T-cell-based therapy to treat patients suffering with AML (a kind of leukemia) and certain solid tumours. "We are developing the entire therapy with industrial partners", explains Hagens. "They will be the transferred to the Swiss Biotech Center in Monthey (Wallis) for production under GMP conditions so that patients can be treated eventually in 2019."

Agora - the flagship

At the CHUV, a cell therapy-devoted structure has also been created that will allow to offer these therapies on a large scale. "To the best of my knowledge, it is the largest GMP facility in an academic environment in Europe", says Coukos. Added to that is the imminent completion of a unit to treat both hospitalised and ambulatory patients with T-cell therapies at the CHUV. Also, the construction planning of a second building largely dedicated to Ludwig Institute research has already started at the Biopôle.

Clinical trials with new T-cell therapies will likely be the flagship programme of Agora. Its completion after the creation of a Tumour Board where researchers share information with oncologists from the region and that of the Swiss Cancer Centre Léman (SCCL) that brings together more than 80 research groups from both Lausanne and Geneva, makes Agora the epicentre of Western Switzerland's ambition for oncology. "It is creating the critical mass to convince pharma to start clinical trials in the region and to better translate discoveries from the lab to the patient," asserts Coukos.

Testimony of its worth, the lemanic Tumour Board has already convinced Bristol Myers Squibb to sponsor community clinical trials in Western Switzerland. It includes not only hospitalised patients but also those in private oncologists' practices.

"Bringing together the high level of expertise in the region, including from private practice and peripheral hospitals, has already changed the mentality", affirms Dietrich. "It creates a critical mass which acts as a magnet for both pharma and biotech", adds Coukos. As proof of that, the SCCL has established an agreement that allows several projects to be financed by Roche mainly in preclinical projects geared for drug development. And a similar agreement has recently been made with Bristol Myers Squibb.

Guided missiles against cancer

ADC Therapeutics, a Lausanne-based immunotherapy biotech, is the latest rising star in the Swiss pharmaceutical sector. BY FABRICE DELAYE

The 54th World Cancer Congress (ASCO) in early June in Chicago was an opportunity to showcase spectacular progress. In terms of diagnosis, the advance of liquid biopsies, which make it possible to detect cancer very early through biomarkers found in blood tests, raises new hopes. And when it comes to treatments, the multiplication of immunotherapies has made them a new strategy on top of radiotherapy, chemotherapy and surgery.

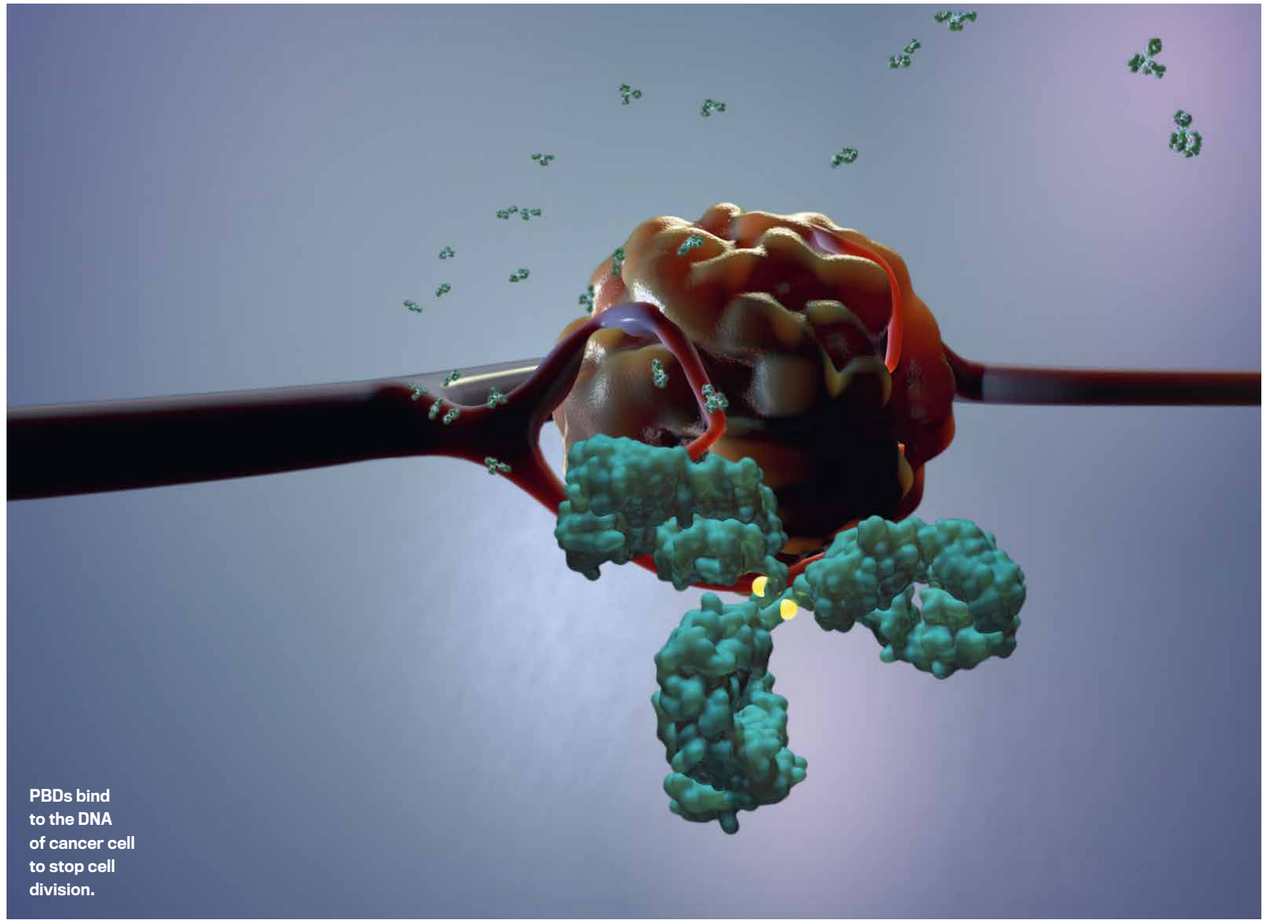
445 million Swiss francs raised

There are two forms of immunotherapy. The "active" form makes cancer cells that have found a way to escape the immune system visible again so that T-Cells can destroy them. The "passive" form involves linking an anticancer drug with an antibody which will transport it precisely to the cells to be destroyed. Called immune-conjugates, these therapies are often likened to guided missiles and their explosive warheads.

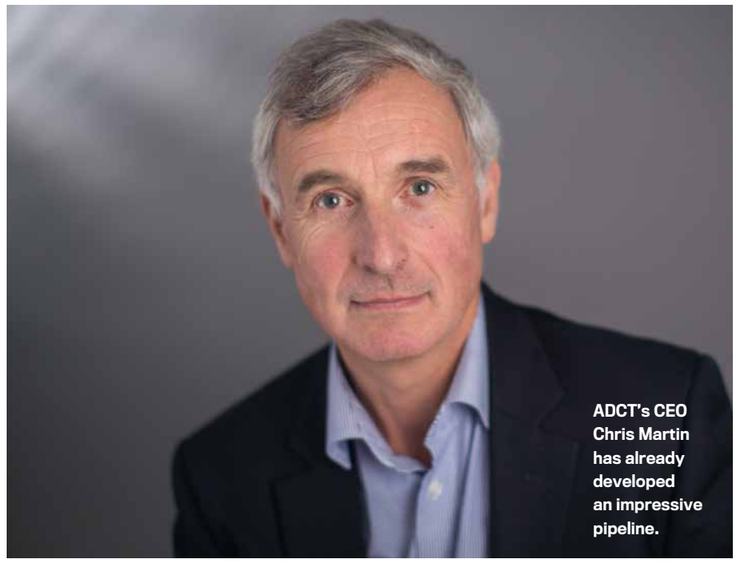
A potential leader in this promising approach has been based at the Biopôle incubator in Lausanne since 2012. ADC Therapeutics has raised CHF 445 million over the last few years, making it the second unicorn (a company valued at more than a billion) to be based in French-speaking Switzerland after neurorehabilitation specialists MindMaze. Despite its spectacular fundraising ADCT has evolved mostly under the radar, but CEO Chris Martin agreed to lift the veil for Technology by Bilan,

The origins of ADC Therapeutics go back to research conducted in the 1990s at the University College London and the University of Nottingham and funded by Cancer Research UK. They identified the potential of a very active toxin, Pyrrolobenzodiazepine or PBD, to bind to the DNA of cancer cells to stop cell division. "Not only are these PBDs very potent at a very low dosage, but they are also not recognised by the DNA repair system, therefore reducing the drug resistance profile,which is a problem widely seen with other chemotherapies," says Martin. "One must be able to bring this toxin where it is needed to avoid destroying healthy cells."

> ADC Therapeutics is the second unicorn to emerge from the life sciences cluster of Western Switzerland.



PBDs bind to the DNA of cancer cell to stop cell division.



ADCT's CEO Chris Martin has already developed an impressive pipeline.

At the end of the 1990s, oncology research was driven by the discovery of monoclonal antibodies. Ultra-specific because they can detect molecules (antigens) expressed only by cancer cells, these antibodies attach to cancer cells to neutralise their proliferation mechanisms, to prevent tumour vascularisation or reactivate tumour monitoring by the immune system. In 1997 Roche, through its subsidiary Genentech, obtained the first marketing authorisation for such an antibody which quickly became a blockbuster with sales exceeding $7 billion in 2015.

Guided missiles

The ultra-specificity of monoclonal antibodies was the discovery Martin was waiting for. In 2000 he founded Spirogen, the company responsible for developing the first PBD based immunoconjugates. These connect the explosive charge of PBD toxins with antibodies to guide them precisely. "Spirogen's business model is to license its technology for applications in different types of cancer," he explains.

> The company is targeting blood cancer as well as solid tumours with multiple candidates in clinical trials.

In 2008, Spirogen started a collaboration with a small American biotech, Seattle Genetics. In 2011, it obtained the first authorization by the Federal Drug Administration (FDA) to market an immunoconjugate, Adcetris, to treat Hodgkin's disease, a cancer of the lymphatic system. Listed on the Nasdaq, the company's share price -which had languished under $ 10 since 2001, took off and passed the $ 60 mark.

This situation did not escape pharmaceutical giant AstraZeneca which bought Spirogen for $ 440 million.

Just before the transaction Michael Forer, Spirogen's Executive Director, founded ADC Therapeutics with a capital injection from Lausanne-based venture capital fund Auven Therapeutics to further develop licensing-based immunoconjugates with Spirogen's PBDs. ADC Therapeutics, which operates its R & D in the UK, chose Lausanne and the Swiss pharmaceutical ecosystem for its headquarters, and was soon joined by Martin as CEO.

Forer and Martin developed a strategy targeting blood cancers such as lymphomas and leukemias, and solid tumours. The first results of the human trials of two of its products allowed the company to start testing for the registration of these products this summer. With Martin, a veteran of the pharmaceutical industry, ADC Therapeutics has targeted a rare form of lymphoma for its first immunoconjugate, ADCT-402, because it has shown convincing results in patients for whom there is no alternative.

If this lack of therapeutic alternatives is likely to favour the approval by health authorities for its first drug, ADC Therapeutics has an impressive pipeline. Multiple candidates are in the clinical phase for blood cancers and solid tumours. Four other products are in the preclinical phase for solid tumours and the company has several more in preclinical research.

With 100 people, ADC Therapeutics already has the potential to be bought back at a higher level than the billion dollars it was valued at in its last round. In a world where more than 25 million people are expected to be diagnosed with cancer every year after 2030, its targeted therapies have enormous potential.

Still, Martin does not rule out an IPO and plans to develop production in Switzerland further, making ADC Therapeutics a new locomotive for life sciences in the Lake Geneva region.

Prof. Olivier Michielin leads translational oncology in Western Switzerland.

Immunotherapy is the revolution we were hoping for in the fight against cancer

Olivier Michielin, chief medical officer of the division of personalised analytical oncology at the University Hospital in Lausanne (CHUV) and chief of melanoma consultation, represents a generation of doctors with one foot in research and the other in the clinic. He explained why immunotherapies are such a breakthrough in helping to defeat cancer. **BY FABRICE DELAYE**

Located in the heart of the Canton of Vaud University Hospital Centre (CHUV), the Agora Cancer Centre, inaugurated in October, is at the cutting edge of cancer research in the Lake Geneva region.

The fruit of a partnership between the ISREC Foundation (the project leader) and the CHUV, the University of Lausanne, the Swiss Institute of Technology of Lausanne (EPFL), the Ludwig Institute for Cancer Research, the University Hospital of Geneva (HUG) and the University of Geneva, Agora is a concrete example of translational medicine at its best. The vision is to relate laboratory discoveries directly to their medical applications with patients. To do that, Agora has brought more than 300 practicing physicians, life scientists, medical imaging technologists and data analysts together under one roof.

Immunotherapies, increasingly the weapon of choice in the fight against cancer, will be at the heart of Agora. As chief medical officer of the division of personalised analytical oncology and chief of melanoma consultation, Professor Olivier Michielin explains why and how these therapies are revolutionising cancer therapies.

After radiotherapy, chemotherapy and targeted therapies, the focus is now on immunotherapies. Why?
This is the revolution we hoped to see. The clinical results are so spectacular for some pathologies that for a small number of patients we no longer measure survival in months but in years. There is even the possibility that some can be cured, though it is too early to say that with any certainty.

> More and more immunotherapies are becoming front line treatments.

Yet immunotherapies are not yet used as front line therapies by oncologists...
It is changing. In the case of melanoma and more and more lung cancers as well as other diseases, immunotherapies are becoming the first treatment. We can already see their incredible long-term benefits in melanoma. Some patients have stabilised for five or even 10 years. And maybe they will never relapse. These are results I would never have expected to see a few years ago.

PHOTOS: DR

What explains this efficiency and sustainability?
There are several reasons. The simplest is that when you do chemotherapy or targeted therapy you have a drug that targets the tumour cells. But a few days after the treatment, there is nothing. With immunotherapies, you stimulate white blood cells that have the capacity to divide and regenerate and which, moreover, have a memory. The treatment will immunise you against your cancer much in the same way that you are immune to a flu that you have already had.

Why can't the immune system prevent these cancers from developing?
That is what it does normally. But through mutations, tumour cells manage to make themselves invisible to T cells. It is one of the main ways cancer evades the immune system. It is done by various means, for example by expressing small "antennas" on tumour cells that are normally found in certain healthy tissues. Normally these "antennas" are intended to prevent an attack by the immune system on certain cells. Cancer is kind of hacking these biological mechanisms for its advantage, to evade the immune defences. The discovery of this piracy of biology has led to the discovery of specific molecular targets, proteins like PD-1 (programmed cell death protein 1) that can be antagonised with specific antibodies. With this approach, the immune system recovers its ability to attack mutated cancer cells and destroy them.

Is it necessary to reintroduce these antibodies regularly?
Not in most cases. It is the beauty of these therapies: these antibodies allow the immune system to reprogramme itself. The T cells resume their functions and kill the cancer cells, and their elimination becomes natural and systemic again. In some cases, however, the antibodies cannot be controlled and may trigger autoimmune diseases. We still have a lot to understand!

How many immunotherapies are used?
In clinical practice, oncologists essentially use those which block the PD-1 protein or a molecule (ligand) associated with it (PDL-1). But there is a whole string on the way with between 10 and 20 new targets in the near future. It is believed that they will be used in combination with these anti-PD-1s.

Because they work well with melanoma and lung cancer but not with other tumours?
Depending on the cancer, the mechanism to evade the immune system is not necessarily the same. PD-1 and PDL-1 are important in melanoma and lung cancer, less in other cancers. Added to this is the immunogenicity of cancers. In other words, is the cancer still identifiable once all the escape mechanisms have been removed? The answer lies mainly in the number of mutations. The more there are, the more cancer cells will be visible by the immune system. Tobacco causes a lot of mutation in lung cancer, while brain cancers have a few mutations. This does not mean that they will not eventually respond to immunotherapies.

> Through mutations, cancer cells manage to make themselves invisible to the immune system.

These therapies are very different from conventional drugs. What is the role of pharma companies in their development?
Clinical studies to validate these products cost hundreds of millions of francs and it is difficult to do without the pharma industry. Still, the academic has a say in basic research and in the development of therapeutic strategies. Dozens of clinical studies are initiated by the CHUV either with pharma partners or independently when we are trying to push for our own discoveries. The group of George Coukos, head of the Department of Oncology UNIL CHUV and director of the Ludwig Institute for Cancer Research Lausanne, has developed its own studies on cellulotherapies which consist of extracting certain dormant immune cells in tumours and boosting them before reinjecting them to do their job of eliminating cancer cells.

Again an almost natural approach. You mentioned possible autoimmune side effects, what are they?
Nothing is more specific than a white blood cell. Its ability to move against the right target is phenomenal. That said, these immunotherapies do not only awaken cancer-specific lymphocytes. We can also wake others with the risk of triggering autoimmune attacks. These therapies require a lot of knowledge of the management of side effects at the clinical level.

Hence the idea of bringing research and clinical development closer in Agora?
Agora will bring together researchers and clinicians who need their mutual experience to advance tomorrow's oncology and personalisation, the other coming breakthroughs. To personalise therapies, we have to measure a lot of things. An entire floor of Agora will gather these statistical analyses, from DNA sequencing to imaging. On the other side we are standardising the electronic patient records at the CHUV to follow precisely how patients respond to treatments. By combining these data with those from molecular analyses, imaging, and so on, we will be able to begin to predict the efficacy and toxicity of a treatment. It will guide therapeutic choices.

How will Agora be connected with the needs of patients and their referring physicians?
We have already created with the HUG a "tumour board" which network many oncology specialists in French-speaking Switzerland to discuss and interpret complex molecular data to make treatment proposals. We have just launched a national project, the Swiss Personal Health Network, to pool the data of personalised medicine. The Swiss population is very stable. So we hope to get information that tells us which is the most effective treatment sequence for a given patient in the long run. This is another revolution that is coming because it will allow us to determine on a molecular basis the populations in which treatments will have significant success rates.

Incyte invests CHF 100 million in Yverdon

The american biopharma Incyte has chosen Switzerland to set up its new production site. Announced in November 2017, the investment started to take shape in September 2018 with the laying of the foundation stone in Y-Parc. BY MATTHIEU HOFFSTETTER

In Yverdon, the new Incyte's plant will produce monoclonal antibodies.

Tuesday, November 7th, 2017: tremendous news thrills the pharma sector of Western Switzerland. Incyte Biosciences, one of the new American leaders in biopharma, announces the establishment at Y-Park in Yverdon-les-Bains of a production site specialising in anticancer treatments.

Its arrival will be in three stages. First, teams will be set up in existing buildings while the production site is built. The company has acquired 21,000 m² of land for this phase which should last two years, with 46,000 m² around the perimeter already reserved for future extensions. On September 20, 2018, the foundation stone was laid.

A European headquarters in Lausanne

With 1,100 employees worldwide, Incyte, founded in Palo Alto in 1991, has great ambitions. "80% of our business is in the field of cancer," says CEO Hervé Hoppenot. "We are currently witnessing a revolution in the treatment of cancer with immunology and the re-engineering of the immune system."

For him, this Swiss project is a sort of return. He worked for Novartis and chaired Novartis Oncology. Incyte's European headquarters is also located in Lausanne. And the American pharma has two clinical research groups in Lausanne and Geneva. "We wanted to keep the European headquarters and production site close enough," he says. "Y-Parc presented the most interesting option, being 20 minutes from Lausanne."

As of 2020, the future site will have a 3,500 m² production building with two bioreactors at the start and the possibility of six in the end. It is this building whose first stone was laid in September 2018. Next to this main building will be another building for administration and laboratories to control the manufacturing of the product, and a third for energy and consumables.

"Here in Yverdon we will have a plant for the production of monoclonal antibodies and the manufacture of the active ingredient," says Michael Morrissey, corporate senior vice president and head of global technical operations at Incyte. "Once it is manufactured, it will be shipped to other sites in Europe and the US to produce the treatments."

Jobs creation

"Initially, we will create 70 jobs but we will go up to 130 positions at full capacity," says Morrissey.

According to Philippe Leuba, state councillor in charge of the economy for the canton of Vaud, it is a long-term project. "Future extensions are almost assured," he says, making it "a major project within the Health Valley, which already includes 360 companies and 400 research institutes in the canton of Vaud, for 20,000 jobs." The 46,000 m² for future extensions reserved by Incyte are testimony of such ambitions.

For Hervé Hoppenot, the availability and quality of the local workforce have also been paramount in the choice of Yverdon. "The products we manufacture are highly technological, with a development cycle that is understood in decades, not months or years," he says.

"We aim for 100% reliability for patients, both in efficiency and in the availability of the product. Criterion number one for us was therefore to find the skills to run a plant that will be able to achieve this level of reliability. We have found that in the heart of Switzerland in the canton of Vaud".

PHOTOS: DR

In the middle Silvia Angeloni and Kaspar Suter, in the inner staircase of Neode Incubator in Neuchâtel. The shot is part of a project at the hinge among art and innovation.

Enabling qualified sustainable human tissues for preclinical screening

"We serve biologists, not biology" explains Silvia Angeloni, innovation manager at SiMPLInext. Interview. BY REBECCA GARCIA

Neuchatel based SiMPLInext markets dependable connected tools for the design of next generation preclinical tests.

What is SiMPLInext's product?

A lot has been done in the last ten years in the field of tissues reconstituted from human cells. However labware is often not biomimetic enough nor complies with the required level of standardisation to scale niche engineered tissues to industrial level. SiMPLInext acts as a facilitator supplying the first Internet of Things platform for tissue qualification. The key elements are a cost-effective system, CoMPLI, and a premium single-use device, SiMPLIs, holding the tissue growth. The first version is a customised version of state-of-the-art TEER (trans epithelial electrical resistance) meters. TEER assesses the physiological barrier function of epithelium and endothelium, the tissues which typically define the inside and outside of our body.

Who is on the team?

Apart from myself who spotted the business opportunity with Kaspar Suter and defined the channel to costumers, Cees Lanting brings his strategic skills and proven experience in R&D and product industrialisation, Marc Bersier in communication and Jean-Pierre Dan in company administration. We are ambitious and realistic too.

Who is this for?

We serve biologists, not biology. Our end users are drug designers and tissue engineers in R&D units in pharma, chemicals and food, but also in governmental public health institutions. They are known to be very conservative. This is easy to understand, as they deal with ever-changing innovative living materials. So we strive to introduce advantages, likely innovative, with the form factor of a standard – and to them familiar – multi-well plate and tissue growth insert. Everything can be handled in a traditional way, being compatible with existing protocols and leveraging knowledge paradigms adopted over the last 30 years.

What do tissue engineers and researchers gain from it?

A more ergonomic way to handle tissues. Scientists can test more efficiently since the thickness of the ceramic membrane insert enables more physiological in vitro tissues, compared to the current plastic membrane inserts. The barrier function is also more easily qualified because of the electronic monitoring. It's a non-invasive, remote, continuous and by design traceable generation of data in line with the incubator online concept. In the future, we will add an optic fibre or instruments to measure pH or temperature, for example, augmenting the functional modules' offer while keeping the same standard form factor.

What are the next steps?

We have generated value in intangible assets as intellectual property foreground on an early stage technology from CSEM in Neuchâtel, feasibility studies, market product pre-validation projects and creation of a supply chain. We know that we have our product, the single-use device used by pioneering customers, functioning as designed. It is on the market and we industrialise it, while we finalise the R&D for the full system. The timing for our bottom-up development is favourable, as market and social awareness meets regulatory shifts in the direction of banning animal tests, expected in Europe by 2020. If preclinical tests are banned on animals, we see high demand for commercial validation kits including human tissues based on our smart SiMPLIs. We are benefiting from local access to different technologies, as typically possible at Neode, and in the canton of Neuchâtel, but the market is global.

PHOTOS: MARINA CAVAZZA

Inflammatory diseases: a mine of innovation for pharma

Inflammatory diseases affect a large part of the world's population and represent a huge market for pharma companies based in Western Switzerland **BY ELISABETH GORDON**

Although the inflammatory response is beneficial to the body, if it is not well controlled it endures, causing chronic diseases that are almost impossible to cure. But the drugs available today only reduce the symptoms, including pain, so for academic laboratories, pharmaceutical and biotechnology companies, these pathologies represent a mine of potential innovation.

Nicolas Hug, General manager of UCB Bulle

Inflamed joints

Arthritis, previously called rheumatism, covers a hundred different conditions causing pain in the joints, most of which are inflammatory diseases. To treat the most common, osteoarthritis, TRB Chemedica, a family-owned SME headquartered in Geneva, offers an oral drug, Diacerein. "It slows down the inflammatory cascade without blocking it," explains Alessandro Di Napoli, Vice President of TRB Chemedica. The company also intends to take advantage of a biodegradable polymer developed by the University of Geneva. It has forged a partnership to develop a new injectable product in the joints that it can thus lubricate.

For its part, Merck Serono has developed a protein, also injectable in the knee joint affected and currently in clinical trials. "This experimental drug enables cartilage regeneration, which is a first in rheumatology," says Andrew Galazka, Head of the Global Medical Excellence department of Merck Serono.

Another form of arthritis, rheumatoid arthritis, can also affect other parts of the body. This disease is called autoimmune because it is due to a disruption of the immune system which, mistaking its target, attacks its host. In this area, UCB Farchim markets Cimzia, whose active ingredient is produced entirely at its Bulle plant in the canton of Fribourg.

This biological drug "controls the disease extraordinarily well," says Nicolas Hug, manager of the Bulle site of UCB Farchim, not only relieving pain but also limiting or stopping the progression of the disease. It is also the only drug in its class that has minimal to no transfer through the placental barrier, allowing women to continue their treatment when pregnant. Its use during pregnancy and for women of childbearing age has recently been approved by the US and European health authorities and will also soon be given the go-ahead by Swissmedic, says Hug. "UCB also innovates in terms of design by developing, with the help of patients, syringes facilitating the self-injection of drugs", he says.

Arthritis may also be associated with psoriasis, an inflammation of the skin. To treat this "psoriatic arthritis", the American company Celgene, which has established its international headquarters and production site in Boudry in the Canton of Neuchâtel, has developed Otezla. Introduced in 2014 in the US and the following year in Europe and Switzerland, "this drug works on both

The UCB biotech manufacturing site in the canton of Fribourg.

PHOTOS: DR

MULTIPLE SCLEROSIS: GENEURO TARGETS THE ROOTS OF THE DISEASE

To fight against multiple sclerosis (MS), GeNeuro, an SME based in Plan-les-Ouates, near Geneva, has taken an original approach. Rather than blocking the immune response, as existing drugs do, it attacks the very cause of the disease. According to Deputy General Manager of GeNeuro **François Curtin**: "The development of this disease is linked to the reactivation of a retrovirus that was integrated into the human genome millions of years ago." This results in the production of a protein that blocks the repair of lesions on myelin, the sheath surrounding the nerve fibres.

This discovery led to the development of a therapeutic product, a humanised monoclonal antibody, which is undergoing clinical trials. GeNeuro benefited from the contribution of the Servier Group which granted it $ 322 million to develop the product.

Since then, the Geneva-based SME has launched a European Phase 2a clinical study involving more than 260 people suffering from MS. The one-year results are positive: "In the treated patients, the inflammation was reduced," says François Curtin. In addition, their brain volume decreased less than that of patients who received a placebo. This is "a very strong signal" demonstrating that the therapeutic product has an effect on the remyelination of nerve fibres.

He says it is also the first time that it has been proved that the retrovirus protein can be neutralised in a specific way and that this has a therapeutic consequence. GeNeuro is now considering launching new trials to evaluate whether the drug can stop the progression of multiple sclerosis, or even reduce the disability of patients.

PHOTOS: DR

In Saint-Prex, Ferring develops an original approach to fight inflammatory diseases with bacteriophages.

psoriasis and psoriatic arthritis, which are two different diseases," explains Lee Heeson, President, Worldwide Markets, Inflammation and Immunology at Celgene. Unlike its competitors, it does not inhibit the immune system, but modulates it. This is the first oral drug for these conditions, according to Franz J. Lechner, manager of Celgene Switzerland. "It reduces joint pain and removes or reduces the itching that patients complain about."

Multiple sclerosis: a growing market

Inflammation can also affect the central nervous system and attack myelin, a lipid-rich sheath surrounding nerve fibres, causing multiple sclerosis (MS). This autoimmune disease affects one in 1,000 people and represents a growing market valued at around $ 17 billion in 2018.

One of the first drugs limiting its progression, Rebif, produced by Merck Serono, celebrated the 20th anniversary of its approval last May. "It has already treated more than 500,000 patients," says Galazka. Merck Serono's plant in Corsier-sur-Vevey, canton of Vaud, "produces the active principle for the whole world", an interferon beta-1a, manufactured by genetic engineering, which "calms the immune system". The drug itself is made in Aubonne in the canton of Vaud, which makes Andrew Galazka say that "French-speaking Switzerland is Merck Serono's centre of excellence in biotechnology".

In French-speaking Switzerland, the company has also developed Mavenclad. Clinical trials have shown that its active ingredient, already used in the treatment of a form of leukemia, "could also be used for the management of MS, because it greatly limits its progression," according to Andrew Galazka. In addition to oral administration, "it only requires 20 days of treatment for a beneficial effect of four years, compared to daily administration for other oral medications".

Michel Pettigrew, Ferring's managing director.

Other companies have begun expanding the available therapeutic arsenal for MS. This is particularly the case of Celgene who have developed Ozanimod, an oral treatment. Phase 3 clinical trials show that, compared to other drugs in its class, it is better tolerated and more effective in reducing relapses. Lee Heeson hopes for its approval in the United States and Switzerland in 2020. In Geneva, GeNeuro has also begun to tackle the very causes of the disease (see box p.29).

Bacteria killing viruses

The gastrointestinal system is not spared by chronic inflammation. In this area, the multinational Ferring wants to position itself as an important player, according to its managing director, Michel Pettigrew. In 2006, the group set up its global headquarters in Saint-Prex in the canton of Vaud, where its products are formulated and packed in sachets or tablets. Its portfolio includes a variety of medications including Pentasa, which treats the onset of inflammatory attacks of Crohn's disease, and Cortiment MMX for the treatment of ulcerative colitis.

The company also invests heavily in research and development. In collaboration with an international consortium of laboratories bringing together several French universities and the American company Intralytix, it is developing an original approach using bacteriophages. These viruses, harmless for humans but killers for bacteria, could attack a bacterium called AIEC (Adhesive invasive ecchericoli) present in the digestive tract of 30% of people suffering from Crohn's disease.

PHOTOS: DR

A "miraculous" result

The long list of inflammatory diseases also includes ocular pathologies against which Xigen, a spin-off from the University Hospital of Lausanne (CHUV), is developing innovative peptides. There are also rare diseases such as Behcet's disease, inflammation of the blood vessels that mainly results in damage to the mucous membranes such as mouth and genital sores for which Celgene's Otezla may find a new indication.

Another rare disease, hemophagocytic lymphohistiocytosis (LHL) affects about one in a million children. But resulting in particular in an excess of ferritin, a protein that stores iron in various organs, and by a severe deficiency of blood cells, this disease has a mortality rate of 40% with available treatments. To improve therapies, Novimmune, a biotech company based in Plan-les-Ouates near Geneva, and Basel, has developed the antibody-based drug Emapalumab. Novimmune has filed an application for approval with the US drug authority and do the same with its European counterpart this year.

The start-up AB2 Bio, based at the Innovation Park of the Swiss Federal Institute of Technology in Lausanne (EPFL), is for its part targeting a hereditary form of LHL called NLRC4-MAS, with the help of a recombinant protein, Tadekinig alpha. In 2015, before its phase 3 clinical trials started, the company was given the opportunity to test it compassionately on a three month-old American girl.

"After two injections, the result was miraculous" recalls Andrew Sleight, the start-up's CEO. Today, now three years old and still under treatment, the girl is doing well and results obtained since then in other compassionate uses are very encouraging. Tadekinig alpha may also be indicated for other forms of LHL and for the Still disease causing severe joint pain, for which no treatment is currently available.

Far from being exhaustive, this panorama shows how inflammatory diseases have become a field in which large and small companies in Switzerland are investigating and investing.

A NEGLECTED DISEASE

Sjögren's syndrome, characterised by dryness of the eyes and mouth followed by fatigue and joint pain, is more common than previously thought, affecting 0.2 to 0.4% of the human population. This is "an important market for many pharmaceutical companies," says Thomas Hügle, head of the Rheumatology Department of the Canton Vaud University Hospital (CHUV). Diagnosis involves biopsies of the salivary glands that are difficult to perform and may cause side effects. The rheumatologist has therefore developed a special tool that makes it easier to obtain the tissues to be analysed, currently being marketed by Curemed in Bern.

Our understanding of the immune system is paving the way for many new treatments

Faced daily with chronic diseases, Professor Jörg Seebach heads the Immunology department of the University Hospitals of Geneva (HUG). He regularly deals with diseases such as lupus and arteritis. He also leads research on xenotransplantation. Interview. BY REBECCA GARCIA

As head of the immunology and allergology service and the laboratory of translational immunology at the HUG, Professor Jörg Seebach does research in immunology and cell biology with particular emphasis on natural killer cells, a very active type of cytotoxic lymphocyte. His current projects include xenotransplantation and Fc receptor interactions with antibodies.

You coordinated a long term research program on lupus, how is it organised?
The Swiss cohort on systemic lupus erythematosus was established about 10 years ago. It is starting to release publications on the clinical data that have been collected. We gather them with all the patients who come regularly. I give my patients blood tests on an outpatient basis once a year for this research.

Is lupus easy to diagnose?
No it is difficult because the disease is quite rare. Lupus manifests itself in very different ways according to each patient. It can include skin lesions and pain in the joints, but it can affect the whole body. We have some means of diagnosis in the blood with serologies. We are looking for autoantibodies because fundamentally it is an autoimmune disease. The environment can have an influence but genetics can as well. We do not know all the mechanisms at the molecular level but research is bringing more and more answers.

Who is affected by lupus?
It affects one in 3,000 people. Lupus may be simple skin lesions at first, but it can also have very serious effects. We also know that it affects ten times more woman than men and that young African and Asian women are more at risk than Caucasians.

Another area of your expertise is xenotransplantation. Why is it important?
Xenotransplantation aims to eliminate the problems of organ shortages in the field of clinical transplants. The donors of human organs are too scarce, and one of the potential solutions is to use organs from animals. We chose the pig because it does not have the problems that monkeys have. They are too close to us and threatened with extinction.

> Xenotransplantation aims to eliminate the problems of organs shortages for clinical transplant.

How has the research evolved?
Since 1995 when I started working in this field there have been enormous changes in terms of understanding organ rejection and the creation of methods to avoid it. We now have genetically modified pigs to make them less visible to the human immune system.

We take baboons as recipients and multi-transgenic pigs as donors, and there, for example, we have recipients of hearts who have lived for several years with a pig's heart. If this heart is transplanted to the real place of the heart, it can stay for two or three months which may be sufficient to find a donor. These are better results than 10 years ago. In my opinion, we are close enough to do clinical trials with patients.

What is the transformation process of the animal heart to be transplanted in a human?
There are several ways the human immune system can reject organs from pigs. For example, there are antibodies in the blood that are very similar to the one involved in ABO blood groups' incompatibility which reject the organ of the pig. One of the solutions to improve compatibility was to eliminate the enzyme that produces a carbohydrate on the cell surface that was rejected by the antibodies. There are several knockouts of this type that eliminate rejections by human antibodies. All the different mechanisms of rejection and incompatibility are surmountable by genetically manipulating the pig.

Can we hope humans will benefit from these technologies soon?
We are getting closer. Today there are clinical trials under way for diabetics for example, even if it is encapsulated. In my opinion, the first therapeutic xenotransplantation will happen in the United States or in China.

Why not in Switzerland?
Because of the lack of investment and the critical mass of researchers – we are not very numerous in this field – and also perhaps the reluctance of the Swiss to embrace this pioneering field.

Is it easier to find out how to transplant pig organs into humans than to push people to register as a donor?
Even with optimal use of human theoretical donors, we would not have enough organs. The donation rate is particularly low in Switzerland, for political, societal or personal reasons, but this does not justify abandoning other approaches.

PHOTOS: DR

Professor Jörg Seebach heads the Immunology department of the University Hospitals of Geneva.

In addition, one can theoretically improve the performance of xenogeneic organs. If you can adapt pork donors, which you can never do with humans for ethical reasons, you may also be able to improve the recipient's tolerance. This immunological mechanism makes it possible to adapt the pig's organ that will be transplanted to the person to reduce immunosuppression, because today humans are forced to take drugs to suppress their immune system after transplantation.

How do you proceed to test the different molecules?
We define the rejection mechanisms in our laboratory experiments. We examine what molecules are involved, and let geneticists know which ones to change. They are the ones who modify the molecule, the enzyme or the protein in pigs.

Are the organs of pigs intended to last for life?
There I have my doubts. It is not possible that they will last for life, but a few years would be a good result.

Arteritis is also one of the pathologies you see on an outpatient basis. What do we know about it?
We see many patients with vasculitis. It is an inflammation of the arteries because of different mechanisms which affects patients who are 70 years old or more. The arteries are attacked by the immune system, and the origin of this attack is perhaps also dysimmunity, deregulation after an infection by a virus. The immune system can no longer calm down because the structure of the arteries resembles that of the virus. There, we must intervene to prevent vascular disasters.

> Nowadays we can often reduce the symptoms of chronic diseases so that people can live a normal life.

Why is the immune system still active?
We do not know precisely. There may be genetic aspects or environmental factors, such as smoke.

How do patients live with such a chronic disease?
There are many possible reactions. Some patients live a completely normal life, others are destabilised. What matters is to have good communication with their doctor, to be supported and to discuss how to manage the disease. There are those who face these challenges in an exemplary and courageous way. What I do for my patients is to organise meetings so that they support each other and share their experiences with people who understand what they are going through. Nowadays we can often reduce the symptoms of chronic diseases so that people can live a normal life.

The World Intellectual Property Organisation is headquartered in Geneva.

Protecting antibody therapeutics: intellectual property considerations

Since the first description of laboratory monoclonal antibody production by Prof. Askonas and colleagues in 1970, the monoclonal antibody industry has expanded exponentially. It has been estimated at close to 100 billion dollars in 2017.

BY GILLES PFEND, PH.D. AND ANDREA MANOLA EUROPEAN AND SWISS PATENT ATTORNEYS

Today, about 75 monoclonal antibodies (mAbs) are approved by the European Medicines Agency (EMA) and US Food and Drug Administration (FDA) for use in humans for treating various diseases, among which 35 in the field of inflammatory diseases including rheumatoid arthritis, Crohn's disease, ulcerative colitis, spondyloarthropathies, juvenile arthritis, psoriasis, psoriatic arthritis, and others.

These approved mAb-based therapeutics are usually directed against one of the following proteins involved in the inflammatory process: tumor necrosis factor (TNF), interleukin-1 (IL-1) receptor, IL-6 receptor, alpha 4 integrin subunit, VLA-4, CD52 or CD20 to name a few, and inhibit their activity.

Some of them, such as for example anti-TNF mAb-based therapeutics (infliximab, adalimumab, golimumab, and certolizumab pegol) have markedly improved the outcome of the management of rheumatoid arthritis .

This article illustrates the variety of ways in which antibodies may be claimed in a European Patent whether by their function, structure, combination of structure and function or their use. Of course, each case is specific and the question of what claims are appropriate will depend on the type of invention.

Patentability criteria

The European Patent Office (EPO) applies the same patentability criteria to inventions directed to antibodies as to other inventions, i.e. an invention must be novel, inventive and industrially applicable. In addition to these criteria, an invention must be sufficiently described, clear and supported by the description.

It is, however, increasingly difficult for a novel antibody to meet the inventive step requirement since the EPO's view regarding antibodies is that "nature does it for you". The Office now considers that, once you have a method to produce one type of antibody, the skilled artisan knows how to produce other antibodies by routine techniques with equivalent functional properties, albeit with a different structure.

Antibody defined by its function

An antibody may be functionally defined by the fact that it selectively binds an antigen X. In such a claim, the antibody is being defined indirectly by reference to its target, i.e. the antigen X to which it binds.

If this antigen is unknown, the EPO will likely acknowledge the novelty and inventive step of the claimed antibody and grant a broad genus claim. Theoretically, a broad antibody genus claim can be obtained even if no antibody has actually been made at the filing date.

If the antigen X is known, for example TNF alpha, then the EPO will not grant a genus claim. However, if the antibody binds a new epitope of the said known antigen, broad claims might still be possible assuming that the antibodies previously described are not directed to the new epitope.

Antibody defined by its structure

Remember, antibodies are glycoproteins belonging to the immunoglobulin superfamily consisting in two large heavy chains and two small light chains. Each light and heavy chain shows three regions (CDR1, CDR2 and CDR3) of hyper-variability (respectively VH and VL) in sequence called the complementarity determining regions (CDRs).

According to the EPO's recent case law, the inventive step criteria is not met for an antibody on the basis of structural non-obviousness since the production of an antibody against a known antigen is considered a mere routine process. However, this rejection might, in some cases, be overcome by describing in the patent application an unexpected, advantageous property of the antibody. An unexpected, advantageous property of an antibody may, for example, be a particular cross-reactivity pattern, a high affinity for the antigen target, a new or improved biological activity, or a low immunogenicity.

EPO Examiners mostly will also require the recital of all six CDRs amino acid sequences in the claims.

Even when an unexpected, advantageous property of an exemplified antibody has been established, EPO Examiners may still object to the claims for lack of inventive step and require full heavy and light chain variable amino acid sequences be recited in said claims in addition to the six CDRs.

Depending on the case, it is possible to overcome this objection by inserting a functional feature into the claim in addition to the six CDR amino acid sequences.

Antibody defined by an hybridoma

A patent application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. When biological material is involved, such as an antibody, it has to be assessed whether or not it is available to the public. If, for any reason, the antibody sequence is not available to the public, it is also possible to claim it by referring to a hybridoma. In such case, it is necessary to deposit the hybridoma producing the antibody at specific depository institutions such as, for example, the Culture Collection of Switzerland AG (CCOS) before filing the first (priority) patent application. Once the hybridoma is deposited, a viability test is carried out by the depositary institution and if this test is negative, the deposit is not acknowledged and a new deposit should be carried out. This may have a negative impact if the patent application has been already filed.

It is always advisable to include both an antibody sequence and a reference to a deposit as a way to make sure that the antibody has been fully disclosed.

Use of an antibody

As for any pharmaceutical substance or composition, where a known antibody is found to have a previously unappreciated function in a disease, it is possible at the EPO to obtain claims directed to this antibody for use in the treatment of the disease by way of so-called second medical use claims. The EPO generally accepts second medical use claims in the format "Antibody X for use in the treatment of disease Y".

SPC on antibody patent

A supplementary protection certificate (SPC) is an intellectual property right that extends the duration of certain rights associated with a patent. It applies to specific pharmaceutical and plant protection products that have been authorised by regulatory authorities (for example Swissmedic, Federal Veterinary Office and Federal Office for Agriculture). This authorisation refers to the first authorisation to place the product, for example an antibody, on the market as a medicinal product. The term of protection of the SPC begins as soon as the maximum term of protection (20 years) for the Swiss basic patent protection for the active ingredient expires and extends the protection for a maximum of up to five years on Swiss territory. A six-month additional extension is available if the SPC relates to a medicinal product for children for which data have been submitted according to a Pediatric Investigation Plan (PIP). In view of the recent change of practice initiated by the Swiss Federal Court decision on SPCs , it is not clear whether a new SPC based on a basic patent that claims an antibody via a functional language will be granted or held valid. In this situation, we usually recommend including in the patent description as much structural information as possible regarding both target-binding and constant regions of the claimed antibody.

Litigation

As with any other EP patent, once a patent on an antibody genus claim has been obtained, it may be opposed at the EPO or potentially rendered invalid in later national court proceedings. It is therefore always advisable to have also at least one claim directed to the sequence of the antibody in the same patent which can serve as a fallback solution if the genus claim is invalidated. The case law of the EPO is constantly evolving in life sciences. An invention that was considered inventive ten years ago is no longer inventive in view of the scientific progresses in biology. Keeping up to date with legal developments, not only at the EPO but also in other jurisdictions is essential to obtain a strong patent protection for an invention in the life sciences.

About the firm and the authors

Gilles Pfend Ph.D. and Andrea Manola are partners with Katzarov, one of the foremost intellectual property firms in Switzerland (www.katzarov.com) which provides creative, effective solutions for protecting intellectual property since 50 years. They both specialise in pharmaceutical and biotech inventions and counsel local and international life sciences clients on strategic issues relating to the development and management of their global patent portfolios.

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Located between Lausanne and Neuchâtel, Yverdon attracted Incyte to build a major manufacturing facility.

A booming economy supported by an innov ative life science sector

The life sciences sector fulfils an important role in the Swiss economy in general and in Western Switzerland specifically. In particular, the medtech industry has thrived thanks to the regional historic expertise of microtechnics and watchmaking (see chart below). Supported by the seven cantons in the region, Berne, Fribourg, Geneva, Jura, Neuchâtel, Valais and Vaud, Western Switzerland has the most diversified life sciences cluster in the world, called BioAlps. Western Switzerland is home to 1120 life sciences companies, 39 life sciences academic institutions, and 58 public and private support organisms. While each canton has its specificities, all are tightly interwoven to create a singularly rich tapestry of competencies and achievements, opportunities and specialisations, stimulating the region's innovation and competitiveness.

As 99% of the Swiss economy is driven by small and medium enterprises (SMEs), Western Switzerland has made a concerted effort to create incubators and accelerators to encourage the creation of start-ups. Mass Challenge, Eclosion, Fongit, Fri Up, Fusion, Neode, Y-Parc, InnoBe and The Ark all focus on driving innovation and fostering entrepreneurship by connecting startups with the experts and resources they need to grow. From financing to proof of concept with industry partners to market launch, there is easy access to the ecosystem which includes business angels, venture capitalists and corporations.

A new 9,100 m2 building called the SE-B extends the Lausanne (Vaud) BioPôle, which houses both start-ups in the marketing phase and companies that are leaders in their field. New tenants in the SE-B building already include the medical analysis company Unilabs and the Lausanne-based scale-up Abionic, which has developed a device enabling ultra-rapid screening for the risk of sepsis. StartLab is Biopôle's new incubator, dedicated to the support and commercial development of innovative scientific projects.

Campus Biotech, based in Geneva with a population of 1,200 highly qualified life sciences professionals, constitutes an unusual model which groups together university researchers, startups, SMEs, and international health organisations such as GAVI, the vaccine alliance. This rich environment leads our attractive startups to flourish. For example, Lundbeck recently acquired Prexton Therapeutics. Agilent acquired Genohm. After having raised the largest investment round for a Swiss startup in 2016, ADC Therapeutics ranked top of 20 VC rounds in 2017 with CHF 197 million ,while Obseva was listed on Nasdaq.

A number of high performance centres of competence are concentrated in Western Switzerland. The Swiss Integrative Center for Human Health (SICHH), comprised of a network of 10 academic partners, was imagined by the University of Fribourg and the Fribourg

Western Switzerland Medtech Industry Landscape 2017

Total exports value (CHF)	CHF 4,1 Billion
Contribution to total export value (Percentage)	5,2%
Number of employees (EFT)	20 400
Number of employees per million active population	64
Part of the total active population	1,6%
Number of medtech companies	295
Part of the total life sciences companies	27%
Productivity per medtech employee	CHF 310 000
Sales turnover invested in medtech R&D	(17%)
Medtech patents per million inhabitants (2017)	37
Annual sales growth rate (Yearly Avg. 2012-2016)	4,6%
Venture Capital Investment in medtech start-ups (Yearly Avg 2016-2018)	CHF 95 million
Part of the Venture Capital Investment in medtech (Avg 2016-2018)	21%

cancer researchers from different partner institutions. The ISREC and the Ludwig Institute for Cancer Research, the University Hospitals of Geneva (HUG) and Lausanne (CHUV) and the University of Lausanne are all members of this single site in Lausanne.

The Swiss Cancer Centre – Léman (SCCL) leads cutting-edge basic and translational cancer research in personalised molecular therapies and immunotherapies with the aim of developing outstanding multi-disciplinary care for cancer patients. The SCCL is a truly integrated research community whose multidisciplinary cancer research programmes offer the most innovative approaches and therapies for cancer patients.

Increasing recognition that research on autoimmune diseases is still in its infancy has led to further efforts in identifying and treating such conditions. Startup Augurix, in the Valais, designs, produces and markets companion diagnostics devices to facilitate early diagnosis and confirmation of gastro-intestinal diseases, notably celiac disease. The CHUV has recently inaugurated a cell production facility for immunotherapy in the Biopôle in Epalignes (Vaud).

This dense ecosystem and efficient infrastructure attract significant foreign investments. The existing talent pool, favourable business environment, and proximity to leading academic institutions are enticing. Celgene, based in the canton of Neuchâtel, is building its second production plant in Couvet, Val-de-Travers, followed by the construction of a third production site in the canton, in Boudry, to produce oral treatments to treat patients with inflammatory bowel diseases. American oncology specialist Incyte is investing $100 million for a monoclonal antibody production site in Yverdon (Vaud) and has installed its EMEA headquarters in Geneva. In Vaud, American cancer diagnostics and pharma services company NeoGenomics settled its European headquarters there.

It is this diverse, dynamic and creative life science ecosystem that BioAlps maintains and promotes, due to its excellence and performance in local, regional and international markets. BioAlps bolsters innovation and nurtures creativity in research, education and business, enabling novel products and services to reach the market efficiently and quickly. BioAlps is the entry point to a wealth of contacts, knowhow, knowledge and provides both personal and institutional support and thus contributes to maintaining the high position of Switzerland in international rankings.

MR. PHILIPPE LEUBA
Minister of Economic Affairs, Innovation and Sport, Canton of Vaud

MR JEAN-NATH KARAKASH
Minister of Economy and Social Affairs, Canton of Neuchâtel
President of the Conference of Economic
Departments of Western Switzerland Cantons (CDEP-SO)

Cantonal Hospital; it is hosted in blueFACTORY in Fribourg. SICHH was developed to provide both academia and industry with custom R&D services, with the latest available equipment in spectroscopy and microscopy, sequencing and computing power. Based in Monthey (Valais) since 2016, Swiss Biotech Center (SBC) acts as a competence centre open to innovative companies, academic researchers, developers and young entrepreneurs. SBC turns biomedical research of academic institutions and small companies into products, providing support to innovative biopharmaceuticals and in vitro diagnostics companies, with a specific focus on point-of-care tests.

The Center of Excellence in Characterisation (CEC) brings together experts and methods from CSEM, the Haute Ecole Arc (HE-Arc) and the Paul Scherrer Institute (PSI). Based in Microcity in Neuchâtel, which is part of the Western Switzerland Innovation Park (SIP) network, CEC builds on the microtechnical heritage of the Neuchâtel region, as applied to the life sciences. A centre for artificial muscles is opening in one of EPFL's offices in Neuchâtel. Indeed, researchers from EPFL's Integrated Actuator Laboratory based in Microcity, Neuchâtel, are already working on a new assistance system for cardiac failure. Also in Neuchâtel, startup One Drop Diagnostics is developing innovative photonics technology which measures multiplexed assays from the surface of microfluidic chips. In Lausanne, Lunaphore Technologies SA is developing a next-generation technology for cancer tissue diagnostics, using fast fluidic exchange (FFeX) microfluidics technology.

With the excellence of its teaching and research institutions, Western Switzerland has become a hub for research and development in the fields of oncology, auto-immune and inflammatory diseases. There have been strong developments in oncology. The Agora translational cancer research centre in Lausanne groups together over 300

[1] *https://www.eda.admin.ch/aboutswitzerland/en/home/wirtschaft/uebersicht/wirtschaft---fakten-und-zahlen.html*
[2] *https://www.biopole.ch/fr/news/adc-therapeutics-ranks-1-in-top-20-vc-rounds-in-switzerland-for-the-second-consecutive-year-closing-chf-200-million-in-2017/*

Socorex Isba: experts in laboratory metrology and animal injection

A world leader in precision liquid handling, Socorex Isba exports more than 90% of the dosing instruments it produces in Ecublens near Lausanne. **BY SYLVAIN CHRISTEN, CEO OF SOCOREX ISBA SA**

Liquid volume measurements in a laboratory require special attention and adequate instrumentation, especially when the range is less than a microlitre.

Technological know-how

Precision dosing has been Socorex's strength for more than 50 years. The company, whose production site is in Ecublens near Lausanne, mastered the tightness of a plunger in a barrel, liquid flow through a valve system and fluid metrology. This expertise proved to be an asset in manufacturing medical syringes until the 1980s and the transition to increasingly precise dosing instruments in ever smaller volumes.

Today Socorex concentrates its activities in the areas of laboratory liquid handling such as dispensers, manual and electronic micropipettes, pipettors and repeater pipettes, for example and animal health including variable and fixed volume automatic injectors for mass vaccination.

Calibration to the highest standards

Accompany our products through their lifespan, Socorex offers a service centre with qualified personnel providing efficient maintenance and calibration. The laboratory has been accredited to ISO 17025 standards and the service programme has increased as demand has grown. More than ten service levels are now offered for instruments of all brands, both in Socorex's laboratories and on customers' sites.

> Beyond its quality, the success of a products depends on the circles of competences which surround it.

Global distribution with local roots

More than 90% of products are exported worldwide through dedicated distributor networks. These partners serve users by providing technical advice, keeping stock, caring for sales and performing maintenance locally.

Over the years Socorex has built an important community of institutional and private partners. These contacts and collaborations consolidate its presence in the Lake Geneva region making the company a privileged player in the promotion of science.

Staying at the forefront of progress

Liquid handling is constantly evolving with new analytical methods, miniturisation of equipment and increasing costs of reagents. These trends fuel the demand for reliable, ergonomic, durable instrumentation enabling precision dosing in very small volume ranges. Meeting these expectations remains Socorex's main focus.

Precision micropipettes and bottle-top dispensers undergo a strigent validation process before QC acceptance.

InnoMedica's clean room facility in the MIC.

InnoMedica develops new cancer medication at the Marly Innovation Center

What started as a venture in an improvised laboratory in a basement in Bern will soon find its way into Swiss hospitals: an innovative biological transport system to improve chemotherapy

BY ANDREA ZURKIRCHEN, HEAD OF COMMUNICATION, HR, LEGAL & COMPLIANCE AT INNOMEDICA

The concept is simple but smart. The aim is not to discover new active substances, but to enhance the risk-benefit profile of well-known pharmaceutical ingredients. "This was the sole reason why we dared to start this project in 2013," explains Dr Peter Halbherr, General Manager of InnoMedica. "Otherwise it would have been impossible for us to finance it." Because of this, InnoMedica's therapy does not qualify as a new substance but as a known substance with innovation, allowing for a simpler submission to Swissmedic, thus constituting a massive strategic advantage.

In-house clean room facility

"At the beginning of the project it was rather difficult to find investors willing to finance our idea and we soon realised that it wouldn't be possible to outsource the production process," Dr Halbherr says. "So we invested nearly all our acquired new capital in the first clean room facility. Of course, this was only feasible with a partner who understood the needs of a small pharma startup and was also willing to take risks."

Dr Halbherr remembers how the team built up their production site in the Marly Innovation Centre near Fribourg. In hindsight, the construction of InnoMedica's own cleanroom turned out to be a wise decision that has proven instrumental for fast development of the drug compound. The former Ilford complex was an ideal incubator, offering a good infrastructure for pharmaceutical production purposes as well as considerable room for expansion.

Today the InnoMedica team consists of 22 employees and is continuously growing. The first clinical batch will soon be manufactured for InnoMedica's initial clinical trial with the cancer therapy Talidox. The trial will take place in five Swiss hospitals and be conducted by the Swiss Group for Clinical Cancer Research (SAKK). Additionally, the research and development department has already filled the pipeline with promising new oncological compounds, while also venturing into neurology: "As it turns out, our transport system can be modified so as to cross the blood brain barrier and we decided to use this advantage for a new approach in the treatment of Parkinson's Disease." explains Dr Halbherr.

The Marly Innovation Center in Marly (canton of Fribourg).

Across the blood brain barrier

The treatment uses an endogenous active substance with protective and regenerative properties aiming to reverse the neuro-degenerative process of the disease. Last year's filing of its patent application has encouraged InnoMedica to proceed with the newly developed compound. "If we can achieve real benefits for patients with our technology, we are obliged to do so." Dr Halbherr is not alone in this opinion: the growing shareholder base of InnoMedica, counting more than 650 investors, illustrates the strong interest in small but innovative players in the pharma business. In order to remain independent, InnoMedica has pursued a milestone financing model, addressing a larger public in its annual capital increase campaigns.

Given the promising preclinical results in terms of efficacy and tolerability, expectations are high and oncologists are eagerly awaiting the launch of the clinical trial with Talidox. To Dr Halbherr it is clear that the progress of the project was made possible both by the highly skilled team of InnoMedica and the strong involvement of its numerous partners.

MARLY INNOVATION CENTER

THE MIC IN BRIEF

The MIC is one of the largest technology centres in Switzerland at 370 000 m². Our current facilities include available spaces for rent, of which 7000 m² are fully equipped and secured laboratories. Five buildings with an additional area of approximately 11 500 m² are being constructed. 150 companies – providing 500 jobs – are currently enjoying the benefits of our infrastructure. And we have space for new members!

In future a green eco-dwelling will be built in the immediate surroundings. This will provide an entire ecosystem for people who work on site. Quality of life is essential to success.

marly-innovation-center.org

Straumann is expanding capacity with a CHF 40 million investment in Villeret.

More than creating smiles – restoring confidence

Implant dentistry leader the Straumann Group produces more than 12 million components at its main production centre in the heartland of Swiss watchmaking in Villeret.

BY DR. GERHARD BAUER, HEAD RESEARCH, DEVELOPMENT & OPERATIONS, STRAUMANN GROUP

The need for tooth replacement and corrective dentistry is huge, even in countries where dental care is highly advanced. The American College of Prosthodontists estimates that 178 million people in the US are missing at least one tooth and about 40 million are missing all their teeth, while 75 per cent of the population have misaligned teeth. These facts underline the significant medical need for modern tooth replacement and corrective solutions offered by the Straumann Group.

Pioneering implant dentistry

Headquartered in Basel, the Straumann Group is a global leader in tooth replacement and aesthetic dentistry. It unites global and international brands that stand for excellence, innovation and quality including Straumann, Neodent, Medentika, ClearCorrect and Dental Wings. In collaboration with leading clinics, institutes and universities, it researches, develops, manufactures and supplies dental implant systems, biomaterials and digital solutions for use in tooth replacement and restoration or to prevent tooth loss.

For more than six decades, Straumann has been innovating, developing and refining products that meet patient needs and enhance the quality of life. More than 40 years ago, the company was among the pioneers of implant dentistry, which has since become one of the most popular treatments for replacing lost teeth and restoring smiles. Dental implants are highly sophisticated minute screws that effectively replace the root of a lost tooth. Made of biocompatible titanium or ceramic, they integrate with the jawbone to support and anchor dental crowns and dentures.

Through its various brands the Straumann Group offers an unparalleled range of implant solutions that cover all indications, preferences and price requirements. Its flagship premium brand, Straumann, is renowned for innovation, clinical excellence and, above all, Swiss precision and reliability. It was in Switzerland that Straumann developed innovations like the SLActive implant surface, which cuts healing times dramatically, and the high-strength material Roxolid, which makes it possible to produce smaller minimally invasive implants. Straumann has also developed a range of full ceramic implants for patients who require highly aesthetic metal-free implant solutions.

Straumann Pure is made from a very special ceramic.

A new CHF 40 million investment

The company takes pride in its Swiss heritage, quality and service, which are key attributes of its premium positioning. Straumann's main production centre is in the heartland of Swiss watchmaking. Sixteen years after it went into operation, the factory in Villeret employs a team of 520 and produces more than 12 million components a year. With sales growing strongly and capacity running at full speed, the plant has started a large construction project with an investment of CHF 40 million. The expansion is creating new jobs in Switzerland and the company is looking for skilled operators and precision engineers.

Every 10 seconds someone somewhere in the world is treated with a Straumann Group product. The company's success is due not only to its innovative, high quality products and service excellence, but also its ability to provide total solutions. Straumann offers a broad range of biomaterials because up to one in every two implant procedures requires bone augmentation. It also provides a wide range of digital solutions to help plan and guide treatments by computer and to design and fabricate prosthetics. The digital range includes intraoral scanners, lab scanners, 3D printers, chairside and in-lab milling machines and related planning and software. These tools span the complete tooth replacement and orthodontic workflows, saving time, cost, discomfort and inconvenience. In addition, digital solutions increase predictability.

The group recently branched out into orthodontics by acquiring ClearCorrect in the US, which offers modern clear aligner solutions to correct misaligned teeth.

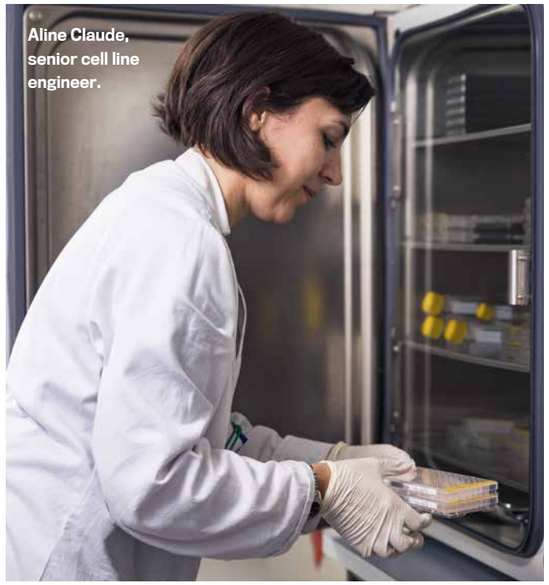
Straumann's journey into new fields, segments, geographies and technologies has turned it into a global group of national and international brands, companies and partners. It currently employs approximately 5,500 people worldwide and its products, solutions and services are available in more than 100 countries through a broad network of distribution subsidiaries and partners.

Selexis drives innovation in cell line development from research to manufacturing

Headquartered in Geneva, Selexis is the global leader in cell line development that enables the life sciences industry to rapidly discover, develop and commercialise innovative medicines and vaccines.

BY ROBERT MEISTER, HEAD OF CORPORATE AND MARKETING COMMUNICATIONS, SELEXIS SA

The increasing prevalence of chronic diseases, ranging from cancer to autoimmune, have driven industry demands for recombinant protein expression systems that can support faster, effective and safer drug discovery and manufacturing. This, along with the paramount need for technologies that can help express complex next-generation biologics, has fuelled the remarkable growth of Selexis.



Aline Claude, senior cell line engineer.

"Made in Switzerland" commitment

In 2001 Igor Fisch PhD co-founded Selexis using prize money he won from the de Vigier Foundation followed by the NETS prize (the predecessor programme of Venture Kick), a philanthropic three-stage funding model to support Swiss startups. Today, Selexis is helping its global partners predictably, rapidly and cost-effectively generate life-saving biological medicines and vaccines with its modular suite of technologies, the SUREtechnology Platform™. The platform addresses all aspects of cell line development from efficient gene transfection and integration to the selection and characterisation of a final high-producing and stable clonal research cell bank (RCB) that is "Made in Switzerland."

Generating stable production cell lines that secrete maximum levels of therapeutic proteins requires elevated gene transcription and a production cell line with machinery that can fold and secrete the increased protein load. The SUREtechnology Platform has been built to meet these two fundamental needs.

A recipe for growth

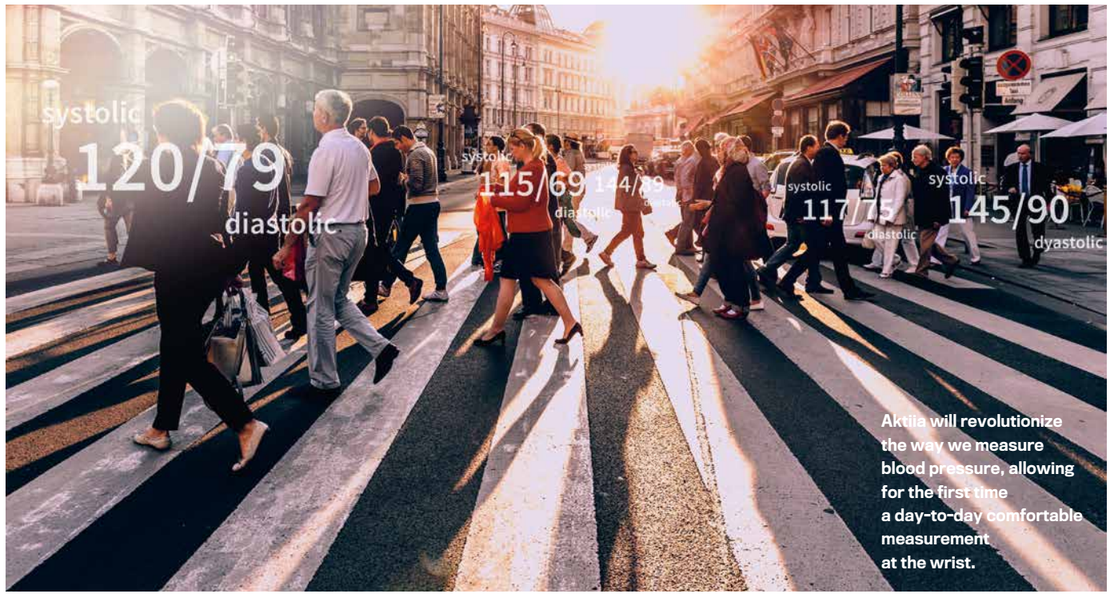
In 2017 Selexis became part of JSR Life Sciences. Together with KBI Biopharma, another JSR company, Selexis introduced a new collaboration: the most robust and fastest gene to GMP service offering in the biopharmaceutical industry, GENE to GMP™ in 9 onths. This offering brings together the collective expertise of both KBI and Selexis to deliver a seamless process for fast development of protein therapeutics without sacrificing quality or analytics. For conventional mAbs and more readily-expressible proteins, the development process advances to clinical grade API (active pharmaceutical ingredient) in nine months versus traditional industry timelines of 16-24 months. Industry partners can predictably get cGMP material for their clinical studies and benefit from best-in-class contract development manufacturing (CDMO) services.

Proven around the world

Selexis' technologies are currently being used in more than 100 drug products in clinical development and three marketed products in oncology and inflammation. Recently, the company also signed its 100th commercial license agreement and invested $2 million in new laboratory equipment for its state-of-the-art laboratory facility and corporate headquarters in Geneva's biotechnology hub.

Mission still holds true

Built on a more than 15-year mission to continually develop cutting-edge technologies and sciences, Selexis has become the internationally recognised innovation leader for mammalian cell line development. From traditional monoclonal antibodies to next-generation biologics, Selexis will continue to bring novel technologies to biopharmas seeking to develop complex yet potentially life-saving therapies.



Swiss startup set to reinvent the way we measure blood pressure

Based in Neuchâtel, aktiia deploys a proprietary technology to measure blood pressure at the wrist based on optical sensors that we already wear in our smart watches. **BY MATTIA BERTSCHI AND JOSEP SOLA, FOUNDERS OF AKTIIA SA**

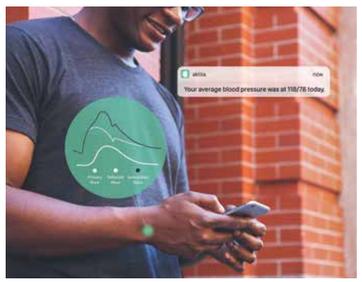
According to the World Health Organisation, every third adult suffers from high blood pressure – that is more than 1 billion adults worldwide. So-called hypertension can lead to severe complications and results in 7.5 million premature deaths worldwide.

Hypertension awareness

The paradox of hypertension is that most people suffering from the condition are unaware of it, which is why it is known as the silent killer. Yet the standard way to measure blood pressure remains a cuff placed around the arm – a 110-year-old technology that is cumbersome and leads to low acceptance for patients prescribed to self-monitor at home.

aktiia SA was created in 2018 to release its disruptive technology to fight hypertension, starting from the deployment of global scale prevention campaigns, through to the daily follow-up of diagnosed patients. The aktiia solution relies on more than a decade of pioneering work by the Swiss Research and Technology Organisation (CSEM).

This proprietary technology, named OBPM – Optical Blood Pressure Monitoring, enables the estimation of physiological parameters from optical signals measured at the wrist, similar to the signals measured every day by commercial smart watches. The aktiia solution (awarded the Neode prize 2017) will be embedded in non-medical third-party wearables tracking blood pressure trends for preventive purposes, as well as in aktiia's medical grade wearables for medical diagnosis and management of hypertensive patients. aktiia aims for CE marking as well as FDA clearance.



Aktiia technology relies on more than 10 years of Swiss research on the measurement of blood pressure.

Data to revolution clinical practices

In September 2018, four months after its incorporation, the company has offices in Neuchâtel (in Neode/Microcity Incubator) and Zurich, employs 10 highly-qualified people and exploits the worldwide support and network power of its Silicon Valley and Swiss-based investors. aktiia is currently developing both strategic third-party manufacturer partnerships and its full product offering.

After more than a century of limited access to the real time 24/7 blood pressure profiles of hypertensive patients, the time has come to change. The new data generated by the aktiia products is expected to revolutionise clinical practices.

As Professor George Stergiou of the European Society of Hypertension explains: "When this technology becomes available, we will have to rewrite the chapter on diagnosis and management of hypertension and all the methods for blood pressure evaluation will eventually become redundant."

Six steps to success at Tornos

Building on its proud 125-year history, Swiss machine tool manufacturer Tornos is well on its way to implementing its six-point 2020 strategy. **BY MICHAEL HAUSER***

Streamlining operations and maintaining our renowned quality are at the heart of Tornos strategy. For more than 125 years our company based in Moutier, Switzerland, has enabled production of high-quality components across many industries. Our first-class Swiss-type machines and high-productivity multispindle machines deliver volume and quality to customers in the automotive, electronics, medical, dental, micromechanics and other sectors. Today, Tornos is two-thirds through its 2020 business strategy supported by six strategic thrusts.

Internationalisation

A huge manufacturing shift motivated us to adapt our processes. This shift – mainly toward China – affected both our customers and ourselves as machine tool makers. We adapted our previously Europe-focused strategy, and key to this has been the opening of plants in China and Taiwan, now accounting for about 50 per cent of our output, focusing on entry-level and standard machines. Key components are made in Moutier, which focuses on high-end, precision machines like the MultiSwiss, EvoDECO and SwissNano. Europe remains Tornos core region and our expansion gives customers in all other markets access to standard Swiss-type lathes to produce virtually any part.

Flexibility

Adoption of lean manufacturing gives us flexibility for long-term sustainability. We have reduced the time it takes to manufacture machines by 30 per cent, without sacrificing quality, due to automation, greater efficiency, careful outsourcing and reducing our carbon footprint.

The importance of flexibility was proven by the Swiss National Bank unpegging of the Swiss franc/euro fixed exchange rate, making trading with Switzerland more costly. Switzerland is famous for quality, precision, durability and safety. Whether you buy a Swiss watch or a Swiss machine tool, you know that it is a quality product that holds its value. We must capitalise on this even if some of our components will be produced outside of Switzerland. We have also created a new management tier: global supply chain management.

Tornos CEO Michael Hauser describes the group clear strategy.

Innovation

Another way to mitigate currency difficulties is to grow Switzerland's reputation for machine tool innovation especially with fierce competion from the East. We embrace Industry 4.0 and new manufacturing technologies, as proven by our streamlined portfolio with the high-tech SwissNano, designed for micromechanics, and our TISIS communication and remote machine monitoring software.

Service

Tornos' precise, sophisticated and customisable machines require equal support. Tornos Service provides support from the first sale anywhere in the world. Our loyal workforce plays a vital role.

Operational excellence

Operational excellence begins at home. We enhance our operational excellence through such internal initiatives as embedding our core values across the global group.

Customised solutions

These measures enable Tornos to target a wider range of sectors and territories with customised solutions – diversification to ensure our longevity. With our clear strategy, Tornos is set to finish the current cycle in a position to further target global markets and contend with growing competition from East Asia. Targeting specialised manufacturers and innovating our products, we will advance our legacy as the Swiss standard of quality worldwide.

*Michael Hauser is CEO of Tornos and a member of the boards of Schlatter Industries and Starrag Group Holding. He is a SWISSMEM council member and chairman of its machine tools and manufacturing technology division, and vice-chairman of the CECIMO European Committee for Cooperation of the Machine Tool Industries Board (he was chairman from 2009 to 2011).

Ferring: helping people live better lives

Ferring Pharmaceuticals is a research-driven, specialty biopharmaceutical group committed to helping people around the world build families and live better lives. **BY MICHEL PETTIGREW, PRESIDENT OF THE EXECUTIVE BOARD AND CHIEF OPERATING OFFICER OF FERRING PHARMACEUTICALS**

Founded in 1950, today Ferring is a leader in reproductive medicine and women's health, and in specialty areas within gastroenterology and urology.

Our global headquarters are based in St-Prex, Switzerland, where we employ over 700 people. In addition to the headquarters, the St-Prex site also hosts a production facility which manufactures our market-leading treatments for inflammatory bowel disease and bedwetting in children.

Globally, we operate in 56 countries, employ over 6,500 people, and help improve the quality of life of patients in over 110 countries.

Ferring delivers personalised healthcare solutions.

Building families worldwide

Ferring has been developing treatments for mothers and babies for over 50 years. We are the only pharmaceutical company to have a full spectrum of products from conception to birth. A scientific leader in fertility, we are committed to advancing research to help the 1 in 6 couples around the world who have difficulty starting a family.

In addition to helping people become parents, we are also committed to ensuring a safe birth for all mothers, no matter where they live. As part of this commitment, one of our goals is to use our expertise to help reduce maternal mortality. Excessive bleeding after childbirth, or postpartum haemorrhage (PPH), is the leading direct cause of maternal death worldwide. Through our innovative collaboration with the World Health Organization (WHO) and MSD for Mothers, we are working to reduce post-partum haemorrhage in the countries with the highest burden.

We are also committed to advancing research to help families affected by preterm birth, with a focus on finding the unknown causes of preterm birth and new ways to prevent it.

Developing novel therapies and addressing the unmet needs of patients

Our success results in good measure from a strong scientific heritage which continues today.

We invest heavily in the process of creating new medicines through our research and development centres and through research collaborations with scientific institutes, as well as leading biotechnology and pharmaceutical companies.

Ferring is a science-driven organisation with a long and strong track-record in peptide-based drugs, and it has the world's largest portfolio of peptide-based medicine.

Earlier this year, we announced a 30 million CHF investment in a new biotech centre at our St-Prex site. While we will continue to invest in peptide research, the new centre will expand our existing capabilities in the discovery, development and manufacture of biologics, including monoclonal antibodies, enabling us to meet both present and future patient needs.

We also recently acquired Rebiotix, an innovative biotechnology company and microbiome pioneer. Rebiotix is developing a non-antibiotic treatment for the prevention of recurrent Clostridium difficile infection, one of the most common healthcare-associated infections in the US. This treatment has the potential to be the world's first approved human microbiome product.

Earlier this year, we also signed a global agreement to commercialise a novel gene therapy, which has the potential to revolutionise the way bladder cancer patients are treated.

Overall, it's an exciting time to be here at Ferring. We have significant opportunities to bring innovative new solutions to our patients, across our key therapeutic areas of reproductive medicine and women's health, gastroenterology and urology.

SAV-IOL aims to launch a new product every year.

Intra-ocular lenses a far-seeing part of the Internet of Things

Neuchâtel-based Swiss Advanced Vision – SAV-IOL – is disrupting the market for intra-ocular lenses for cataract surgery with app-controlled active devices. **BY MAX BOYSSET, CEO OF SAV-IOL**

Cataract is an unavoidable evolution for the eye's crystalline lens that ultimately develops into blindness if left untreated. The goal is for the patient to recover sharp and glasses-free vision, and Swiss Advanced Vision (SAV-IOL) is engaged in that mission. We have two unique characteristics: we are the sole Swiss manufacturer of intraocular lenses (IOL) and the only one considering ultra-innovative and disruptive technologies to move this market into another era.

A new product every year

Our commercial policy and R&D activities are aligned and intense – we aim to launch a new product every year, and this highly demanding challenge has been achieved with remarkable success so far. In 2016 we launched our first IOL called InFo, built around a unique and innovative extended depth of focus technology (EDOF) called Instant Focus. An aspheric element turns the incident wavefront into a pseudo-non-diffracting beam, enabling constant resolution and light intensity on the retina and leading to a higher level of comfort for the patient.

After the launch of the InFo lens in 2016, we launched the Lucidis and Eden lenses in 2017, both using Instant Focus patented technology. As a new concept, Lucidis brings two major achievements to the monofocal market: extending the depth of focus on a monofocal lens and being the first affordable Instant Focus IOL. Thanks to its advanced refractive design, it allows continuous vision from near to distant. At the same time we are building on the success of the InFo lens for the multifocal market. With convenient blister packaging, Eden, the gold standard in the premium hybrid market, offers high-performance continuous vision.

> All projects aim to address untapped issues through entirely novel approaches to intraocular lenses.

Active and connected devices

In the autumn of 2018 a genuine custom-made EDOF IOL will be launched with a user-friendly web interface for patients and surgeons. A graphical preview will be displayed to help find the optimal compromise for a patient's vision. From the same interface, an order will be sent to SAV-IOL for on-demand manufacturing.

As "far-seeing" remains the core value of the company, all projects aim to address untapped issues through entirely novel approaches to intra-ocular lenses, and there are many. One such project, called R-TASC – Real-Time Autofocus Servo Control – proposes an active lens with autofocus and wireless connectivity for app-control. This lens addresses the issue of the lack of real accommodation that passive lenses suffer due to their static design. A passive approach comes inevitably with compromises with regard to light distribution, resolution and visual disturbances. R-TASC proposes an active and continuous loop control for the focus and energy transmission. That disruptive implant will be placed into the healthcare IoT (Internet of Things) implants family, so far very discrete. This revolution represents a turning point in an industry that still has not moved to active and connected devices.

The R-TASK project is protected by one of the patents that the company has filed among a solid IP portfolio. As of today, our teams are working on five different subjects, and the resulting products and methods will be as disruptive as R-TASC is today. But so far, those remain secret – aligned with our "far-seeing" credo.

In Bulle (Canton of Fribourg) UCB is operating in a state of the art biotech manufacturing facility.

UCB: creating value for patients

Inspired by patients and driven science, UCB is bringing solutions to people living with neurological or immunological diseases.

BY NICOLAS HUG, GENERAL MANAGER UCB BULLE (SWITZERLAND) & HEAD OF BIOTECH COE

At UCB, we are inspired by patients and driven by science. We follow a single strategy: to offer value to people suffering from severe diseases in neurology and immunology. Founded in 1928 and headquartered in Belgium, UCB employs more than 7,500 people of over 70 different nationalities operating in circa 40 countries. Our business is solid. Our total revenue grew to 4.5 billion euros in 2017.

Connecting science with patients

Rather than starting researching any new drug with the science alone, we want to better connect patients with science and science with patients. Our researchers are developing a range of novel chemical entities (NCEs) and novel biological entities (NBE) to improve people's lives. We recognize that radical changes are taking place in the eco-system of care and that we need to evolve accordingly to deliver on our vision.

Better understanding the reality of patients living with neurological and immunological disorders will enable us to take a more holistic approach to care, ensuring that ultimately the right drug and the right care reaches the right patients in order for them to live the lives they choose.

Patients inspire us to bring them value through more cutting-edge science, more innovative drugs, and more practical solutions. Each year, more than a quarter of our turnover is reinvested in research and development. Based on clear priorities, we are well positioned to develop our molecules and deliver promising therapies. We have two state of the art R&D centers in Belgium and in the UK and several international partnerships with renowned academic institutions. We are leveraging scientific advances and skills in areas such as genetics, biomarkers and human biology.

More than CHF 600 million invested in Switzerland

In Swizerland, UCB invested since 1996 more than 600 million CHF in his plant in Bulle (in the canton of Fribourg) for the construction and the installation of industrial equipment on the cutting edge of techonology and innovation. Today, UCB employs more than 500 qualified employees in Switzerland.

The new biotech manufacturing plant in Bulle inaugurated in 2014 and operational since 2015 allow UCB to deliver a treatment to patients suffering of chronic inflammatory autoimmune diseases such as rheumatoid arthritis or Crohn disease.

Creating patient value is what inspires us, drives our actions and allows us to be more agile in an ever-challenging world. Integrating the patient at every level of our operating model is our way to create unique and sustainable value and we believe every one of us can have an impact, wherever in the world, whatever our role.

AMAL Therapeutics educates the immune system to fight cancer

AMAL Therapeutics is a Swiss biotech developing unique therapeutic vaccines that trigger potent immune response against tumour cells. **BY MADIHA DEROUAZI, FOUNDER AND CEO OF AMAL THERAPEUTICS**

Founded in 2012, AMAL Therapeutics is a spin-off from the University of Geneva and is currently transitioning from a discovery to a clinical stage biotech company. It employs 13 people, led by a dedicated team with a strong background in immunology, cancer immunity R&D and drug development expertise, gained from working in startups and at renowned academic institutes and large pharma companies.

AMAL Therapeutics aims to overcome the challenges around effective anti-cancer therapy by stimulating a patient's immune system in a unique way to create immunological memory, as well as targeting a broad range of patients. To do so, we are using our proprietary vaccine platform KISIMA to educate the immune system to specifically recognise and kill tumour cells. Thanks to its unique pathway supporting and enabling the immunotherapy field, AMAL Therapeutics has ranked among the top 100 Swiss startups for three years in a row since 2015, reaching 14th position in 2017.

The momentum of immunotherapies

In oncology, multi-modal treatments are in the vast majority of cases the standard of care, including surgery, radiotherapy, chemotherapy, and targeted therapy. However more recently immunotherapy has become a new treatment modality available in this armamentarium.

Despite major advances in understanding of cancer biology and improvement in clinical cares, some cancers still have a very poor prognosis, including metastatic colorectal cancers and glioblastoma. Therefore, there is an urgent medical need to develop new treatment options with the objective of either enhancing or partially replacing the current standard of care, in a multi-modal approach.

In this context, the goal of a therapeutic cancer vaccine is to educate the killer T lymphocytes and the helper T lymphocytes to recognise and destroy tumour cells. Active immunotherapy is a conceptually attractive treatment option to be used in conjunction with existing modalities. Indeed, T lymphocytes can actively seek out neoplastic cells, and they have the potential to safely and specifically eliminate these cancer cells without damaging the surrounding healthy tissues.

A first-in-class platform

AMAL Therapeutics has developed a first-in-class vaccine platform, called KISIMA, that can be tailored to any cancer indications by changing the antigens. KISIMA allows simultaneous priming of both helper and killer cells, while providing the necessary activation signal required for a potent anti-tumour immune response. KISIMA was established and validated in different murine tumour models along with an established link between tumour infiltration and control of tumour growth. Key parameters have been optimised including optimal dose, route of injection and vaccination schedule. A pilot non-human primate study confirmed the dose and route of injection while showing a good safety profile for the vaccine. A strong data package for combination therapies showed synergies with immune checkpoint inhibitors that lays the basis of our ambitious first-in-man clinical trial.

AMAL Therapeutics's lead vaccine from the KISIMA platform, ATP128, has been designed and tailored towards colorectal cancer. The manufacturability of the compound has been established, and currently process development and scale-up is ongoing. The GLP toxicology study will start by the end of 2018, and the initiation of the clinical trial in combination with an immune-checkpoint inhibitor is planned for the second half 2019.

Amal's headquarter is located on the campus of the University of Geneva.

The BioArk Technology Park is a link between two major industrial sites in the canton of Valais.

BioArk bridges industries with innovation

The canton of Valais, accounting for one in four life sciences jobs in Western Switzerland, has big plans for growth in the sector, and BioArk is playing a major role.

BY JACQUELINE PRIM, PROJECT MANAGER, AND MASSIMO NOBILE, SITE MANAGER AT BIOARK

Diversifying and driving the regional economy through new high added-value activities with strategically aligned innovation projects is the mission The Ark Foundation received from the canton of Valais authorities in 2004. In addition to day-to-day support of innovation projects, The Ark invested in building a holistic approach, strengthening and combining the best from companies, academia and government to create a truly regional innovation system. One building block of this system includes dedicated technology parks in the areas of digital sciences and services, energy and environment and life sciences. Spread across different sites in Valais, they form an economic development backbone for the region. Three of these sites, BioArk in Monthey and Visp, and PhytoArk in Conthey, are dedicated to life sciences activities.

BioArk... a dedicated life sciences technology park

The BioArk Technology Park bridges the two industrial sites of Monthey and Visp, combining training, technology and entrepreneurship to nurture and grow innovation. A new four-storey, 4,000 m2 building was opened 2016 in Visp, increasing BioArk's infrastructure to 10,500 m2. By 2020, this will more than double with additional buildings in Visp and Monthey.

BioArk Visp is ideally located next to a biotech-pharma industrial site and train station. It hosts a school of chemistry and biology laboratory assistants, offers flexible office and laboratory space for start-ups and SMEs, and added-value services like fill and finish. Swissfillon (see below), a successful public-private partnership, operates the cutting edge fill and finish facility.

The first two start-ups to join BioArk Visp are Medirio and Curio Biotech (see p.49). BioArk supports the development of new innovative projects bringing together the best of industry and academia. The demand for a skilled and trained workforce in the biotech-pharma sector is increasing – together with industry, professional education and academia. BioArk will answer this need with a dedicated training platform located in the new Visp building opening 2020.

Life sciences in Valais

The life sciences sector in the canton of Valais represents about an eighth of the canton's GDP and provides more than 6,000 jobs. One in four life sciences jobs in Western Switzerland are in Valais. These figures will strongly increase with large investments such as the Ibex biomanufacturing complex from Lonza that will start operations in 2020 (see p.49). There is also a broad range of smaller biotech-pharma companies and industries doing very well as fresh young talents create start-ups. Today, Valais offers the full value chain with innovative platforms boosting biopharma product development.

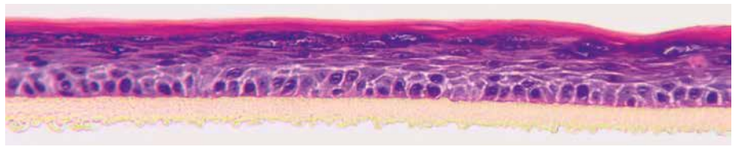
PHOTOS: DR

The agile advantage of Ibex from Lonza

Ibex from Lonza is an innovative new concept aimed at biopharma customers looking for ultimate flexibility as they address their next development and manufacturing challenge. Comprising a group of modular, technology-agnostic development and manufacturing complexes, Ibex solutions give customers complete freedom in facility design and implementation, and the ability to respond rapidly as their needs evolve. These companies can also exploit a significant time-to-market advantage by using the Ibex pre-built option, which is further accelerated thanks to the integration of Ibex into Lonza's state-of-the-art site in Visp, Switzerland. Ibex solutions are also available with highly flexible business and ownership models, to match and adapt to each customer's expectations and forecasts.

BY TORSTEN SCHMIDT, SENIOR DIRECTOR, HEAD OF IBEX OPERATIONS, LONZA

Lonza is investing CHF 400 million to develop its production complex in Visp (Wallis)



3D cell culture at Curio mimicks in vivo conditions.

Curio Biotech

Curio Biotech looks forward to growing and expanding in 2019 by introducing its current R&D pipeline of products aimed at providing clinical solutions.

Curio Biotech, founded in 2017, is a start-up CRO company providing services to clients in the life sciences sector of the pharma, cosmetic, nutraceutical and diagnostic industries. We are focused on using primary human cells for physiologically relevant in vitro 3D and ex vivo culture models. Service areas are human – dermatology, immunology and stem cell biology – with a broad range of epithelial cell types from various organs. Primary human cells are isolated and specialised reagents manufactured in our own laboratory.

Curio Biotech constantly improves existing 3D cell culture systems and further develops novel in vitro models. We aim to create products mimicking, as far as possible, the mechanisms and physiological environment of the in vivo condition, without the need for animal-derived components like serum or non-physiological chemicals or inducers. These novel 3D cell cultures can be used not only for in vitro drug discovery, screening of compounds and pre-clinical investigation, but can also be translated for various clinical applications.

Our focus is on cells, their communication and interactions. Curio Biotech works in human cell biology, aiming to understand surface markers, cell-to-cell interactions and intercellular signalling molecules cells use for their communication. These provide important insights for the development of novel therapeutics such as cell-based therapies, improved drugs, tissue transplantation materials and predictive disease-onset diagnostics.

BY CHENNAKESAVA CUDDAPAH, FOUNDER, CURIO BIOTECH LIMITED

Swissfillon, the Swiss fill and finisher

Swissfillon is a very agile aseptic fill and finish service provider to pharmaceutical and biotech companies ensuring highest quality, highest security, fully cGMP compliant CMO services for high value, complex, difficult to fill products. With the innovative, fully automated and highly flexible filling line, we provide manufacturing capacity for vials, syringes and cartridges from 1l to 100l batch size, when the product is too complex for small (manual) fill and finishers and when the big fill and finishers are fully booked for large quantities. Together with our partners, we are your ideal CDMO partner for all fill and finish related aspects from clinical phase I to early commercial supply.

- Primary packaging development: container, glass and rubber specification, including state-of-the-art product-specific primary packaging validation
- Compounding
- Fully automated liquid aseptic filling in isolator technology
- Visual Inspection
- Full QC services from income testing of raw materials to drug product release together with our QC partner Solvias/Confarma

BY DANIEL KEHL, FOUNDER AND CEO, SWISSFILLON

Citizen science is the motto of Hackuarium.

When science comes out of the box

Art using pigments produced by bacteria, a way of analysing the genome of beer and a low-cost spectrophotometer: these are just three of the unusual projects to emerge from a laboratory open to new ideas **BY JOAN PLANCADE**

At the heart of the Workshops of Renens, among the start-ups and craft companies that occupy this former printing house near Lausanne, Hackuarium's door is usually wide open.

Which is not surprising because the motto of the laboratory launched four years ago is "citizen science", dedicating free space to personal research projects. As its co-founder Luc Henry explains: "We are a non-profit association, all the material has been donated, and our relationship with the Inartis Foundation which operates the space allows us to use the premises for free."

Office benches, storage racks, centrifuges, microscopes, incubators and test tubes are available in the 50 square metre space where people work in an informal atmosphere reminiscent of both a local science club and a high-end laboratory. For this equipment it is also a second life. When new it was worth nearly half a million Swiss francs in total, according to Yann Pierson, a member of the association, who was responsible for obtaining the equipment from companies such as Debiopharm and Nestech and universities including EPFL.

Beer decoded

Visitors can expect the people at Hackuarium to have unusual profiles for a life sciences laboratory. Vanessa Lorenzo joined Hackuarium four years ago to do her masters project in design. She started using natural pigments produced by bacteria, and has since pursued her experimental artistic work. She did not study biology at college but learned from others how to handle the instruments and cultivate bacteria.

For professional scientists, Hackuarium makes it possible to design projects outside the constraints of academia. Gianpaolo Rando, a teacher and researcher, who in addition to his days working at the University of Geneva has spent nights at the laboratory on his project titled "Beer Decoded". Focusing on the analysis of the genome of beers, it allows consumers to identify the type of beer that tastes best for them. The project was too "out of the box" to be accepted by the academic world, according to Rando, but it nevertheless gave rise two years ago to a scientific publication.

Anteroom of entrepreneurial success?

"There are silos in the corporate and academic worlds, but this type of place can break them," says Rando, whose spin-off from Beer Decode, SwissDeCode, is installed right in front of Hackuarium in the workshops. The young company has signed a contract with Agroscope, the federal institute for research in agronomy, and is currently working on the detection of bacteria in cheese for health purposes.

Another project to spring from the lab is driven by Luc Patiny, a professor at EPFL, who created a low cost spectrophotometer, and began to democratise this open source technology primarily with students in the Swiss colleges and now in the developing world. "The strength of Hackuarium is its interdisciplinarity", says Patiny. "Members who studied electronics were able to mentor me, a chemist, to carry out the manufacturing of the spectrophotometer. There is an exchange of ideas here that we cannot find elsewhere."

With about a hundred registered members of which 15 are very active, some say Hackuarium should be used more. Mostly composed of scientists, the community hopes to attract people with all kinds of backgrounds.

However, for co-founder Luc Henry, the human connections in a small community are an asset. "Being a small community facilitates the bubbling of ideas and interaction," he says, "and of course we are open to all to enrich the exchanges."

A Guide to life sciences 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
3volutec SA	Medtech	JU	http://www.3volutec.com
Aardex Group SA	Research	VS	http://www.aardex.ch
AB2 Bio SA	Research	VD	http://www.ab2bio.com
ABC Orthodontics SA	Medtech	JU	http://www.abc-orthodontics.ch
ABCDx SA – Advanced Brain Companion Diagnostics SA	Medtech	GE	http://www.abcdx.ch
Abionic SA	Medtech	VD	http://www.abionic.com
Abrema	Services	VD	http://www.abrema.com
AC Immune SA	Biotech	VD	http://www.acimmune.com
AC Solutions Sàrl	Cosmetics	JU	
Accuratus AG	Medtech	BE	http://www.accuratus.ch
Accuray International	Medtech	VD	http://www.accuray.com
Acrostak International Distribution Sàrl	Medtech	GE	http://www.acrostak.com
Actando SA	Services	GE	http://www.actando.com
Actemium Suisse SA	Medtech	VD	http://www.actemium.ch
Actidot	Nutrition	VS	http://www.actidot.ch
Actimed SA	Biotech	VD	http://www.actimed.ch
Active-Food SA	Nutrition	NE	http://www.active-food.ch
Activen SA	Biotech	VD	http://www.activen.ch
ActLight SA	Medtech	VD	http://www.act-light.com
Ad Hoc Partners	Services	VD	http://adhocpartners.com
ADC Therapeutics SA	Biotech	VD	http://www.adctherapeutics.com
Addex Therapeutics SA	Biotech	GE	http://www.addextherapeutics.com
Adecco Life Sciences	Services	GE	http://www.adecco.ch
Adima AG	Biotech	BE	http://www.galenica.com
Adipogen	Research	VD	http://www.adipogen.com
ADIPSE Sàrl	Services	GE	http://www.adipse.com
Adolphe Merkle Institute	Research	FR	http://www.am-institute.ch
Advanced Accelerator Applications International SA	Biotech	GE	http://www.adacap.com
Advanced Microfluidics SA	Medtech	VD	http://www.amf.ch
Aesyra SA	Medtech	VD	http://www.aesyra.com
AFE Partners SA	Investor	GE	http://www.afepartners.com
Aginko Research AG	Research	FR	http://www.aginko.com
Agolin SA	Biotech	VD	http://www.agolin.com
Agroscope (Changins and Liebefeld-Posieux)	Nutrition	VD	http://www.agroscope.admin.ch
Akabe Sàrl	Medtech	JU	http://www.akabe.ch
Akenco Pharma SA	Pharma	GE	http://www.akenco-pharma.com
Akka Switzerland SA	Services	VD	http://www.akka-technologies.com
Akson Engineering Sàrl (Vaud and Geneva)	Medtech	VD	http://www.akson.ch
Aktiia SA	Medtech	NE	http://www.aktiia.com
Albedis SA	Services	VD	http://www.albedis.com
Alchimie Forever Sàrl	Biotech	GE	http://www.alchimie-forever.com
Alcimed Sàrl	Services	VD	http://www.alcimed.com
Alcon Management (Geneva) and Alcon Pharmaceuticals (Fribourg)	Pharma	GE	http://www.alcon.com
Alcosuisse	Nutrition	BE	http://www.alcosuisse.ch
Aleva Neurotherapeutics SA	Medtech	VD	http://www.aleva-neuro.com
Allergan Medical Sàrl	Medtech	VD	http://www.allergan.com
Alliance	Services	VD	http://www.alliance-tt.ch/accueil
Alliance Consulting	Services	VD	http://www.alliance-consulting.ch
Almedica AG	Services	FR	http://www.almedica.ch
Alpes Lasers SA	Medtech	NE	http://www.alpeslasers.com
Alphom Sàrl	Services	NE	http://www.alphom.com
Alpine Institute for Drug Discovery SA	Pharma	VD	http://www.aidd.ch
ALPS Automation SA	Medtech	VS	http://www.alpsautomation.ch
Alpvision	Services	VD	http://www.alpvision.com
Alro Engineering SA	Services	VS	http://www.alro.ch
ALS – Anti-Ageing Laboratories Switzerland SA	Research	FR	http://www.als-als.com
Altacare	Services	VD	http://www.altacare.fr
Altran AG	Services	VD	http://www.altran.ch
Alveolix AG	Medtech	BE	http://www.alveolix.com
Alver	Nutrition	VD	http://www.alver.ch

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
Alver Golden Chlorella SA	Nutrition	VD	http://www.alver.ch
ALYS Technologies SA	Services	VD	http://www.alys-technologies.com
Amal Therapeutics SA	Biotech	GE	http://www.amaltherapeutics.com
Amazentis SA	Nutrition	VD	http://www.amazentis.com
American Orthodontics Switzerland Sàrl	Medtech	VS	http://www.americanortho.de
Amires Sàrl	Investor	NE	http://www.amires.eu
Amotec Technique de montage SA	Medtech	BE	http://www.amotec.ch
Amsonic SA	Medtech	BE	http://www.amsonic.ch
Analytecon SA	Services	NE	
André Gueissaz SA	Medtech	VD	https://www.ruetschi-group.com/index.php
Andre Roland SA.	Services	VD	http://www.andreroland.com
Andrew Alliance SA	Medtech	GE	http://www.andrewalliance.com
Andromis SA	Medtech	GE	http://www.andromis.ch
Anecova SA	Medtech	VD	http://www.anecova.com
Anemon SA	Biotech	JU	http://www.anemon-sa.ch
Anergis SA	Biotech	VD	http://www.anergis.ch
Anokion SA	Biotech	VD	http://www.anokion.com
Anteis SA	Cosmetics	GE	http://www.anteis.com
Antenna	Research	GE	http://www.antenna.ch
Antero Partners	Services	VD	http://www.anteropartners.com
Antion Biosciences SA	Biotech	GE	http://www.antionbiosciences.com
Antlia SA	Medtech	VD	http://www.ithetis.com
Anton Meyer & Co AG	Medtech	BE	http://www.meyco.ch
Apidel	Biotech	GE	http://www.apidel.com
Apimec SA	Medtech	NE	http://www.apimec.ch
Applimed SA	Medtech	FR	http://www.applimed.ch
Aptissen	Research	GE	http://www.aptissen.com
Ares Life Sciences SA	Investor	GE	http://www.areslifesciences.com
Argenius Sàrl	Services	VD	http://www.argenius.com
ArisGen SA	Research	GE	http://www.arisgen.com
Arnold Deppeler SA	Medtech	VD	http://www.deppeler.ch
Artefact SA	Services	VD	
Ascendys Sàrl	Services	GE	http://www.ascendys.ch
Asceneuron	Research	VD	http://www.asceneuron.com
Aspivix SA	Medtech	VD	http://www.aspivix.com
ASSCO Engineering Monthey SA	Medtech	VS	http://www.assco.ch
Assut Medical Sàrl	Medtech	VD	http://www.assutsutures.com
Assystem Switerland SA	Services	VD	http://www.assystem.com
Aston Life Sciences Sàrl	Medtech	VD	http://www.astonls.com
Astral Technologies Sàrl	Medtech	JU	
Asulab SA	Medtech	NE	http://www.asulab.ch
Asyril SA	Medtech	FR	http://www.asyril.ch
Atelier Mécanique René de Siebenthal & Fils SA	Medtech	VD	http://www.desiebenthal.ch
Atheris Laboratories SA	Research	GE	http://www.atheris.ch
Atokalpa SA	Medtech	JU	http://www.atokalpa.ch
Atracsys Sàrl	Medtech	VD	http://www.atracsys.com
Attolight SA	Medtech	VD	http://www.attolight.com
Auctris Life Sciences SA	Services	VD	http://www.auctris.com
Augurix SA	Medtech	VS	http://www.augurix.com
Auxyme SA	Cosmetics	VS	http://www.auxyme.ch
Axepta SA	Research	GE	http://www.axepta.com
Aximed SA	Services	JU	http://www.aximed.com
Axis biodental SA	Medtech	JU	http://www.axis-biodental.ch
AZAD Pharma AG	Pharma	BE	http://www.azad.ch
B Braun Medical SA	Medtech	VD	http://www.bbraun.ch
B.C. Development SA	Services	JU	http://www.bcdevelopment.ch
Baccinex SA	Research	JU	http://www.baccinex.com
Bachem SA	Research	VS	http://www.bachem.com
Baldelli SA	Services	NE	http://www.baldelliautomation.com
Balluff HyTech AG	Medtech	BE	http://www.balluff.com
Bangerter Microtechnik AG	Services	BE	http://www.bangerter.com
BASF Suisse SA	Biotech	VS	http://www.basf.ch
Battelle Memorial Institute Geneva Research Center	Research	GE	http://www.battelle.org
Bausch Switzerland SA	Medtech	JU	http://www.bausch-group.com
Baxter BioScience Manufacturing Sàrl	Biotech	NE	http://www.baxter.ch
Baxter Recombinant Sàrl	Biotech	NE	http://www.baxter.ch
BC Consulting & Solutions Sàrl	Medtech	VD	http://www.eu.com
Bccc Avocats Sàrl	Services	GE	http://www.bccc.ch
Be Ceuticals	Biotech	VS	http://www.be-ceuticals.com
Beckman Coulter Eurocenter SA	Medtech	VD	http://www.beckmancoulter.ch

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
Bellus Health (International) Limited	Biotech	VD	http://www.bellushealth.com
Bench International Sàrl	Services	GE	http://www.benchinternational.com
Berdat Charles	Biotech	JU	http://www.charlesberdat.ch
Bernafon AG	Medtech	BE	http://www.bernafon.com
Berney Précision SA	Medtech	VD	http://www.berney-precision.ch
Biar SA	Medtech	VS	http://www.biar.com
Bien-Air SA (Berne and Jura)	Medtech	BE	http://www.bienair.com
BiiON	Research	FR	http://www.biion.com
Bio-Rad Laboratories AG	Medtech	FR	http://www.bio-rad.com
Bio-Ur SA	Research	JU	
BioApply Sàrl	Services	VD	http://www.bioapply.com
BioArk SA	Incubator	VS	http://www.bioark.ch
BioCell Interface SA	Biotech	NE	http://www.biocell-interface.com
Biofactory Competence Center SA	Research	FR	http://www.bcc.ch
Biofield SA	Medtech	NE	http://www.biofield.com
Biofluid Systems SA	Medtech	VD	http://www.biofluidsystems.com
Biokaizen Lab SA	Medtech	VS	http://www.theark.ch
Biokema SA	Pharma	VD	http://www.biokema.ch
Biolabo Scientific Instruments SA	Biotech	FR	http://www.labgene.ch
Biomapas	Services	VD	http://www.biomapas.eu
BioMérieux (Switzerland) SA	Medtech	GE	http://www.biomerieux.com
BionActis SA	Cosmetics	VS	http://www.bionactis.com
BioNoox Suisse SA	Cosmetics	VD	http://www.bionoox.com
BioPack Medical Sàrl	Medtech	VD	http://www.biopack.ch
Biophos	Medtech	GE	http://www.biophos.com
Biopôle SA	Incubator	VD	http://www.biopole.ch
Biosafe SA	Biotech	VD	http://www.biosafe.ch
BioScan SA	Medtech	GE	http://www.bioscan.ch
BioScience Medical SA	Medtech	NE	http://www.biosciencemed.ch
Biosensors Europe SA	Research	VD	http://www.biosensor.com/int/contact-us
BioSig Technologies Inc	Medtech	GE	http://www.biosigtech.com/
Biosite International Sàrl	Medtech	VD	http://www.biosite.com
Biosmart GmbH	Research	BE	http://www.biosmart.ch
Biospectal	Medtech	VD	http://www.biospectal.com
Biotech SA	Biotech	JU	http://www.biotec.ch
Bioway GmbH	Biotech	JU	http://www.bioway.eu.com/
BioWebSpin	Services	VS	http://www.biowebspin.com
BioXPress Therapeutics	Pharma	GE	http://www.bioxpress.com
Bista Consulting	Biotech	VD	http://www.bista-consulting.com
Blanc-Labo SA	Research	VD	http://www.blanc-labo.com
BlueOcean Ventures	Investor	GE	http://www.blueocean-ventures.com
BM Laser, Broquet et Monin	Medtech	JU	http://www.bm-laser.ch
Boiron SA	Biotech	GE	http://www.boiron.com
Bordier Affinity Products SA	Research	VD	http://www.bordier.ch
Botta Orthopädie AG	Medtech	BE	http://www.bottaweb.ch
Bracco Suisse SA	Research	GE	http://www.bracco.com
BrainGenetics SA	Research	VD	http://www.braingenetics.ch
Bredam SA	Services	VD	http://www.bredam.ch
Bricad Associates Sàrl	Services	VD	http://www.bricad.com
Brook Automation AG	Medtech	BE	http://www.brooks.com
BS-Optics SA	Biotech	FR	http://www.bs-optics.com
BT Bienne Special Tools Sàrl	Medtech	BE	http://www.btbienne.ch/
Büchi Optik AG	Medtech	BE	http://www.buechioptik.ch
Bumotec SA	Medtech	FR	http://www.starrag-com
Business & Decision (Switzerland) SA	Research	GE	http://www.businessdecision-lifesciences.com
Cabinet Frederic Tissot-Favre	Services	VD	http://www.tissot-favre.com
Cabinet SR Conseils SA	Services	VD	http://www.successjob-biotech.ch
Cälinesse	Cosmetics	VS	http://www.calinesse.com
Calypso Biotech SA	Biotech	GE	http://www.calypsobiotech.com
Calypte Biomedical Corporation	Research	GE	http://www.calypte.com
Camara and Partners Sàrl	Services	VD	http://www.camara-partners.com
Campus Biotech	Medtech	GE	http://www.campusbiotech.ch
Carbagas AG	Biotech	BE	http://www.industrie.carbagas.ch
Cardinal Health Switzerland Sàrl	Medtech	VD	http://www.cardinal.health.com
CardioBeat Sarl	Services	GE	http://www.cardiobeat.ch
CareFusion Switzerland Sàrl	Medtech	VD	http://www.carefusion.com
Carestream Health Suisse SA	Medtech	VD	http://www.carestream.com
Carthagenetics	Services	VD	http://www.carthagenetics.com
Cassiopée Applied Solutions Sàrl	Medtech	VD	http://www.cassiopee.org

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
CBI | Clinical Business Intelligence	Services	VD	http://www.a-cbi.com
CCS Schweiz AG	Medtech	BE	http://www.ccsholding.com
CCV (Centre Chimie Vouvry) Sàrl	Biotech	VS	http://www.ccv-chimie.ch
Cdm Centre de diagnostic moléculaire SA	Research	FR	http://www.labocdm.ch
Celgene International Sàrl	Biotech	NE	http://www.celgene.com
Cellestia Biotech AG	Pharma	VD	http://www.cellestia.com
CELLnTEC Advanced Cell Systems	Research	BE	http://www.cellntec.com
Cendres + Métaux SA	Medtech	BE	http://www.cmsa.ch
Centredoc	Services	NE	http://www.centredoc.ch
Ceramaret SA	Medtech	NE	http://www.ceramaret.ch
Cerebro GmbH	Research	GE	http://www.cerebro.pro
Ceres Heilmittel AG	Nutrition	VS	http://www.ceresheilmittel.ch
CERN	Research	GE	http://kt.cern/medtech
certus molecular diagnostics AG	Medtech	BE	http://www.venturekick.ch
ChemAlive SA	Research	VD	http://www.chemalive.com
ChirMat Sàrl	Medtech	VS	http://www.chirmat.ch
ChondroNest SA	Medtech	VS	http://www.chondroest.com
Chord Therapeutics	Pharma	GE	http://www.chordtherapeutics.com
CHUV	Research	VD	http://www.chuv.ch
Ciba Vision Europe AG	Medtech	FR	http://www.alcon.com
CimArk SA	Services	VS	http://www.cimark.ch
Cimo Compagnie Industrielle de Monthey SA	Biotech	VS	http://www.cimo.ch
Ciposa SA	Medtech	NE	http://www.ciposa.com
CLA Clinical Laboratory Automation SA	Medtech	JU	http://www.cla.ch
Claude Ammann Consulting	Services	VD	http://www.claudeammann.com
Clinopsis SA	Services	VD	http://www.clinopsis.com
Coat-X SA	Medtech	NE	http://www.coat-x.com
Cognex	Medtech	VD	http://www.cognex.com
Combioxin SA	Biotech	GE	http://www.combioxin.com/
Comelec SA	Medtech	NE	http://www.comelec.ch
Comet AG	Medtech	FR	http://www.comet.ch
Comphya Sàrl	Medtech	VD	http://www.comphya.com
Composites Busch SA	Services	JU	http://www.compositesbusch.ch
Confrérie Clinique SA	Research	VD	http://www.confrerie-clinique.com
Consultancy in Sciences	Services	VD	http://www.consultantsinscience.com
Contelec AG	Medtech	BE	http://www.contelec.ch
CoPexis SA	Biotech	VD	http://www.drdcpharma.com
CordSavings	Biotech	VS	http://www.cordsavings.ch
Cosmotec SA	Cosmetics	VS	http://www.cosmotec.ch
Coulter Partners	Services	VD	http://www.coulterpartners.com
Covance Central Laboratory Services SA	Research	GE	http://www.covance.com
CPAutomation SA	Services	FR	http://www.cpautomation.ch
CRB – Centre de Recherches Biocosmétiques SA	Cosmetics	VD	http://www.crbcosmetics.ch
Creaholic SA	Medtech	BE	http://www.creaholic.com
Creapole SA	Incubator	JU	http://www.creapole.ch
Createch AG	Medtech	BE	http://www.createch.ch
Cremo SA	Research	FR	http://www.cremo.ch
Crisalix SA	Medtech	VD	http://www.crisalix.com
Crucell Switzerland AG	Biotech	BE	http://crucell.com
Crystal Vision Microsystems SA	Medtech	VD	http://www.crystalvision-microsystems.com
CSEM PV-Center	Research	NE	http://www.csem.ch
CSL Behring SA	Pharma	BE	http://www.cslbehring.ch
CSSR SA – Centre de Stérilisation de Suisse Romande	Services	FR	http://www.cssr.ch
Cukierman & Co. Life Sciences	Investor	VD	http://www.cukiermanlifesciences.com
CXI0 Foundation	Foundation/Association	VD	http://www.cxiofoundation.ch
Cyrex Sàrl	Services	FR	http://www.cyrex.ch
Cytel Inc	Research	GE	http://www.cytel.com
DAA Pharma SA	Pharma	VD	http://www.daapharma.ch
DAC-Ortho SA	Medtech	GE	
Dade Behring Diagnostics	Pharma	FR	http://www.dadebehring.com
Dassym SA	Services	JU	http://www.dassym.com/about/
Data Mining Int Inc	Research	GE	http://www.datamining-international.com
Datametrix AG	Research	NE	http://www.datametrix.ch
DBS System SA	Services	VD	http://www.dbs-system.ch
Debio Research & Manufacturing SA	Research	VS	http://www.debiopharm.com
Debiopharm SA (Vaud and Fribourg)	Pharma	VD	http://www.debiopharm.com
Debiotech SA	Medtech	VD	http://www.debiotech.ch
Dec Group Headquarters	Services	VD	http://www.dec.group.net
Decomplix AG	Services	BE	http://www.decomplix.ch

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
Décovi SA	Services	JU	http://www.decovi.ch
Deep Cube	Services	VD	http://www.deepcube.ch
DEERFIELD Institute for Healthcare Research, LLC	Research	VD	http://www.biopole.ch
Degonda-Rehab SA	Medtech	VD	http://www.degonda.ch
Delman SA	Investor	GE	http://www.delman.ch
Deloa SA	Medtech	JU	http://www.borruat.ch
Dentsply IH SA	Medtech	VD	http://www.dentsplyimplants.com
Dentsply Maillefer Sàrl	Medtech	VD	http://www.dentsplymaillefer.com
DePGen SA	Biotech	GE	http://www.netrispharma.com
DePuy Sàrl	Medtech	NE	http://www.depuy.com/
DermAbiotech Sàrl	Biotech	GE	
Dermosafe SA	Cosmetics	VD	http://www.dermosafe.com
Detech SA	Services	JU	http://www.detech.ch
DFB Pharmaceuticals Inc.	Pharma	VD	http://www.healthpoint.com
Diacosa AG	Medtech	BE	http://www.diacosa.ch
Diagnoplex	Medtech	VD	http://www.diagnoplex.com
DiagnoSwiss SA	Research	VS	http://www.diagnoswiss.com
Diamed AG (Bio-Rad Laboratories)	Research	FR	http://www.bio-rad.com
Diepharmex SA	Pharma	GE	http://www.audispray.com
Digmesa AG	Services	BE	http://www.digmesa.com
Dineras International SA	Services	GE	
DistalMotion SA	Medtech	VD	http://www.distalmotion.ch
DJO Global Switzerland Sàrl	Medtech	VD	http://www.djoglobal.com
DLK Technologies SA	Services	NE	http://www.dlk.ch
DM2TC Sàrl	Services	VD	http://www.dm2tc.ch
Dompé International SA	Biotech	VD	http://www.dompe.com
Donawa Consulting Sàrl	Services	VD	http://www.donawa.com
Dorix SA	Services	BE	http://www.dorix.ch/
Dorphan	Pharma	VD	http://www.dorphan.com
Dr E Gräub AG	Research	BE	http://www.graeub.com
Dr WiiCARE SA	Services	FR	
Dräger Medical Suisse SA	Services	BE	http://www.draeger.ch
Drugdesigntech SA	Research	GE	http://www.drugdesigntech.com
Drugs for Neglected Diseases Initiative (DNDi)	Research	GE	http://www.dndi.org
DSM Nutritional Products AG – Alpaflor	Nutrition	VS	http://www.dsmnutritionalproducts.com
DuPont de Nemours International SA	Biotech	GE	http://www.dupont.com/products-and-services/solar-photovoltaic-materials.html
Dynamics Group SA	Services	GE	http://www.dynamicsgroup.ch
Dynatec SA	Services	VD	http://www.dynatec.ch
E-Mediat AG	Services	BE	http://www.e-mediat.ch
EasyMed Services SA	Services	GE	http://www.easymedmobile.com
EBA-Med	Medtech	VD	http://www.venturekick.ch/HadronEBA
Eclosion Fondation	Incubator	GE	http://www.eclosion.ch
Ecosafe SA	Services	VD	http://www.ecosafesa.com
Edel-for-Life SA	Medtech	VD	http://www.edel-for-life.com
Edwards Lifesciences SA	Medtech	VD	http://www.edwards.com
Effik SA	Biotech	VD	http://www.effik.ch/
Egatec SA	Services	BE	http://egatecsa.gelbeseiten.ch/home.aspx
Elanix Biotechnologies SA	Biotech	VD	http://www.elanixbiotechnologies.com
Electro Müller AG	Services	BE	http://www.electro-mueller.ch
Electromag SA	Services	VD	http://www.electromag.ch
Elefil Swiss Sàrl	Services	FR	http://www.elefilswiss.com
Eli Lilly Export SA	Services	GE	http://www.lilly.ch
Elkobio	Biotech	GE	http://www.elkobio.com
Embion Technologies SA	Nutrition	VD	http://www.embiontech.com
EmedSwiss SA	Services	FR	http://www.emedswiss.ch
EMS Electro Medical Systems SA	Medtech	VD	http://www.ems-company.com
encretpixel	Services	VD	http://www.encretpixel.com
Endeavour Vision SA	Investor	GE	http://www.endeavourvision.com
Endoxa Neuroscience s.à.r.l	Services	NE	http://www.endoxaneuroscience.com
Engqvist Consulting	Services	VD	http://www.engqvistconsulting.com
Eoswiss Engineering Sarl	Services	GE	http://www.eoswiss.ch
EP Solutions SA	Medtech	VD	http://www.ep-solutions.ch
EPFL – Ecole Polytechnique Fédérale de Lausanne	Research	VD	http://www.epfl.ch
Epithelix Sàrl	Research	GE	http://www.epithelix.com
Eqval SA	Medtech	VD	http://www.eqval.ch
ERAS Ingénierie Switzerland	Services	VS	http://www.eras.com
Ergomed Virtuoso Sarl	Services	GE	http://www.ergomedplc.com
Erib Corp SA	Research	BE	http://www.eribch.com

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
Eric Gaymard	Biotech	VD	
Espace Création	Services	VS	http://www.espacec.ch
EspeRare Foundation	Research	GE	http://www.esperare.org
Essencedesign	Services	VD	http://www.essencedesign.com
Essential Medical Fondation	Medtech	VD	http://www.essentialmed.org
Estalin SA	Biotech	JU	http://www.estalin.ch
Estoppey-Addor SA	Services	BE	http://www.estoppey-addor.ch
Etameca SA	Services	BE	http://www.etameca.ch
Ethical Skin Care SA	Cosmetics	NE	http://www.ethicalskincare.ch
Ethicon Sàrl	Services	NE	http://www.ethiconinc.com
Ethimedix SA	Medtech	GE	http://www.ethimedix.com
Eurofin Medical SA	Biotech	VD	http://www.eurofinmedical.ch
Evasensor SA	Medtech	NE	http://www.evasensor.com
Exabone Gmbh	Medtech	VD	http://www.exabone.com
ExcellGene SA	Research	VS	http://www.excellgene.com
ExCellness Biotech SA	Medtech	VD	http://www.excellness.com
Eyeware Tech SA	Medtech	VS	http://www.eyeware.tech
Fabrinal SA	Medtech	NE	http://www.fabrinal.ch
Ferring International Center SA	Pharma	VD	http://www.ferring.com
Firmenich SA	Pharma	GE	http://www.firmenich.com
First Aid Marketing GmbH	Services	BE	http://www.firstaidmarketing.ch
Fischer Connectors SA	Medtech	VD	http://www.fischerconnectors.ch
FKG Dentaire SA	Medtech	NE	http://www.fkg.ch
Flexdental Services SA	Medtech	VD	http://www.fdservices.ch
FMC Production	Services	GE	http://www.fmcproduction.com
FME AG	Medtech	BE	http://www.fme-ag.com
Fondation Artères	Foundation/Association	GE	http://www.arteres.org
Fondation Asile des Aveugles	Research	VD	http://www.asile-aveugles.ch
Fondation Campus Biotech	Incubator	GE	http://www.campusbiotech.ch
Fondation EPFL Innovation Park	Incubator	VD	http://www.epfl-innovationpark.ch
Fondation Genevoise pour la Formation et la Recherche Médicale	Research	GE	http://www.gfmer.ch
Fondation H. Dudley Wright	Foundation/Association	GE	http://www.hdwright.org
Fondation iM4TB	Research	VD	http://www.im4tb.org
Fondation ISREC	Foundation/Association	VD	http://www.isrec.ch
Fondation Jeantet	Foundation/Association	GE	http://www.jeantet.ch
Fondation Leenaards	Investor	VD	http://www.leenaards.ch
Fondation Osirix	Foundation/Association	GE	http://osirixfoundation.com/
Fondation pour l'Innovation Technologique (FONGIT)	Incubator	GE	http://www.fongit.ch
Fondation pour Recherche Medicale	Foundation/Association	GE	http://www.unige.ch
Fontax SA	Medtech	VD	http://www.fontax.ch
Forimtech	Medtech	GE	http://www.forimtech.ch
Fors AG	Services	BE	http://www.fors.ch
Foundation for Innovative New Diagnostics (FIND)	Research	GE	http://www.finddiagnostics.org
Frey + Messmer AG	Services	BE	http://www.freymess.ch
Frimorfo SA	Research	FR	http://www.frimorfo.com
Fritz Gyger AG	Services	BE	http://www.fgyger.ch
FSC – Fondation Suisse pour les Cyberthèses	Research	VS	http://www.fsc-sfc.org
Future Health Biobank	Biotech	FR	http://www.futurehealthbiobank.ch
Future Health Cell Bank SA	Services	GE	http://www.futurehealth.co.uk
G-Ray Médical	Medtech	NE	http://g-ray.ch/
G-Therapeutics	Pharma	VD	https://www.gtxmedical.com/#Home
Gait Up	Medtech	VD	http://www.gaitup.com
Galderma Pharma SA	Pharma	VD	http://www.galderma.ch
Galenica AG	Biotech	BE	http://www.galenica.com
Galexis AG	Services	BE	http://www.e-galexis.com
Gamaya SA	Nutrition	VD	http://www.gamaya.com
Gavi-The Vaccine Alliance	Biotech	GE	http://www.gavi.org
GBiotech Sarl	Pharma	GE	http://www.geneva-biotech.com
GCC Geneva Creativity Center	Services	GE	http://www.creativitycenter.ch
Gene Predictis SA	Biotech	VD	http://www.genepredictis.com
Gene Signal International SA	Biotech	VD	http://www.genesignal.com
GeneBio - Geneva Bioinformatics SA	Research	GE	http://www.genebio.com
GeNeuro SA	Biotech	GE	http://www.geneuro.com
Geneva Biotech	Foundation/Association	GE	http://www.geneva-biotech.com
Genevensis Sàrl	Services	GE	http://www.genevensis.com
Genevest Consulting Group SA	Investor	GE	http://www.genevest.ch
Genexion SA	Research	GE	http://www.genexion.com
Genge & Thoma AG	Services	BE	http://www.gengethoma.ch
GeniuSoft Sàrl	Research	FR	http://www.geniusoft.ch

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
GenKyoTex SA	Biotech	GE	http://www.genkyotex.com
Genohm SA	Research	VD	http://www.genohm.com
Genomic Health International Sàrl	Research	GE	http://www.genomichealth.com
GenomSoft	Research	GE	http://www.genomsoft.com
GenomSys SA	Research	VD	https://genomsys.com/
GenView	Research	VD	http://www.genview3d.com/
Gersteltec Sàrl	Services	VD	http://www.gersteltec.ch
GetSet Surgical SA	Medtech	VD	
Gevaltec Sàrl	Medtech	VS	
GF Machining Solutions SA	Medtech	GE	http://www.gfac.com
GGBa Greater Geneva Berne area	Foundation/Association	VD	http://www.ggba-switzerland.ch
Gibaud (Suisse) SA	Medtech	GE	http://www.gibaud.com
Givaudan Suisse SA	Cosmetics	GE	http://www.givaudan.com
GlaxoSmithKline AG	Pharma	BE	http://www.glaxosmithkline.ch
Glenmark Pharmaceuticals SA	Pharma	NE	http://www.glenmarkpharma.com
GliaPharm	Pharma	GE	http://www.gliapharm.com
Globus Medical	Medtech	VD	http://www.globusmedical.com
GMB Services	Medtech	VD	http://www.gmb-services.com
GMP SA	Services	VD	http://www.gmp.ch
GMT Fine Chemicals SA	Pharma	NE	http://www.gmtfinechemicals.ch
Gnubiotics Sciences	Biotech	VS	http://www.gnubiotics.com
GnuBiotics Sciences Sàrl	Nutrition	VS	http://www.gnubiotics.com
Gomina AG	Services	VS	http://www.gomina.ch
Gribi AG	Services	BE	http://www.gribi.ch
Groupe Genitec Holding SA	Research	JU	http://www.genitec.net
Groupe PP Holding SA	Services	GE	http://www.groupe-pp.ch
GTX Medical SA	Medtech	VD	http://www.gtxmedical.com
Gymetrics SA	Medtech	VD	http://www.gymetrics.com
H. Hilderbrand Cie & SA	Biotech	GE	http://www.hilderbrand.ch
H&H INTL Holding	Research	GE	http://www.hh.global
Haag-Streit Holding AG	Medtech	BE	http://www.haag-streit.com
Hader SA	Medtech	NE	http://www.hader-swiss.com
Haemonetics SA	Services	VD	http://www.haemonetics.com
Hanco Schleiftechnik AG	Services	FR	http://www.hanco.ch
Harald Nordin SA	Medtech	VD	http://www.nordin-dental.com
Haslab GmbH	Services	BE	http://www.haslab.ch
Haute Ecole Vaudoise	Research	VD	http://www.hev.ch
HAYA Therapeutics c/o MassChallenge	Pharma	VD	http://switzerland.masschallenge.org/startup/haya-therapeutics
HE-ARC – Haute Ecole Arc	Research	NE	http://www.he-arc.ch
HEALTH Corporate and Healthcare Agency	Services	VD	http://healththeagency.ch
Health Systems and Technology	Services	GE	http://www.hst-consulting.ch
Health Tech SA	Medtech	VD	http://www.holding-bs.com
HEIG-VD	Research	VD	http://www.heig-vd.ch
Heiland Schweiz AG	Services	BE	http://www.heiland.ch
Helbling Technik Bern AG	Research	BE	http://www.helbling.ch
Helvedis Pharma SA	Pharma	JU	http://www.helvedis.com
Helvemed SA	Biotech	GE	http://www.helvemed.com
Helvetica Health Care Sàrl	Biotech	GE	http://www.h-h.com
Hemacore SA	Medtech	VS	http://www.hemacore.com
Hemasoft SA	Services	FR	http://www.hemasoft.com
Henry Schein Medical AG	Medtech	BE	http://www.henryschein-med.de
Hepia	Research	GE	http://www.hepia.hesge.ch
Heraeus Materials SA	Biotech	VD	http://www.heraeus-medicalcomponents.com
HES-SO Fribourg	Research	FR	http://www.hefr.ch
HES-SO Genève	Research	GE	http://www.hesge.ch
HES-SO Valais-Wallis	Research	VS	http://www.hevs.ch
Heska SA	Biotech	FR	http://www.heska.com
High Lantern Group	Services	GE	http://www.highlanterngroup.com
HighPoint Solutions	Services	GE	http://www.highpoint-solutions.com
Hilderbrand Cie & SA	Biotech	GE	http://www.hilderbrand.ch
Hilfsmittelstelle HMS Bern AG	Medtech	BE	http://www.hilfsmittelstelle.ch
Hiqscreen Sarl	Medtech	GE	http://www.hiqscreen.com
HL Technology SA	Medtech	NE	http://www.hl-technology.ch
HMT Microelectronic AG	Services	BE	http://www.hmt.ch
Hock'n Roll AG	Medtech	BE	http://www.hocknroll.ch
Hoffmann Neopac AG	Services	BE	http://www.hoffmannneopac.ch
Hologic Europe Middle East and Africa SA	Medtech	VD	http://www.hologic.com
Homeolab SA	Biotech	VS	

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Horphag Research	Biotech	GE	http://www.pycnogenol.com
HPlus Therapeutics Sàrl	Biotech	GE	
HUG – Hôpitaux Universitaires de Genève	Research	GE	http://www.hcuge.ch
Huntsman Advanced Materials (Switzerland) Sàrl	Biotech	VS	http://www.huntsman.com
Hy-Tech AG	Services	BE	http://www.hytech.ch
Hygie-Tech SA	Services	VD	http://www.hygie-tech.ch
I-Care Suisse SA	Services	NE	http://www.icareweb.com
I-Dent Innovation For Dentistry SA	Medtech	VD	http://www.i-dent-dental.com
ID Quantique SA	Services	GE	http://www.idquantique.com
ID-Gene Ecodiagnostics	Research	GE	http://www.id-gene.com
Idexx Switzerland AG	Medtech	BE	http://www.idexx.com
IE Group	Services	GE	http://www.ie-group.com
IFPMA	Services	GE	http://www.ifpma.org
IHMA Europe Sàrl	Research	VD	http://www.ihmainc.com
IIMG – Instruments, Industrial & Medical Group SA	Services	FR	http://www.iimgroup.org/
Il-Med Tec SA	Services	BE	http://www.ilmedtec.ch
ILP Lüthi + Partner AG	Services	BE	http://www.ilp-switzerland.ch
ILS Services SA	Services	GE	http://www.integralife.eu
iM4TB	Biotech	VD	http://www.im4tb.org
Inartis Foundation	Foundation/Association	VD	http://www.inartis.ch
Inartis Network	Services	VD	http://www.inartis-network.ch
Include Consulting Sàrl	Services	VD	http://www.includeconsulting.com
Incyte Biosciences International Sàrl (formerly Ariad Pharmaceuticals SA)	Pharma	VD	https://www.incyte.com/
Incyte Europe Sàrl	Research	GE	http://incyte.com
Index Ventures	Investor	GE	http://www.indexventures.com
Indigo Consulting Sàrl	Services	GE	http://www.indigoconsulting.ch
Infinity Dental (Switzerland) SA	Medtech	VD	http://www.infinity-dent1.com
Inflamalps SA	Research	VS	http://www.inflamalps.com
Infomed SA	Medtech	GE	http://www.infomedsa.ch
InnoMedica Holding AG	Pharma	BE	http://www.innomedica.com
InnoPeritus Sàrl	Services	GE	http://www.innoperitus.com
Innosurf SA	Services	FR	http://www.innosurf.ch
Innovaud	Services	VD	http://www.innovaud.ch
Inomed Technology SA	Medtech	JU	http://www.inomed.ch
Inselspital, Hôpital universitaire de Berne	Research	BE	http://www.insel.ch
Institut Clayton de la Recherche	Research	GE	http://www.claytonbiotech.ch
Institut de Recherche en Ophtalmologie	Research	VS	http://www.iro.vsnet.ch
Institut de Recherche en Réadaptation (IRR)	Medtech	VS	http://www.irr-valais.ch
Institut Suisse des Vitamines	Foundation/Association	VD	http://www.swissvitamin.ch
Instrumat AG	Services	VD	http://www.instumat.ch
Intento	Medtech	VD	http://www.intento.ch
Intercosmetica Neuchâtel SA	Cosmetics	NE	http://www.intercosmetica.ch
Interdigit SA	Services	VD	http://www.interdigit.com
Interdigit SA	Services	VD	http://www.interdigit.com
Interlabor Belp AG	Research	BE	http://www.interlabor.ch
InterMedService Sàrl	Services	JU	
Intersteri AG	Services	BE	http://www.intersteri.ch
Intrace Medical SA	Pharma	VD	http://www.intrace-medical.com
Intuitive Surgical Sàrl	Medtech	VD	http://www.intuitivesurgical.com
Invacare International Sàrl	Medtech	VD	http://www.invacare.eu.com
INVENesis Sàrl	Research	NE	http://www.invenesis.com
InVivoSwiss Sarl	Medtech	VD	http://www.invivoswiss.ch
Ipstudies Sàrl	Services	FR	http://www.ipstudies.ch
Ismeca Europe Semiconductor SA	Medtech	NE	http://www.cohuseg.com
ISS AG – Integrated Scientific Services	Services	BE	http://www.iss-ag.ch
IUMSP	Research	VD	http://www.iumsp.ch
Ivers-Lee MedTec AG	Medtech	BE	http://www.iverslee.com
Ixxeo Healthcare SA	Services	VD	http://www.ixxeo.com
Jacques Allemann SA	Services	BE	http://www.jacques-allemann.ch
JAG Jakob AG	Services	BE	http://www.jag.ch
JB Metrics SA	Services	NE	http://www.jbmetrics.ch
Jet Medical SA	Medtech	NE	http://www.jetmedical.net
JetSolutions SA	Services	FR	http://www.jetsolutions.ch
Jinfo SA	Services	JU	http://www.jinfo.ch
Jobtogether	Services	VD	http://www.jobtogether.com
Johnson & Johnson	Medtech	NE	http://www.jnj.ch
Juratec SA	Services	JU	http://www.juratec.ch
Juvaplus	Medtech	NE	https://www.juvaplus.com/
Kaleidoscope International Sarl	Services	VD	http://Www.kaleidoscope-Int.com

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
KANAMY – Regulatory affairs for life sciences	Services	VD	http://www.kanamy.ch
Karmagenes Sarl	Services	VS	http://www.karmagenes.co
Katzarov SA	Services	GE	http://www.katzarov.com
KEJAKO SA	Medtech	GE	http://www.kejako.com
Kelly Services SA	Services	GE	http://www.kellyservices.ch
Kemopharm SA	Pharma	GE	
Kenta Biotech Ltd	Biotech	BE	http://www.kentabiotech.com
Kergrohen & Associates Sàrl	Services	GE	
Kessler & Co SA	Services	VD	http://www.kessler.ch
KeySep	Research	GE	http://www.pharmatching.com
Keysight Technologies Switzerland (ex-Agilent Technologies SA)	Medtech	GE	http://www.keysight.com
Kisano Suisse SA	Services	VD	http://www.kisanogroup.com
Komax Systems LCF SA	Medtech	NE	http://www.komax.ch
Kuhn und Bieri AG	Medtech	BE	http://www.kuhnbieri.ch
Kyburz & Cie SA	Medtech	NE	http://www.kyburz-cie.ch
Kylys Sàrl	Medtech	GE	http://www.kylys.com
L-Techs SA	Medtech	FR	
La Colline Cellular Research Laboratories	Cosmetics	VS	http://www.lacolline-skincare.com
La Manufacture Ressorts CML	Medtech	VD	http://www.lamanufacture.ch
Labatec Pharma SA	Pharma	GE	http://www.labatecpharma.com
Laboratoire Bailleul	Research	GE	http://www.bailleul.com
Laboratoire Dr. Bregnard SA	Research	JU	
Laboratoire Gibro SA	Cosmetics	NE	http://www.gibro.ch
Laboratoire Pauline Burgener Switzerland SA	Cosmetics	VD	http://www.drburgener.com/
Laboratoire SCM SA	Research	JU	http://www.genitec.net
Laboratoires Anesa SA	Biotech	VS	
Laboratoires Biologiques Arval SA	Cosmetics	VS	http://www.arvalcosmetics.com
Laboratoires Plan SA	Pharma	GE	http://www.laboratoiresplan.com
Laborial Suisse SA	Research	VD	http://www.laborial.com
labseed SA	Medtech	VD	http://www.labseed.com
Lambda Health System	Medtech	VD	https://www.lhs-sa.ch/
Lamineries Matthey SA	Medtech	BE	http://www.matthey.ch
LASCCO SA	Biotech	GE	http://www.lascco.com
Lasea Switzerland SA	Medtech	BE	http://www.lasea.com
Laser Automation Gekatronic SA	Medtech	NE	http://www.laser-automation.com
Laser-Jura Sàrl	Medtech	JU	http://www.laserjura.ch
Laserix SA	Medtech	VD	http://www.laserixsa.com
Laserix Sàrl (Laboratoire)	Medtech	VD	http://www.tecvision.ch/laserix/
Lasermed AG	Medtech	VD	http://www.lasermed.ch
Lastec AG	Medtech	BE	http://www.lastec.ch
Laubscher Präzision AG	Medtech	BE	http://www.burde-metall.at/glc.htm
Lauener et Cie SA	Medtech	NE	http://www.lauener.ch
LBA Switzerland	Nutrition	VD	http://www.lba-bhmed.com
Le Vivier	Incubator	FR	http://www.vivier.ch
Legacy HealthCare (Switzerland) SA	Biotech	VD	http://www.legacyhealthcare.ch
Leitner SA	Medtech	BE	http://www.leitner-ag.ch
Leman Cardiovascular SA	Medtech	VD	http://www.lemancardiovascular.com
Leman Consulting SA	Services	VD	http://www.lemanconsulting.ch
Leman Medical Technologies	Medtech	VD	http://www.lemanmedical.com
Leman Micro Devices SA	Medtech	VD	http://www.leman-micro.com
Lemo SA	Medtech	VD	http://www.lemo.com
Lemur-Scouting Sàrl	Services	JU	http://www.lemur-scouting.ch
LI Lasers Instruments Sàrl	Medtech	VS	http://www.laser-instruments.com
Lifescience Consulting SA	Services	GE	http://www.lifescience-consulting.com
LIG-Systems	Services	GE	http://www.lig-systems.ch
Link Implants AG	Medtech	BE	http://www.link-implants.ch
Linkage Biosciences Sàrl	Medtech	GE	http://www.linkagebio.com
LMA Urology Suisse SA	Medtech	VD	http://www.lmaurology.com
Locatis SA	Medtech	JU	http://www.locatis-electronics.ch
Logival SA	Services	VS	http://www.logival.ch
Lonza AG	Pharma	VS	http://www.lonza.com
Loop Medical	Medtech	VD	
Loroch CTLS	Services	VD	http://www.loroch.ch
Louis Bélet SA	Services	JU	http://www.beletsa.ch
LPS Services SA	Services	FR	http://www.lps-services.ch
Lucentix SA	Medtech	VD	http://www.lucentix.ch
Ludwig Center for Cancer Research	Research	VD	http://www.ludwigcancerresearch.org
Lugaia AG	Medtech	VS	http://www.lugaia.ch
Lumendo	Medtech	VD	http://www.venturekick.ch

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
Lunaphore Technologies SA	Medtech	VD	http://www.lunaphore.ch
Lymphatica Medtech SA,	Services	VD	http://www.lymphatica.ch
Lyncée Tec SA	Services	VD	http://www.lynceetec.com
Madep SA	Services	NE	http://www.madep-sa.com
Mandatec AG	Services	BE	http://www.mandatec.ch
Mane SA	Biotech	VS	http://www.mane.com
Manigley SA	Services	BE	http://www.manigley.ch
Manufactures D'Outils Dumont SA	Services	JU	http://www.dumonttools.com
Manuplast SA	Services	VD	http://www.manuplast.ch
Mapag Maschinen AG	Medtech	BE	http://www.mapag.ch
MAPE Engineering Switzerland SA	Research	JU	http://www.groupe-mape.com
Marcel Blanc et Cie SA	Medtech	VD	http://www.marcel-blanc.ch
Marcel Jaccard SA	Services	NE	http://www.jaccard.ch
Marketing Matters Consulting	Services	VD	http://www.marketingmatters.ch
Marly Innovation Center	Incubator	FR	http://www.m-innovationcenter.org
Masimo Sàrl	Medtech	NE	http://www.masimo.com
MassChallenge Switzerland	Incubator	VD	http://switzerland.masschallenge.org
Max Jung AG	Medtech	BE	http://www.maxjung.ch
MaxiMed Sàrl	Medtech	VD	http://www.maximed.ch
MaxiVAX	Pharma	GE	http://www.maxivax.ch/
MCL Medizinische Laboratorien	Research	BE	http://www.mcl.ch
MCS Labordatensysteme AG	Services	BE	http://www.mcs-ag.com
MD Development Sàrl	Medtech	NE	
MD-Clinicals	Medtech	VD	http://www.md-clinicals.com
Mecaplast SA	Services	FR	http://www.mecaplast.ch
Mecha Ch Rohr	Services	BE	http://www.mecha.ch
Med Communications International,Sàrl	Services	GE	http://www.medcommunications.com
Med Discovery SA	Research	VD	http://www.med-discovery.com
Medacta International SA	Medtech	JU	http://www.medacta.com
MedC. Partners Sàrl	Medtech	VD	http://www.medmap.ch ou medcpartners.com
Medeco-ch Sàrl	Medtech	VD	http://www.medeco-ch.com
Medelec SA	Services	VD	http://www.medelec-tubes.com
MedExpansion Sàrl	Services	VD	http://www.medexpansion.ch
Medic-Micro Sàrl	Medtech	JU	http://www.medicmicro.ch
Medical Devices Lease SA	Investor	NE	http://www.mdlfinance.com
Medical Titanium Sàrl	Medtech	GE	http://www.medicaltitanium.com
Medico Technique SA	Medtech	NE	
Medicontur	Medtech	GE	http://www.medicontur.com
Medicosearch AG	Services	BE	http://www.medicosearch.ch
Medics Labor	Research	BE	http://www.medics-labor.ch
Medidee Services SA	Services	VD	http://www.medidee.com
Mediliant SA	Medtech	NE	http://www.mediliant.com
Medimaps Group	Medtech	GE	http://www.medimapsgroup.com/
Medinel Sàrl	Services	VD	http://www.medinel.com
Medinorma Sàrl	Services	VD	http://www.medinorma.ch
Medion Diagnostics AG	Research	FR	http://www.medion-diagnostics.ch
Mediplant	Biotech	VS	http://www.mediplant.ch
Medirio	Medtech	VS	http://www.medirio.com
mediSeeds	Biotech	VS	http://www.mediseeds.ch
Medistri SA, sterilisation, laboratory, packaging	Services	FR	http://www.medistri.com
Meditec Consulting GmbH	Services	BE	http://www.meditec-consulting.ch
Medlight SA	Medtech	VD	http://www.medlight.com
Medos International Sàrl	Medtech	NE	http://www.jnj.com
MedPlast SA	Medtech	VS	http://www.medplast.ch
Medtronic Europe Sàrl	Medtech	VD	http://www.medtronic.ch
Medtronic Kyphon Sàrl	Medtech	NE	http://www.medtronic.ch
Medvantis	Services	BE	http://www.medvantis.ch
Meister + Cie AG	Services	BE	http://www.meister-ag.ch
Melcure SA	Pharma	GE	http://www.eclosion.ch
Melet Schloesing Pharmaceuticals SA	Pharma	NE	
Memedge Consulting Sàrl	Services	VD	http://www.memedge-consulting.ch
mementor GmbH	Services	FR	http://www.memntor.ch
Mensys Group	Services	VD	http://www.mensys-group.com
Mentice SA	Medtech	VD	http://www.mentice.com
Merck Serono SA	Pharma	VD	http://www.merckgroup.com
Meridian AG	Medtech	BE	http://www.meridian.ch
Métafil-Lagirolle SA	Services	JU	http://www.metafil-lagirolle.ch
Meyer Sintermetall AG	Services	BE	http://www.sintermetall.ch
MH LOG	Services	BE	http://www.mh-log.ch

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Michael Page Healthcare & Life science	Services	GE	http://www.michaelpage.ch
Micro Precision Systems AG	Medtech	BE	http://www.mpsag.com
Microcity	Incubator	NE	http://www.microcity.epfl.ch
Microdose SA	Services	VD	http://www.easymonitoring.ch
Microscan Service SA	Research	VD	http://www.microscan.ch
Microsens SA	Medtech	NE	http://www.microsens.ch
Micrus Endovascular SA	Medtech	VD	http://www.micrusendovascular.com
Mikron Holding AG	Medtech	BE	http://www.mikron-tg.com
Milian SA Dutscher Group	Biotech	GE	http://www.milian.com
Milupa SA	Biotech	FR	http://www.milupa.ch
MindMaze SA	Medtech	VD	http://www.mindmaze.ch
Mintaka Medical Research Foundation	Services	GE	http://www.mintakafoundation.com
MLF Consulting Services Sàrl	Services	VD	http://www.mlf-consulting.com
MMV Medicines For Malaria Venture	Services	GE	http://www.mmv.org
Moinas & Savoye SA	Services	GE	http://www.msc-ip.com
Monnier & Zahner AG	Medtech	BE	http://www.monnier-zahner.ch
Morphodyne SA	Medtech	NE	http://www.morphodyne.com
Morphotonix SA	Medtech	VD	http://www.morphotonix.com
Motilis Medica SA	Medtech	VD	http://www.motilis.com
MPI International	Biotech	VD	http://www.mpi-inter.com
MPS Precimed	Medtech	BE	http://www.mpsprecimed.com
My-Vitality Sàrl	Services	VD	http://www.biopole.ch
Mycotec SA	Services	NE	http://www.mycotec.ch
MyK Consulting	Services	GE	http://www.mykconsulting.com
Mymetics SA	Biotech	VD	http://www.mymetics.com
Myotest SA	Medtech	VS	http://www.myotest.ch
Nagi Bioscience	Medtech	VD	http://www.nagibio.ch
Namiki Precision of Europe SA	Services	VD	http://www.namiki.net
Nano Bridging Molecules SA	Medtech	VD	http://www.nbmolecules.com
Nanogalenix	Biotech	JU	http://nanogalenix.com/
Nanolive SA	Medtech	VD	http://www.nanolive.ch
Nanologica Pure Sàrl	Biotech	JU	http://www.nanologica.com
Nanosensors	Medtech	NE	http://www.nanosensors.com
NanoWorld AG	Medtech	NE	http://www.nanoworld.com
NBB Biotech GmbH	Medtech	FR	http://www.nbbbiotech.com
NCCR Robotics	Medtech	VD	http://www.nccr-robotics.ch
NeoCoat	Biotech	NE	http://www.neocoat.ch
Neocutis SA	Biotech	VD	http://www.neocutis.com
Neode SA	Incubator	NE	http://www.neode.ch
NeoGenomics Europe SA	Medtech	VD	http://www.neogenomics.com
NeoMed Medical Sàrl	Investor	GE	http://www.neomed.net
Nestec SA	Nutrition	VD	http://www.nestlenutrition.com
Nestle Health Science	Nutrition	VD	http://www.nestlehealthscience.ch
NetModule AG	Services	BE	http://www.netmodule.com
Neurix SA	Research	GE	http://www.neurix.ch
NeuroAssets Sàrl	Biotech	VD	http://www.neuroassets.com
Neurolite	Medtech	BE	http://www.neurolite.ch
Niklaus	Services	GE	http://www.niklaus-sa.com
Novadaq Technologies	Medtech	VD	http://www.novadaq.com
Novagraaf International SA	Services	GE	http://www.novagraaf.ch
Novartis Consumer Health SA	Pharma	VD	http://www.gsk.com
Novassay SA	Research	VD	http://www.novassay.com
Novateb	Biotech	VD	http://www.novateb.ch
Novigenix SA	Medtech	VD	http://www.novigenix.com
NovImmune SA	Biotech	GE	http://www.novimmune.com
Novipart Health & Life Sciences Sàrl	Services	VS	http://www.novipart.com
Novo Business Consultants AG	Services	BE	http://www.novo-bc.ch
Novodent SA (Implantswiss)	Medtech	VD	http://www.implantswiss.com
Novoglas	Services	BE	http://www.novoglas.ch
Novostia SA	Medtech	NE	http://www.novostia.com
Nufer Medical AG	Medtech	BE	http://www.nufer-medical.ch
Numelec SA	Services	GE	http://www.numelec.com
Nutricia SA	Nutrition	FR	http://www.nutricia.ch
Nutrilinks	Nutrition	VD	http://www.nutrilinks.net
Nutrimedis SA	Services	FR	http://www.nutrimedis.ch
NV Logistics SA	Research	GE	http://www.nvlogistics.com
ObsEva SA	Pharma	GE	http://www.obseva.com
Obtech Medical Sàrl	Medtech	NE	http://www.jnj.com
Octave Biotech Consulting	Services	GE	http://www.octavebiotech.com

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Oculis Switzerland	Pharma	VD	http://www.oculis.com
Odinelixir SA	Biotech	VS	http://www.odinelixir.ch
Olympus Suisse SA	Medtech	VD	http://www.olympus.ch
Omega Insights	Services	GE	http://www.omegainsights.com
Omega Statistical Consulting	Services	VD	http://www.omegastatco.ch
OmniScience SA	Services	GE	http://www.omniscience-ltd.com
OMSI Ventures Sàrl	Medtech	GE	http://www.omsiventures.com
OncoEthix SA	Services	VD	http://www.oncoethix.com
ONCommit Sàrl	Services	VD	http://www.oncommit.ch
OncoTheis	Medtech	GE	http://www.oncotheis.com
ONDACO SARL	Services	GE	http://www.ondaco.com
One Drop Diagnostic Sàrl	Medtech	NE	http://www.1dropdx.com
Oriflame Cosmetics SA	Cosmetics	FR	http://www.oriflame.com
Orphée SA	Services	GE	http://www.orphee-medical.com
Ortho-Team AG	Medtech	BE	http://www.ortho-team.ch
Ortho.Kern SA	Medtech	VD	http://www.ortho-kern.ch
Orthoglobal Sàrl	Biotech	VD	http://www.orthoglobal.ch
Oscimed SA	Medtech	NE	http://www.oscimedsa.com
Osterwalder AG	Services	BE	http://www.osterwalder.com
Otsuka SA	Pharma	GE	http://www.otsuka.com
P.T.M.	Services	GE	http://www.ptm.ch
P&TS SA	Services	NE	http://www.patentattorneys.ch
Pact & Partners International	Services	VD	http://www.pactpartners.com
PACTT	Research	VD	http://www.pactt.ch
Partner Inside	Services	NE	http://www.partner-inside.com
PaxVax Berna Gmbh	Pharma	BE	http://www.paxvax.com
PB Swiss Tools AG	Medtech	BE	http://www.pbswisstools.com
PB&B SA	Cosmetics	VD	http://www.pbbtech.ch
Pearlwater Mineralquellen AG	Nutrition	VS	
Pen-fix Sàrl	Medtech	JU	http://www.pen-fix.ch
Perfusal Sàrl	Medtech	JU	http://www.perfusal.ch
Petitpierre SA	Medtech	NE	http://www.petitpierre.ch
Petz Industries AG	Services	FR	
Pewatron AG	Services	FR	http://www.pewatron.com
PFL Antralux SA	Medtech	NE	http://www.precel.ch
PFM Medical Sàrl	Medtech	NE	http://www.celgene.com
PGT Healthcare	Biotech	GE	
Pharma Consulting Marion Senn GmbH	Services	BE	http://www.pharmaconsulting.ch
Pharma Futura SA	Pharma	VS	http://www.nutritiondusport.ch
Pharmalp SA	Pharma	VS	http://www.pharmalp.ch
Pharmasys CH – Suisse	Services	NE	http://www.pharmasys.ch
Pharmatic AG	Services	BE	http://www.pharmatic.ch
Phasis Sàrl	Biotech	GE	http://www.phasis.ch
Phenosystems SA	Medtech	VD	http://www.phenosystems.com
Phi Pharma SA	Pharma	VS	http://www.phi-pharma.com
Phonak Communication AG	Services	FR	http://www.phonak-communications.com
PHT Corporation Sàrl	Services	GE	http://www.ert.com
Phyt-Inov SA	Biotech	JU	http://www.phyt-inov.com
PhytoArk SA	Research	VS	http://www.phytoark.ch
PhytoConcept	Biotech	VS	
Phytomed AG	Biotech	BE	http://www.phytomed.ch
Phytopharma SA	Pharma	FR	http://www.phytopharma.ch
PhytoSwissPharma Särl	Pharma	VS	http://www.phytoswisspharma.ch
Pibor Iso SA	Services	JU	http://www.pibor.ch
Pico Drill SA	Medtech	VD	http://www.picodrill.com
Pierre Kern Orthopédie	Medtech	VD	http://www.ortho-kern.ch
Piguet Frères SA	Services	VD	http://www.piguet-freres.ch
Pimatron Medizintechnik + Consulting GmbH	Medtech	BE	http://www.pimatron.ch/index.html
Pixon Engineering SA	Research	VS	http://www.pixon-ch.com
PKNM Solutions	Biotech	VD	http://pknmsolutions.ch/
Plaspaq SA	Services	FR	http://www.plaspaq.ch
platinn	Services	FR	http://www.platinn.ch/
Pnn Medical SA	Medtech	VD	http://www.pnnmedical.ch
Polar Electro Europe B.V., Schipol-Zuid	Services	NE	http://www.polar.com
Polydec SA	Biotech	BE	http://www.polydec.ch
Polyform Kopp AG	Biotech	BE	http://www.polyform.ch
Polykem Sàrl	Biotech	VD	http://www.polykem.com
Posalux SA	Services	BE	http://www.posalux.ch
Positive Coating SA	Medtech	NE	http://www.positivecoating.ch

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Precipart SA	Services	BE	http://www.precipart.ch
Précision éléctronique Precel SA	Medtech	NE	http://www.precel.ch
PRECISION FOR MEDICINE	Research	GE	http://www.quartz.bio
Preclin Biosystems AG	Research	VD	http://www.preclinbiosystems.com
PreenTec AG	Services	FR	http://www.preentec.ch
PregLem SA	Biotech	GE	http://www.preglem.com
Pretec AG	Services	BE	http://www.pretec.ch
Prexton Therapeutics	Pharma	GE	www.prextontherapeutics.com/
PricewaterhouseCoopers	Investor	VD	https://www.pwc.ch/en/industry_sectors/life_sciences.html
Primequal SA	Medtech	GE	http://www.primequal.com
Pristem SA	Medtech	VD	http://www.pristem.com
Pro Valplantes SA	Biotech	VS	http://www.provalplantes.ch
Product Life AG	Services	VD	http://www.productlife.ch
Productec SA	Services	JU	http://www.productec.ch
Produits Dentaires SA	Medtech	VD	http://www.pdsa.ch
Promed SA	Medtech	FR	http://www.Promed-lab.ch
Prosai SA	Services	FR	
Protaccine Biotec Sàrl	Biotech	JU	http://www.protaccinebiotec.ch
Protec Medical Sàrl	Services	GE	http://www.protec-shop.ch
ProTool AG	Services	BE	http://www.protool-ltd.ch
Proxilab Analyses Médicales SA	Research	VD	https://www.proxilab.ch/
Pryv	Research	VD	http://pryv.com/
PulmonX International Sàrl	Medtech	NE	http://www.pulmonx.com
Pure by Switzerland SA	Cosmetics	JU	http://www.purebyswitzerland.com
PX Precimet SA	Medtech	NE	http://www.pxgroup.com
QGel SA	Services	VD	http://www.qgelbio.com
Qloudlab	Medtech	VD	http://www.qloudlab.com
Qualimatest SA	Services	GE	http://www.qmt.ch
Quantis International	Services	VD	http://www.quantis-intl.com
Quantum Pharmaceuticals SA	Pharma	NE	http://www.quantumpharmaceuticals.com
Quintiles Switzerland Sàrl	Research	VD	http://www.quintiles.com
R-Action Distribution Sàrl	Services	VD	http://www.radistribution.com
Raumedic AG	Medtech	FR	http://www.raumedic.com
Recomatic SA	Services	JU	http://www.recomatic.ch
Redelec Technologie SA	Research	VS	http://www.redelec.ch
Regen Lab SA	Medtech	VD	http://www.regenlab.com
RegenHU SA	Medtech	FR	http://www.regenhu.com
RegioMed Fred Riesen	Medtech	BE	http://www.regiomed.ch/
Relief Therapeutics	Biotech	GE	http://www.reliefftherapeutics.com
REM Analytics	Medtech	VD	http://www.remanalytics.ch
REMINISCIENCES SA	Biotech	VD	http://switzerland.masschallenge.org
Remora Partners	Investor	VD	http://www.remora-partners.ch
Remp AG	Services	BE	http://www.remp.com
ReseaChem GmbH	Research	BE	http://www.reseachem.ch
RetinAI Medical GmbH	Medtech	BE	http://www.retinai.com
Reuteler & Cie SA – Patent & Trademark Attorneys	Services	VD	http://www.reuteler.net
RF Pharmaceuticals Sàrl	Pharma	GE	
Rheon Medical SA	Medtech	VD	http://www.rheonmedical.com/
Rhizen Pharmaceuticals SA	Pharma	NE	http://www.rhizen.com
RiboVax Biotechnologies SA	Biotech	GE	http://www.ribovax.com
Ridepharm Consulting Sàrl	Services	VS	http://www.ridepharm.com
Riotex AG	Services	BE	http://www.riotex.ch
RNI Consulting Healthcare	Services	VS	http://www.rni-conseil.com
Rodanotech Sàrl	Research	GE	http://www.rodanotech.ch
Roewasys AG	Services	BE	http://www.roewasys.com
Romande Energie Services Sa	Services	VD	http://www.romande-energie.ch
Romedic SA	Medtech	VD	http://www.romedicsa.ch
Rosin Entreprise Sàrl	Medtech	VD	http://www.rosin-ent.com
Ruetschi Technology AG	Services	FR	https://www.ruetschi-group.com/en/
Rüfenacht AG	Services	BE	http://www.starbowl.ch
Rüsch (Schweiz) AG	Medtech	BE	http://www.ruesch-schweiz.ch
S-GE Switzerland Global Enterprise	Services	VD	http://www.s-ge.com
S&S Sàrl	Medtech	BE	http://www.ssgmt.com
Safrima AG	Medtech	BE	http://www.safrima.ch
SamanTree Medical SA	Services	VD	http://www.samantree.com
Sandozmedica Ltd	Medtech	VD	http://www.sandozmedica.com
Saniswiss SA	Medtech	GE	http://www.saniswiss.com
Sanitex SA	Medtech	JU	http://www.sanitex.ch

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
Sankom Switzerland SA	Nutrition	JU	http://www.sankom.com
Sanofi-Aventis (Suisse) SA	Pharma	GE	http://www.sanofi-aventis.ch
Santen Switzerland SA	Pharma	GE	http://www.santen.eu
Saphetor SA	Research	VD	http://saphetor.com
Saphirwerk Industrieprodukte AG	Medtech	BE	http://www.saphirwerk.com
SATYAtek SA	Medtech	VD	http://www.satyatek.com
SAV-IOL SA	Medtech	NE	http://www.sav-iol.ch
SBG – Healthcare Strategic Marketing & Communication	Services	VD	http://www.sbg-marcom.ch
sbridg Sàrl	Services	NE	http://www.sbridg.ch
Sccopi Engineering Sàrl	Services	GE	http://www.sccopi.com
Schaerer Mayfield Schweiz AG	Medtech	BE	http://www.schaerermayfield.com
Schlafli Engineering AG	Services	BE	http://www.schlafli.ch
Schmitz AG	Services	BE	http://www.schmitz-soehne.com
Schneiter & Vuille	Services	VD	http://www.sv-ip.com
ScienceVisuals Sàrl	Medtech	VD	http://www.sciencevisuals.com
Scientis Pharma SA	Pharma	GE	http://www.scientispharma.ch
Scitec Research SA	Research	VD	http://www.scitec-research.com
SCU,SWissCheckUp,SA	Medtech	GE	http://www.swisscheckup.com
SDI Surgical Device International Sàrl	Medtech	BE	http://www.sdigmbh.ch
Second Sight Medical Products Sàrl	Biotech	VD	http://www.secondsight.com/
Sedia AG	Medtech	FR	http://www.sedia.ch
Sedin SA	Services	GE	http://www.sedin.ch
SeedIMPULSE SA	Medtech	VD	http://www.seedimpulse.ch
Selexis SA	Research	GE	http://www.selexis.com
Semadeni AG	Services	BE	http://www.semadeni.com
Semtech Neuchâtel Sàrl	Services	NE	http://www.xemics.com
SensArs Neuroprosthetics Sàrl	Medtech	VD	http://www.sensars.com
Sensimed SA	Medtech	VD	http://www.sensimed.ch
Sérolab SA	Research	FR	http://www.serolab.ch
Servier Suisse SA	Pharma	GE	http://www.servier.com
Seyonic SA	Medtech	NE	http://www.seyonic.com
SGS M-Scan SA	Research	GE	http://www.m-scan.com
SGX Sensortech SA	Services	NE	http://www.sgxsensortech.com
SIB Swiss Institute of Bioinformatics	Research	VD	http://www.sib.swiss
SICHH Swiss Integrative Center for Human Health	Research	FR	https://www.sichh.ch/
SICPA SA	Services	VD	http://www.sicpa.com
SIE AG Surgical Systems	Medtech	BE	http://www.ziemergroup.com
Siegfried Evionnaz SA	Services	VS	https://www.siegfried.ch/
Siemens Suisse SA	Services	VD	http://www.siemens.ch
Signal Processing SA	Services	VD	http://www.signal-processing.com
Silver Wave SA	Cosmetics	GE	
SilverSwiss Technology Sàrl	Medtech	FR	http://www.silverswiss.ch
Simatec AG	Medtech	BE	http://www.simatec.com
SimplicityBio	Research	VS	http://www.simplicitybio.com
Simplinext SA	Medtech	NE	http://www.simplinext.com
Sincopharm SA	Cosmetics	VD	http://www.sincopharm.ch
Sintetica Bioren SA	Biotech	NE	http://www.sintetica-bioren.com
Sipel	Services	GE	http://www.sipel.ch
Sirad SA	Services	NE	http://www.sirad.ch
SISPha SA	Services	VS	http://www.sispha.com
Siteminsel Ltd.	Services	BE	http://www.sitem-insel.ch
Skin Cell Technologies	Cosmetics	VS	
Smart Cardia	Medtech	VD	http://www.smartcardia.com
Smartcanula Sàrl	Medtech	VD	http://www.smartcanula.com
SmartGene Services Sàrl	Research	VD	http://www.smartgene.ch
SME BioAdvisor Ltd	Investor	VS	http://www.smebioadvisor.com
SMR Engineering & Development SA	Services	BE	http://www.smr.ch
SMT Swiss Microtechnology AG	Medtech	BE	http://www.ziemergroup.com
Snortec Sàrl	Services	GE	http://www.snortec.ch
SNP Consulting	Services	FR	http://www.swissnp.ch
Socar Research SA	Research	VD	http://www.socar-research.com
Société Suisse des Explosifs	Biotech	VS	http://www.explosif.ch
Socorex Isba SA	Medtech	VD	http://www.socorex.com
Solae Europe SA	Biotech	GE	http://www.solae.com
Solid Drug Development (SDD) SA	Research	GE	http://www.soliddrugdevelopment.com
SolvAxis SA	Services	BE	http://www.solvaxis.com
Sonceboz SA	Medtech	BE	http://www.sonceboz.com/en/medtech/
Sonoscope SA	Services	FR	http://www.sonoscope.ch
Sonoview LLC	Medtech	BE	http://www.sono-view.com
Sophia Genetics SA	Research	VD	http://www.sophiagenetics.com
Sourcin SA	Services	FR	http://www.sourcin.com
SpacePharma SA	Pharma	JU	http://www.space4p.com
Spagyros SA	Biotech	JU	http://www.spagyros.ch
SPD Swiss Precision Diagnostics	Medtech	GE	http://www.swissprecisiondiagnostics.com
Spectroswiss Sàrl	Research	VD	http://www.spectroswiss.ch
SpineArt	Biotech	GE	http://www.spineart.ch
Spinomix SA	Medtech	VD	http://www.spinomix.com
SpirAlps SA	Biotech	VS	http://www.spiralps.ch
SPsolutions SA	Services	VS	http://www.spsolutions.ch
Staar Surgical AG	Medtech	BE	http://www.staar.com
STALICLA	Research	GE	http://www.stalicla.com
Stamford Consultants	Services	VD	http://www.thestamfordgroup.com/
Startech Consulting	Services	VD	http://www.startech-consulting.ch
Station de recherche Agroscope Changins-Wädenswil	Biotech	VS	http://www.agroscope.admin.ch
Steiger Galvanotechnique SA	Medtech	FR	http://www.steiger.ch
Stemedica International SA	Biotech	VD	http://www.stemedica.com
Stemergie Biotechnology SA	Biotech	GE	http://www.stemergie.com
SteriLux SA	Medtech	VD	http://www.sterilux.ch
Steris AG	Biotech	BE	http://www.steris.com
SteriSwiss Sàrl	Research	GE	http://www.steriswiss.ch
Stiftung für Technologische Innovation	Investor	BE	http://www.sti-stiftung.ch
Stolmár & Partner Intellectual Property S.à.r.l.	Services	GE	http://www.stolmar-ip.com
Stoppani AG	Research	BE	http://www.stoppani.com
Stragen Pharma SA	Pharma	GE	http://www.stragen.ch
Stratarium Sàrl	Medtech	VD	http://www.stratarium.com
Straumann Villeret SA	Biotech	BE	http://www.straumann.com
Stryker SA (Neuchâtel and Geneva)	Medtech	NE	http://www.stryker.ch
Suisse Med Technologies SA	Medtech	GE	http://www.suissemt.com
SUISSELLE	Cosmetics	VD	http://www.suisselle.com
Sun bioscience SA	Research	VD	http://www.sunbioscience.ch
Sunrise Medical AG	Medtech	BE	http://www.sunrisemedical.ch
Sunstar Suisse SA	Cosmetics	VD	http://www.sunstar.com
Supply Chain Operations SA	Services	VD	http://www.suplychainoperations.ch
Surcotec SA	Biotech	GE	http://www.surcotec.ch
Surgical Instrument Engineering AG	Services	BE	https://www.ziemergroup.com/gateway-fr.html
Süss MicrOptics SA	Medtech	NE	http://www.suss-microoptics.com
Swiss Beauty Technologies SA	Cosmetics	VS	http://www.oseocosmetics.ch
Swiss Biobank Sàrl	Research	VD	http://www.swissbiobank.com
Swiss Biobanking Platform	Services	VD	http://www.swissbiobanking.ch
Swiss Biotech Center	Research	VS	http://www.swissbiotechenter.com
Swiss Dental Material SA	Medtech	VS	http://www.sdm-sa.com
Swiss Institute of Cell Therapies (SICT)	Research	GE	http://www.swiss-ict.ch
Swiss Medbank SA	Services	VD	http://www.swissmedbank.com
Swiss Medical Care SA	Medtech	VD	http://www.swissmedcare.com
Swiss Medtech	Services	BE	https://swiss-medtech.ch
Swiss Motion Technologies SA (formely Nextep)	Medtech	VD	https://www.swissmotiontechnologies.com
Swiss Phytopharma	Pharma	GE	http://www.http://swissphytopharma.com
SWiSS TM Sàrl	Medtech	GE	https://tmswissmed.ch/
Swiss Vaccine Research Institute c/o CHUV	Research	VD	http://www.swissvaccineresearchinstitute.ch
Swiss-Medical-Consultants Sàrl	Services	VD	http://www.swiss-medical-consultants.com
Swissaustral Biotech SA	Biotech	VS	http://www.swissaustral.ch
SwissDeCode Sarl	Nutrition	VD	http://www.swissdecode.com
Swissderm AG	Cosmetics	FR	http://www.swissderm.ch
Swisselect SA	Services	VD	http://www.swisselect.ch
Swissfillon AG	Research	VS	http://www.swissfillon.com
SwissLens SA	Medtech	VD	http://www.swisslens.ch
Swisssurgical Sàrl	Medtech	VD	http://www.swisssurgical.com
Swortec SA	Medtech	VS	http://www.swortec.ch
Symbion Medical Systems Sàrl	Services	VD	http://www.symbion-medical.com
Symbios Orthopédie SA	Medtech	VD	http://www.symbios.ch
Symetis SA	Medtech	VD	http://www.symetis.com
Synaptive Medical	Medtech	VD	http://www.synaptivemedical.com
Syngenta Crop Protection Monthey SA	Biotech	VS	http://www.syngenta.com
Synthes Produktions GmbH	Services	VS	http://www.synthes.com
Sysmatec	Biotech	VS	http://www.sysmatec.ch
Sysmex Digitana SA	Services	VD	http://www.sysmex.ch
Systems Assembling SA	Services	NE	http://www.sysa.ch
Tabrasco SA	Services	VD	http://www.tabrasco.com

COMPANY NAME	MAIN SECTOR	CANTON	INTERNET
Tagator	Services	VD	http://www.tagator.com
Tasly Europe co. Ltd	Biotech	GE	http://www.tasly.info
TauDerma Sàrl	Biotech	VS	
TC Logiciel Sàrl	Services	VD	http://www.tclogiciel.com
Tech-Laser Sandoz SA	Medtech	VD	http://www.techlaser.ch
Techma Consult Sàrl	Research	VD	http://www.techma-consult.com
TechniCAD Engineering SA	Services	VS	http://www.technicad.ch
Techno-Lens SA	Medtech	VD	http://www.technolens.ch
TechnoCut SA	Medtech	JU	http://www.technocutsa.ch
Temmentec AG	Cosmetics	BE	http://www.temmentec.ch
Tenax SA	Services	JU	http://www.jic.ch/tenax
Texelia	Research	GE	http://www.texelia.com
The Ark	Services	VS	http://www.theark.ch
The Biotech Quality Group	Services	NE	http://www.thebiotechqualitygroup.com
The MathWorks GmbH	Research	BE	http://www.mathworks.ch
Thermo Fisher Scientific SA	Medtech	VD	http://www.thermofisher.com
Tissot Medical Research SA	Medtech	NE	http://www.tissotmedical.com
Tolerys SA	Biotech	GE	http://www.tolerys.com
Topotarget Switzerland SA	Biotech	VD	http://www.topotarget.com
Tornos SA	Services	BE	http://www.tornos.com
Totzke & Dreher Scientific SA	Services	GE	http://www.td-s.com
TQM Insight	Medtech	GE	http://www.tqm-insight.com
Trabold & Co AG	Services	BE	http://www.trabold.ch
Trajan Scientific Switzerland	Services	FR	https://www.trajanscimed.com/pages/life
TransCure Biosciences SA	Biotech	GE	http://www.transcurebiosciences.com
TRB Chemedica SA	Pharma	VS	http://www.trbchemedica.com
TRB Chemedica International SA	Pharma	GE	http://www.trbchemedica.com
Triflo Medical Switzerland Sàrl	Biotech	NE	www.triflomedical.com
Trimastek Sàrl	Medtech	NE	http://www.trimastek.ch
Trinzo	Services	GE	http://www.trinzo.com
Triskel Integrated Services SA	Services	GE	http://www.triskel.com
Twiice	Medtech	VD	http://www.twiice.ch
Typon Medical Systems	Medtech	BE	http://www.typon.ch
UCB Farchim SA	Pharma	FR	http://www.ucb.com/worldwide/switzerland
Unident SA	Medtech	GE	http://www.unident.ch
UNIFR - University of Fribourg	Research	FR	http://www.unifr.ch
UNIGE - Université de Genève	Research	GE	http://www.unige.ch
UNIL - University of Lausanne	Research	VD	http://www.unil.ch
Unilabs SA	Research	GE	http://www.unilabs.ch
Unimed SA	Medtech	VD	http://www.unimed.ch
UNINE - University of Neuchâtel	Research	NE	http://www.unine.ch
Uniquer Sàrl	Research	VD	http://www.uniquer.ch
Unitec- Université de Genève	Research	GE	http://www.unige.ch/unitec/presentation.html
Unitechnologies SA	Medtech	BE	http://www.unitechnologies.com
United BioSource (Suisse) SA	Research	GE	http://www.ubc.com
UniverCité	Research	VD	http://www.univercite.ch
University of Bern	Research	BE	http://www.unibe.ch
V.I.P.S medical Sàrl	Pharma	NE	http://www.vipsglobal.com
Valdar SA	Services	VD	http://www.valdar.ch
Valmed SA	Medtech	VS	http://www.valmed.com
Valpharmex SA	Pharma	VS	valpharmex.com/
Valplantes	Biotech	VS	http://www.valplantes.ch
Valsynthèse SA	Pharma	VS	http://www.valsynthese.ch
Valtronic Technologies (Switzerland) SA	Medtech	VD	http://www.valtronic.com
Valucept Sàrl	Cosmetics	GE	http://www.valucept.com
Vaxeal Holding SA	Biotech	VD	http://www.vaxeal-group.com
Venturelab	Services	VD	http://www.venturelab.ch
Vibwife GmbH	Medtech	BE	http://www.vibwife.com
ViDi Systems SA (acquired by Cognex Corporation)	Services	FR	http://www.vidi-systems.com
Vifor Pharma (OM Pharma) SA	Pharma	GE	http://www.viforpharma.com
Vifor Pharma SA	Pharma	FR	http://www.viforpharma.com
Vigisense SA	Medtech	GE	http://www.vigisense.com
Vinci Capital	Investor	VD	http://www.vincicapital.ch
Viral Inactivated Plasma Systems SA	Services	NE	http://www.vipsmedical.com
Vitanae SA	Cosmetics	JU	
Vivactis (Switzerland) SA	Services	VD	http://www.vivactis.com
Vivaleas SA	Services	GE	http://www.vivaleas.com
Viventis Microscopy Sàrl	Services	VD	http://www.viventis-microscopy.com
Vivos Dental SA	Medtech	FR	http://www.vivosdental.com
Voisin Consulting Sàrl	Services	VD	http://www.voisinconsulting.com
Volumina Medical	Biotech	VD	http://www.volumina-medical.ch
Vuilleumier Technology SA	Medtech	BE	http://www.vui-tec.ch
VWR International AG	Services	VD	http://www.vwr.com
Vygon Suisse Sàrl	Medtech	BE	http://www.vygon.ch
W Life Sciences	Services	VD	http://www.wlifesciences.com
WAMA Diagnostics (Switzerland) SA	Services	VS	http://www.wamadiagnostics.ch
Wibemo SA	Services	JU	http://www.wibemo.ch
Willemin-Macodel SA	Services	JU	http://www.willemin-macodel.com
Wire Engineering Sàrl	Services	FR	http://www.wire-engineering.com
Witech Bassecourt SA	Services	JU	http://www.witech-sa.ch
World Medical Device Organization	Medtech	VD	http://www.wmdo.org
Wyss Center	Research	GE	http://www.wysscenter.ch
Xactform SA	Medtech	NE	http://www.xactform.com
Xigen SA	Pharma	VD	http://www.xigenpharma.com
XLBiosim SA	Services	VD	http://www.xlbiosim.com
Xsensio	Medtech	VD	http://www.xsensio.com
Y-Parc SA	Incubator	VD	http://www.y-parc.ch
Ypsomed AG	Medtech	BE	http://www.ypsomed.com
Yttermed SA	Medtech	VD	http://www.yttermed.ch
Zanin Swiss Cosmetics	Cosmetics	VS	http://www.zanin-cosmetics.ch
Ziemer Ophthalmic Systems AG	Medtech	BE	http://www.ziemergroup.com
Zimmer Schweiz GmbH (Berne)	Medtech	BE	http://www.zimmer.com
Zimmer Schweiz GmbH (Geneva)	Medtech	GE	http://www.zimmer.com
ZTC Technology SA	Services	NE	http://www.ztc-techno.com
Zwirner Nanotec AG	Medtech	FR	http://www.zwirner-nanotec.ch

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Life Sciences Cluster Western Switzerland

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33	Research & Academic institutions
1120	Companies
69	Private & Public Innovation Support Mechanisms
5000	Life Sciences students

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Our Services

BioAlps is a non-profit organisation fostering and promoting the excellence and performance of the life sciences sector of Western Switzerland worlwide.
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- Strengthen synergies and partnership among members
- Support the transfer of technologies and competencies from academic to industrial settings
- Stimulate the development of new businesses

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