

# Swiss Biotech Report 2014

Idea

Research

Development

Production

Market

Cover Picture:  
Picture courtesy of Jürg Zürcher ©, view of the Stein glacier near Susten pass, Canton Bern

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# Editorial



The expectation is that biotechnology will continue to play a key role in the sustainable development of Switzerland. Boosting innovation in this industry will be vital to economic growth, to our environmental endeavours, to commercialization of new technologies, and to public health.

By further strengthening academic output, enablers and competitive clusters, we can create a strong 'bioeconomy' moving forward. The current report highlights major initiatives and key players in the value proposition, and looks at the contribution they make to its success.

Following the result of the referendum aimed at stopping mass immigration on February 9, 2014, the Swiss government is working on solution scenarios for Swiss participation in the EU programs Horizon2020 and Erasmus+ that are of high importance to research and innovation driven biotechnology.

A handwritten signature in black ink, reading 'Schneider'.

Federal Councillor Johann N. Schneider-Ammann  
Federal Department of Economic Affairs, Education and  
Research (EAER)

# The biotech value chain

This year's report provides an overview of the many and diverse Swiss stakeholders actively involved in and supporting the national biotech value chain. It is common knowledge that the

path which leads from an idea to its successful introduction into the marketplace is long, risky and tedious. Making this journey requires a well-knit network that shares a common goal.



Idea

Swiss research enjoys a first-class international reputation. This is in large part due to the scientists, who are supported by the Swiss National Science Foundation (SNSF) in their pursuit of research interests, both as individuals and in collaborative projects. >> [page 6](#)

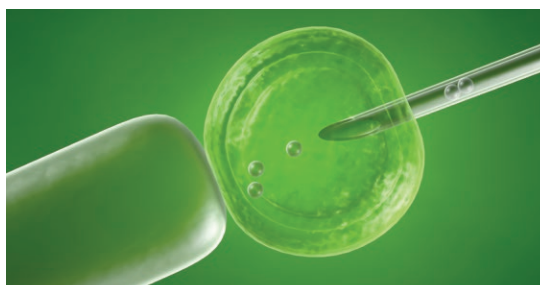
The next stage, whereby research results are further developed into applications, is supported by the Commission for Technology and Innovation (CTI), which specifically backs the cooperation and the transfer of knowledge and technology between universities and industry. >> [page 8](#)



Research

The innovation process is only successful when the support systems enable protection of intellectual property, from research through to development, production and on in to the market. The Swiss Federal Institute of Intellectual Property secures and promotes innovation in Switzerland. >> [page 10](#)

The interaction between industry and academia, and the creation of start-ups, is the key to transferring knowledge and technology into production and from there into the marketplace. The NTN Swiss Biotech, run by the Swiss Biotech Association and biotechnet, plays an active role in the KTT (Knowledge and Technology Transfer) strategy and is one of eight CTI' supported NTNs (National Thematical Networks). >> [page 12](#)



Development

At a networking level, the national industry associations scienceindustries and the Swiss Biotech Association are working in a complementary fashion to support framework conditions for the industry and to develop the business successes of their members. >> [page 14](#)



Production

In biotech, the development, manufacture and marketing of products and the development of companies require tremendous financial resources. That is why there is such an active public and private investor base. The Swiss Private Equity & Corporate Finance Association (SECA), SIX Swiss Exchange and Ernst & Young contribute greatly to the healthy development of Swiss biotech companies. >> [page 16 & 28](#)



Market

The Swiss biotech industry is truly international. With research and production based in Switzerland, access to international markets is the final link in the value chain that starts with an idea and finds its fulfilment in the market. Switzerland Global Enterprise provides support to Swiss enterprises who are interested in exporting and links companies, experts and organisations around the world. >> [page 19](#)

# How to tap the power of diversity



Ori Schipper,  
Swiss National Science  
Foundation (SNSF)

The Swiss National Science Foundation (SNSF) is mandated by the Swiss Confederation to fund high-quality basic research and to support scientists in Switzerland in their quest for excellence. With a range of different funding instruments, the SNSF helps in preparing the ground for new ideas to come to fruition.

On December 17, 2013 Federal Councillor Johann N. Schneider-Ammann announced the creation of eight new National Centres of Competence in Research (NCCR). NCCRs promote long-term research networks in areas of strategic importance for Swiss science, the Swiss economy and Swiss society. They produce gains in terms of scientific findings and sustainable renewal of research structures in higher education institutions. Furthermore, they improve the division of labor and coordination among national research institutions, enhance equal opportunities and drive knowledge and technology transfer.

Life sciences account for three out of the eight new NCCRs. The NCCR *Molecular Systems Engineering* hopes to not only improve understanding of the synthesis processes that take place within cells, but also to break through the barriers of the traditional focus on individual molecular modules and develop new engineering principles that reveal how individual molecular modules can be combined to form working molecular systems or molecular production lines.

The NCCR *RNA & Disease* studies a class of molecules forming the pivot point for many vital processes. RNA defines the conditions, in a given cell, under which a given gene is or is not activated. If any part of this process of genetic regulation breaks down, disease is caused. In fact, heart disease and cancer, neurodegeneration and metabolic disorders can often be tracked down to faulty regulation of RNA. This NCCR hopes to discover new approaches to attack the biggest causes of death in modern society.

The NCCR *Centre for Bio-Inspired Stimuli-Responsive Materials* aims to study and find new smart materials, the properties of which change predictably and selectively in response to stimuli such as chemicals, heat, light or even mechanical forces. Such



## Start-ups from NCCRs

A selection of logos from some of the start-up companies, which emerged from the first round of NCCRs between 2001 and 2013. In total, 79 start-up companies were created providing over 400 jobs.

materials have already been developed, but their properties are well below those displayed by the living. This NCCR aims to pool the expertise of its members in the fields of chemistry, physics, materials science, biology and medicine to reduce this gap.

As of 2014, there will be a total of 21 NCCRs benefiting from a significant level of federal funding – approximately CHF 30 million each year – over a period of up to twelve years. But SNSF's main funding scheme is project funding. Approximately 2,500 applications are received each year. The National Research Council of the SNSF assesses the applications as part of an established evaluation procedure and makes funding decisions. Project funding is open to all disciplines and topics; the projects may concern both use-inspired and pure basic research.

Although NCCRs have a special part of their budget dedicated to knowledge transfer activities, they are not the only ones to boost innovation. Sometimes individual research projects also result in the commercialization of new technologies. Since many years may pass from the initial research discovery until the final product is delivered, it is often difficult to track and quantify the progress initiated by individually funded projects. And it is impossible to predict their success.

With its bottom-up philosophy in project funding, the SNSF supports a vast diversity of research projects. Some of them will yield ideas which will be picked and shaped by market forces to finally give rise to innovative products. One example is perhaps particularly suited to illustrate the unpredictability of this process. Antonio Lanzavecchia is receiving funding from the SNSF for his group's investigation of the human immune system.

This system is a sort of miracle within a miracle. Whenever a person gets infected, the immune system comes up with a huge number of different antibodies and chooses the most convenient ones within just a few days. On a much smaller temporal and spatial scale the immune system follows the same rules and plays the same evolutionary game, during which it came into existence over millions of years. The principles of natural evolution – random diversity and functional selection – also govern the immune response. Taking this thought further, Lanzavecchia and his team reasoned that human blood samples must harbor interesting antibodies, especially if the samples are taken from individuals that have survived serious infections.

They invented and patented a trick to immortalize the immune cells in these blood samples. In this way they created antibody discovery platforms which are now run by Humabs, a start-up company of the Bellinzona-based *Institute for Research in Biomedicine*, which Lanzavecchia founded in the year 2004. Humabs is focusing on the creation of antibodies to treat infectious and inflammatory diseases. Davide Corti, head of antibody discovery at Humabs, says the discovery platforms are adaptable to any human disease in which antibodies have a role, including cancer and neurodegenerative diseases.

**Humabs BioMed AG**  
[www.humabs.com](http://www.humabs.com)



Humabs' strategy is to mine the human immune system to generate unique and potent human monoclonal antibodies to treat infectious and inflammatory diseases.

Year of incorporation: 2004

Humabs concerns itself with the panoply of different antibodies. SNSF has a similar intensity of focus when it comes to encouraging more young talent to consider a career in research, thereby strengthening Swiss research and securing Switzerland's position as a research powerhouse. The SNSF's objective for the future is to make an even greater contribution to ensuring that the best junior researchers are given the right opportunities at the right time to show what they are capable of.

The Swiss National Science Foundation (SNSF) is the most important Swiss agency promoting scientific research. As mandated by the Swiss Federal Government, SNSF supports all basic research in all scientific disciplines, from philosophy and biology to the nano-sciences and medicine. The focus is on the scientific assessment of projects submitted by researchers. The best applicants are funded by the SNSF to the tune of around CHF 760 million each year. The SNSF supports some 7,000 researchers annually, of whom at least 5,500 are aged 35 years or under. For further information visit [www.snf.ch](http://www.snf.ch).

# Strategic funding for technology transfer and innovation



Oreste Ghisalba,  
Commission for Technology  
and Innovation (CTI)

Switzerland's Commission for Technology and Innovation (CTI) backs the transfer of knowledge and technology between universities and business. It supports application-oriented research and development and one of its main missions is the promotion and support of start-ups. This is where many innovations are realised and put on the market by young entrepreneurs.

As the Confederation's innovation promotion agency, CTI supports R&D projects, entrepreneurship, and the development of start-up companies. CTI helps to optimise knowledge and technology transfer through the use of National Thematic Networks. Switzerland needs talented people with exciting business ideas; people who are willing to take on the competition and have the persistence to see their visions implemented in the marketplace.

CTI funding made all the difference for Anergis, according to CEO Vincent Charlon. While friends and family had financed the very early stages, CTI funding made it possible for Anergis to conduct a clinical trial. This took the company to a level of maturity required for investment by biotech venture capitalists (VC). This was supported by a local private investor and later the round A was made possible by several Swiss pharma executives joining the biotech VCs.

**Anergis SA**  
[www.anergis.ch](http://www.anergis.ch)



Anergis develops proprietary COP Allergy Vaccines providing an ultra-fast and safe method of allergen specific immunotherapy (SIT) based on the technology of contiguous overlapping peptides (COP).

Year of incorporation: 2001

## Revised legal framework for the CTI

The totally revised 'Research and Innovation Promotion Act' (RIPA) and the corresponding 'Research and Innovation Promotion Ordinance' (RIPO) came into force on January 1, 2014. An important aspect of the fully revised act is the clarification and delimitation of tasks and responsibilities undertaken by the Swiss National Science Foundation (SNSF) and the CTI. The independent profiles and complementary nature of the two funding bodies are defined in law. Overall the CTI will enjoy greater autonomy and be on a more equal footing with the SNSF. In contrast to the previous legislation, the fully revised RIPA sets out in detail the CTI's responsibilities for international innovation promotion. The revision explicitly gives CTI a

mandate to cooperate with counterparts in other countries in the funding of research partners in international science-based innovation projects. This arrangement with foreign promotion organisations – similar to that enjoyed by the SNSF – means that the CTI can now conduct joint calls for program bids and the evaluation of applications, and it is also able to fund R&D projects in conjunction with counterpart agencies abroad.

## International R&D projects

The whole range from big program to single R&D project is possible, on the basis of a common agreement between both parties (partner countries).

- Single R&D projects must in principle follow the general CTI regulations. They can be submitted anytime and must involve at least one Swiss research and one Swiss implementation partner. The promotion of a foreign research partner is possible only in cooperation (and by subcontracting) with the involved Swiss research institution. The national and foreign research institution must be complementary in their activities and create added-value for both, Swiss implementation and Swiss research partners. The major share of subsidies by CTI must be spent in Switzerland and only finances research institutes.
- Joint R&D programs require a detailed concept on the basis of a MoU (memorandum of understanding) between funding organizations and the number of partners and budget contribution in each country has to be matched over the program.

## New bilateral R&D cooperation agreements

As an important step towards the build-up and extension of international collaborations, the CTI is negotiating with counterparts in potential partner countries on the promotion of science-based innovation. A bilateral agreement between CTI and the Japanese Ministry of Education, Culture, Sports, Science and Technology MEXT was signed during the Japan Symposium in Spiez in October 2013. The symposium was a significant preliminary event in the run up to celebrations marking the 150th anniversary of diplomatic relations between Japan and Switzerland in 2014. The aim of the symposium was to help companies and researchers in both countries to access bilateral partnerships and develop specific projects with corresponding federal funding opportunities. Under the terms of this agreement, Switzerland and Japan recognise the benefits of mutual exchange of technological knowledge and globalisation of research and development. The aim of this agreement is to promote joint science-based innovation projects involving researchers and entrepreneurs from both countries. In addition, the agreement envisages joint workshops for stakeholders in innovation beginning in 2014.

A similar bilateral agreement between CTI and the Korean Institute for Advancement of Technology KIAT (agency of MOTIE, the Korean Ministry of Trade, Industry and Energy) was signed in July 2013 in Seoul. The agreement explicitly includes the ex-



change of information on research, innovation and technology policies and programs. Agreements with other selected foreign organizations promoting science-based innovation will follow.

## Participation in ERA SynBio

CTI is the official Swiss funding partner for *ERANET Synthetic Biology (ERASynBio)* which was initiated in 2012 within the seventh framework program (FP7). Together, the 13 funding agencies involved in the 1<sup>st</sup> call (completed in August 2013) expect to support around €15 million of synthetic biology research. This can be described as a transnational and multidisciplinary approach at the intersection of biotechnology, engineering and information technology. The 1<sup>st</sup> joint call addressed broad research areas within Synthetic Biology, based on the following definition: 'Synthetic Biology is the engineering of biology: the deliberate (re)design and construction of novel biological and biologically based parts, devices and systems to perform new functions for useful purposes, that draws on principles elucidated from biology and engineering.' Switzerland is participating in 4 out of 8 selected ERASynBio projects which is an excellent result. A 2<sup>nd</sup> call is in preparation for 2014.

## Additional funding to promote energy research

As a consequence to the revisions of the 'Research and Innovation Promotion Act' (RIPA) and the 'Research and Innovation Promotion Ordinance' (RIPO) the Federal Council can task the CTI to conduct theme-oriented funding programs. The Federal Council's 'Coordinated Energy Research Switzerland' action plan aims to promote energy research in the years 2013–2016. Central to the action plan is the allocation of a total of CHF 72 million to CTI to create research competence centres or networks between higher education institutions. These will be known as *Swiss Competence Centres for Energy Research (SCCERs)*. The SCCER will bring together the ETH Domain, universities and universities of applied sciences to collaborate on energy research activities and work closely with industry. Under the action plan, the competence centres will have different research priorities to drive research and innovation in the following seven fields:

- *Efficiency*. Approval still pending
- *Grids and their components*. Leading House: Federal Institute of Technology, Lausanne (EPFL). Budget: CHF 10 million

- *Storage*. Leading House: Paul Scherrer Institute (PSI), Villigen. Budget: CHF 11 million
- *Power supply*. Leading House: Federal Institute of Technology, Zurich (ETHZ). Budget: CHF 12 million
- *Economy-environment-law-behaviour*. Leading House: University of Basel. Budget: CHF 11 million
- *Efficient concepts, processes and components in mobility*. Leading House: Federal Institute of Technology, Zurich (ETHZ). Budget: CHF 10 million
- *Biomass*. Leading House: Paul Scherrer Institute (PSI), Villigen. Budget: CHF 11 million

The aim of the SCCERs is to promote the innovation required to sustainably implement the 'Energy Strategy 2050', both on a technical level and on a socio-political level. The SCCERs will continue to operate in the next 'Education Research Innovation Dispatch' period (2017 to 2020), provided they meet the expectations according to the stated objectives.

Of specific relevance for the life sciences and biotech sector is SCCER *Biomass* which has the following R&D topics:

- Production and utilization of biomass
- Biogas for electricity and heat production
- Gaseous and liquid energy carriers from biomass.

Life science contributions can also be envisaged in the SCCERs *Power supply* (CO<sub>2</sub> capture and storage, biological fuel cells) and *Storage* (synthetic fuels such as hydrogen or hydrocarbons). An additional CHF 46 million (newly allocated to CTI) will be used to promote R&D projects in the field of energy that will be evaluated by the CTI according to the commission's standard rules and criteria.

## Half-day patent searches for SMEs

The Commission for Technology and Innovation (CTI), in partnership with the Swiss Federal Institute of Intellectual Property (IPI), offers again free half-day patent searches to SMEs. This is a follow-up to the successful CTI-IPI partnership that began within the framework of the special series of measures taken in 2011. It is also in response to numerous requests by SMEs that this initiative be continued in the context of R&D project promotion. For further information refer to [www.kti.admin.ch/projektfoerderung/00203/](http://www.kti.admin.ch/projektfoerderung/00203/)

The innovation promotion agency Commission for Technology and Innovation (CTI) supports R&D projects, entrepreneurship and the development of start-up companies. CTI helps optimize knowledge and technology transfer through the use of networks, mentors and platforms. Support is generally available for R&D projects relating to scientific innovations in all disciplines. Project proposals are submitted using the bottom-up principle and are mainly selected on the basis of their innovativeness and market potential. For further information visit [www.kti-cti.ch](http://www.kti-cti.ch).

# Intellectual property as a solid basis for sustainable success



Heinz Müller,  
Patent Expert,  
Swiss Federal Institute  
of Intellectual Property

This story reads like a fairy tale come true, at least for biotechnology start-up companies. It all started as an exciting scientific project in James E. Bailey's lab at CalTech in 1991. The idea was to modify glycosylation patterns in monoclonal antibodies in order to improve antibody-dependent cellular cytotoxicity. Two years later, James E. Bailey was appointed professor and moved to Zurich with his Ph.D. student Pablo Umaña; there to continue his research at the ETH Zurich, one of the leading universities worldwide.

At that time, Joel Jean-Mairet, also a biotechnologist in the lab of James Bailey, became the driving force behind commercialization of the technology. Together with Pablo Umaña, he decided in 2000 to submit a business plan to a competition hosted by the ETH and McKinsey & Co. This resulted in the incorporation of GLYCART Biotechnology as an ETH Zurich academic start-up. The company started with a capital of CHF 3 million and a staff of three people.

The breakthrough status of an anti-cancer drug  
In 2003 the product GA101 was developed, a drug that appeared to have great potential and was the first glyco-engineered type II anti CD-20 monoclonal antibody designed for increased antibody-dependent cellular cytotoxicity. Preclinical research programs for this compound started in 2004 with the support of Roche Pharma. In 2005 GLYCART Biotechnology became Roche Glycart AG. The small company with a staff of just 29 people was acquired by Roche for CHF 235 million. Despite its size, this small company was allowed to be a self-directed unit within the giant Roche corporation. It continued its development of potential cancer drugs and grew rapidly. Staff numbers soon topped 100 but it remained tiny compared to Roche's own research force.

The drug GA101, now dubbed Gazyva (obinutuzumab), was further developed and entered clinical trials. In 2013, this drug obtained FDA approval, the first to receive the 'breakthrough' designation for treatment – alongside chemotherapeutic chlorambucil – as a first-line therapy for chronic lymphocytic leukemia (CLL) patients. The FDA noted that 'breakthrough' status is reserved for new drugs that 'offer a substantial improvement over available therapies for patients with serious or life-threatening diseases'. The new Glycart Roche drug seems to meet these criteria since the combination therapy nearly doubled progression-free survival. CLL is one of the most common forms of blood cancer with about 16,000 people diagnosed each year. According to the National Cancer Institute, it causes the death of nearly 5,000 people each year in the US alone.

With this success in fighting the life-threatening disease, analysts estimate Gazyva's worldwide annual sales at between USD 1.5 billion and 2 billion. A blockbuster drug was born. The acquisition of GLYCART is now starting to pay off for Roche. Accordingly, conducting the successful clinical trials would not have been possible without the financial and logistical lead by Roche.

## Patents as the basis for prosperity

This success story is based not just on technology developed in the lab but also on the early provision of patent protection of the inventions. Building up the patent portfolio started in the usual way; one patent application providing the starting point for the protection of subsequent inventions. In 1998, the group (Pablo Umaña, Joel Jean-Mairet and James Bailey) filed a provisional patent application in the US for their technology. On this basis, in 1999 the PCT patent application for 'Glycosylation engineering of antibodies for improving antibody-dependent cellular cytotoxicity' (WO9954342) was submitted. Like most of the technology, and often high-tech driven potential startups, the company has no assets to offer to investors beside its technology and the enthusiasm of its staff. However, a patent application is often the decisive factor in attracting the seed money needed to build up a company and further develop the proprietary technology towards an innovation.

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### Roche Glycart AG

[www.roche.ch/schlieren.html](http://www.roche.ch/schlieren.html)

Roche Glycart AG focuses on product development – from scientific concepts and validation to the corresponding studies. Today the compounds studied and developed are boosting Roche's significant commitment to offering improved cancer medicines.

Year of incorporation: 2000

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## Building up a patent portfolio

With the patent application in hand, the founders of GLYCART Biotechnology were able to convince investors to put money into their startup company. As shown in the graph, the technology was then developed over several years, resulting in eight more patent applications through to 2006. This patent portfolio was built up by filing PCT applications as starting points for large patent families aimed at the worldwide protection of the main potential markets for the drugs in development. All filings were started with a provisional application in the US. A provisional application is a 'pre-application' for a patent filed at the U.S. Patent and Trademark Office (USPTO), which allows filing without any patent claim, oath or declaration, or any information disclosure (prior art) statement. This provides the means for establishing an early effective filing date (priority date). It also allows the term 'Patent Pending' to be applied in connection with the description of the invention. Thus, from the day of

filing a provisional application, negotiations with investors or companies can start without taking further precautions such as non-disclosure agreements.

There are, however, a number of pitfalls in this procedure. First, the 'provisional' filing is not examined, i.e. the applicant will not obtain an opinion on the patentability by the USPTO. Second, the 'provisional' must be complete, even when it is drafted as fast as possible, which is often the case. Completeness means that everything that is necessary for a non-provisional application and the granted patent, in particular the complete disclosure of the invention, has to be in place for the provisional application. Adding further subject matter is not possible and can lead to a loss of the early application date. Thus, using the tool of a provisional application in the US is, although fast, not necessarily an easy way of starting the invention protection process.

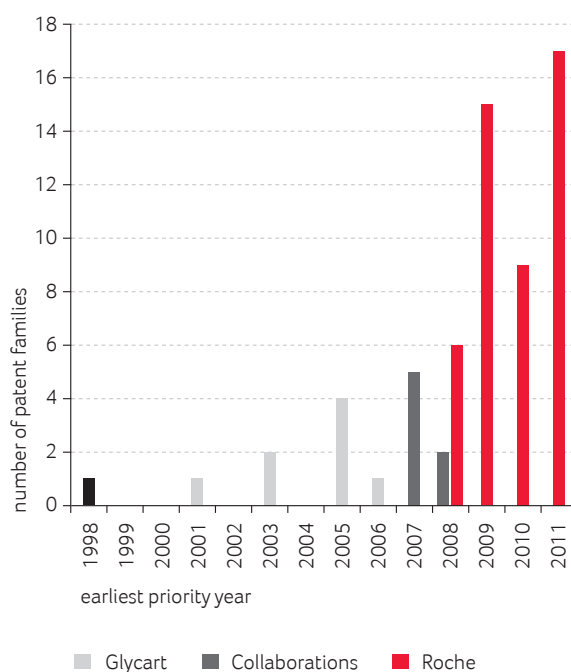
### The patenting strategy as part of the business strategy

The strategy of filing provisional applications was abandoned when Roche stepped in as a partner for the development of proprietary drugs. In collaboration with Roche, a number of patent procedures were started directly with PCT applications. Later on when GLYCART Biotechnology had been acquired by Roche, the patent application output multiplied dramatically; a clear indication of the influx of money and know-how from the big pharmaceutical company and recognition of the potential within the proprietary technology and the people at Roche Glycart.

Overall, the analysis of the patent portfolio, or even a single patent application of a start-up company, can tell a story about the potential of the company's technology. Strategic use of patent application procedures at the right time, and in the right jurisdiction, will help gain lead time advantages and attract much needed investment money. Thus, the strategy of potential start-ups for the protection of their assets is of key importance and needs to be planned very carefully. Furthermore, the strategy for intellectual property protection will need to change with the company's growth and other factors such as new partnerships. Even well-established companies have a substantial need for regular adjustment to their IP strategy in an ever changing world. Professional help from outside the company, in particular for start-ups, is needed to provide the basis for the company's management decisions on interconnected business and IP strategies.

The Swiss Federal Institute of Intellectual Property can assist with such questions by providing certain services such as carrying out high quality patent database searches. Searches performed by a patent examiner could be the basis for many decisions to be made throughout the whole lifespan of a company.

**Glycart's patent families versus earliest priority year**



Note: This graph plots the number of patent applications (as patent families) by either GLYCART Biotechnology (grey), by GLYCART Biotechnology and Roche in collaboration (dark grey) or Roche Glycart (red). The first patent application in 1998 (black) was filed by the inventors before the incorporation of the company.

The Swiss Federal Institute of Intellectual Property is the official government body for intellectual property rights in Switzerland and is responsible for examining, granting and administering these rights. The Institute's services also include tailor-made searches for trademarks and patent information and training courses on various aspects of intellectual property. For further information visit [www.ige.ch](http://www.ige.ch).

# A voice for Swiss biotechnology success



Domenico Alexakis,  
Swiss Biotech Association



Daniel Gyax,  
biotechnet Switzerland and  
University of Applied Sciences  
of Northwestern Switzerland

Swiss research enjoys a first-class international reputation, as does the Swiss biotechnology industry.

The national industry association, the Swiss Biotech Association (SBA) was founded 15 years ago and has developed into the voice of biotechnology in Switzerland. It does that in partnership with other associations from industry and academia. The working relationship with the national academic research and development network, biotechnet Switzerland, has grown closer over the years because the two organizations and their respective potential, complements each other so well.

This collaboration is supported by a recent program initiative from the Commission of Technology and Innovation (CTI), the National Thematic Networks (NTN). They focus on knowledge and technology transfer. NTN Swiss Biotech™, one of eight supported NTN, has exceeded expectations in its first year of existence.

## So how does this work?

The associations are promoting and using the available support instruments from various stakeholder groups. biotechnet Switzerland knows about the competencies within its academic circles and leverages these to develop project proposals with business. SBA has an intimate knowledge of the application fields in which its members work. It uses this knowledge and those databases to find addition candidates to complement proposal submissions. An expert panel at the CTI Life Sciences group evaluates the proposals and approves or declines projects.

Companies, mostly SMEs, favor these applied research opportunities because the administrative work is manageable. In their drive to stay competitive this is crucial to companies such as Bioversys. The company's collaborative project with CTI brought together the ZHAW School of Life Sciences and Facility

## BioVersys AG

[www.bioversys.com](http://www.bioversys.com)



Bioversys is a privately held Swiss biopharmaceutical company located in Basel that focuses on research and development of new drugs and compounds, which switch off drug resistance within bacterial pathogens and restore the efficacy of approved antibiotics.

Year of incorporation: 2008

Management, the School of Life Sciences FHNW and the Universities of Basel, Bern and Geneva. According to Dr. Michel Pieren, group leader at BioVersys this collaborative effort will, with the financial support of CTI, enable a new and highly innovative treatment option for infections with multi-drug resistant pathogens. It demonstrates the strength of partnerships between Swiss academia and the biotech industry.

SBA is not just a support mechanism. It also acts as a business development broker at international biotechnology events. The Swiss Biotech™ brand is well-recognized and respected in other countries: 'SBA's international platforms are ideal for my company,' states Bettina Ernst, principal of Preclin, a Lausanne-

## PRECLIN Biosystems AG

[www.preclinbiosystems.com](http://www.preclinbiosystems.com)



Preclin Biosystems offers a comprehensive in vivo preclinical testing platform for the identification and validation of lead candidate therapeutics.

Year of incorporation: 2008

based service company for the life sciences industry.

The association is also very active in creating presentation platforms for members and other important stakeholders. This is most notable in the finance sector which in addition to providing a valuation process, also fuels the system with start-up and venture capital. 'The open attitude of the SBA towards joint programs and seminars is truly impressive and they really do fulfil their part of the promise', says Andrea von Bartenwerffer, senior relationship manager of SIX Swiss Exchange.

The SBA is pushing for business-relevant education modules that generate greater business knowledge and connect mem-

biotechnet Switzerland is the network of the Swiss Universities of Applied Sciences (FHNW, HES-SO, ZHAW), the Research Institutions CSEM, Empa and the Swiss Center for Regenerative Medicine at the University Hospital and University Zurich. biotechnet Switzerland is the one-stop shop for innovation in technology where companies – especially small and medium-sized ones – can easily find the specialist contact person for a specific development. For further information visit [www.biotechnet.ch](http://www.biotechnet.ch).



# Biotech production in Switzerland: a diverse landscape



Jan Lucht,  
scienceindustries

Healthcare biotechnology contributes to the economic success of Swiss companies. For agricultural biotechnology, today's sociopolitical and regulatory frameworks are difficult, not just in Switzerland but also in the rest of Europe. Industrial biotechnology however will play an increasing role in the creation of a competitive and sustainable Swiss industry.

The biotech business landscape in Switzerland comprises a rich spectrum of vastly different enterprises – from the small garage-style start-up with just a few employees to the well-established global player. There are also many different applications for biotechnology in R&D and in production. About 200 Swiss companies use biotechnological methods in their business. Of these, three quarters can be described as 'dedicated biotechnology companies' with most, or all, of their revenues deriving from biotechnology. Together these companies form a diverse and thriving network where established business models coexist alongside the development of new trends.

## Healthcare biotechnology: a driver of economic development

The Swiss healthcare industry has been an economic powerhouse for many years, recently contributing about a third of Swiss exports. Early on, several companies in healthcare extended their classical business model, based on the chemical synthesis of small molecules, and embraced the new opportunities created by biotechnology to produce biopharmaceuticals, vaccines and new diagnostics systems. Due to this head-start, healthcare biotechnology is now responsible for more than 95% of the total revenue generated by the Swiss biotech sector (SBA/OECD 2013).

The economic success of healthcare biotech applications has created a fertile environment for the setting up of new companies. Today, about two-thirds of dedicated Swiss biotech companies are active in the fields of healthcare and medicine, and several more provide products and services to this sector. In this way, healthcare biotechnology continues to be a success story in Switzerland.

## Difficult conditions for agricultural biotechnology

Not all possible applications for biotechnology find a fertile ground in Switzerland or Europe. Since 1996, agricultural biotechnology – the use of crop plants that have been improved by genetic engineering – has been taken up by farmers in many world regions. Today, over 12% of the global arable surface is planted with biotech seeds and the value of the global biotech crop market is

estimated at USD 14.8 billion annually. Seed companies invest significant funds in research and development of new and improved plant biotech traits.

Swiss academic research in plant biotechnology has traditionally been very strong. On the other hand, skepticism and uncertainty about possible risks and benefits of the technology was fostered by NGO campaigns in Switzerland as elsewhere in Europe, creating an unfavorable political and regulatory framework for the development of biotech crops.

The result is that 'first mover advantage' has not translated into a thriving plant biotechnology scene in Swiss industry. In fact the prevailing negative framework conditions are a powerful discouragement for the sector in both Switzerland and in Europe. It is not only the foundation of small start-up companies in the field of biotech seed development, but also academic research, that suffers from the negative climate in Switzerland; further cemented by the ever-extended moratorium on GM crops.

## A bright future for industrial biotechnology?

Novel biotech methods can also facilitate development and production of improved plant protection products. Currently, Syngenta Crop Protection is interested in biocatalysis to complement its strong synthetic capabilities. This approach can provide alternative routes to novel structures, and exploit the high specificity and selectivity of enzymes, which might offer economic and ecological benefits associated with enzymatic reactions. For these activities, Syngenta finds excellent conditions in Switzerland, and is further supported by its research cooperation with other key players in the *Swiss Industrial Biocatalysis Consortium*.

Syngenta  
[www.syngenta.com](http://www.syngenta.com)



Syngenta is one of the world's leading companies with more than 28,000 employees in some 90 countries dedicated to our purpose: Bringing plant potential to life. Through world-class science, global reach and commitment to our customers we help to increase crop productivity, protect the environment and improve health and quality of life.

Year of incorporation: 2000

Switzerland is also an attractive location for small and innovative companies with novel applications of biotechnology. A case in point is AVA Biochem, founded 2011 and located in the Infrapark Baselland. Using a pioneering technology, the young company produces the high-value platform chemical 5-Hydroxymethylfurfural (CAS 67-47-0) (5-HMF) from renewable biomass. Because of its diversity, 5-HMF has been identified by the United States Department of Energy as one of the top 10 most valuable platform chemicals. The special characteristics of 5-HMF make it a key

component in biochemistry and an important ingredient in the production of polymers, resins and additives.

5-HMF is also intensively used in research to develop revolutionary new materials and products. Due to its innovative and highly efficient production process, based on a modified version of the hydrothermal carbonisation (HTC) process, AVA Biochem is able to produce industrial quantities and can therefore serve existing markets and open up new ones for the downstream chemistry of 5-HMF. AVA Biochem started industrial production of high quality, Swiss-made, 5-HMF in its Biochem-1 production plant in Muttenz, Switzerland in January 2014.

Due to its game-changing technology and the overall positive biotech environment in Switzerland, the company intends to become a global supplier of platform chemicals to the chemical, pharmaceutical, food and other industries. Thomas M. Kläusli, AVA Biochem's chief marketing officer, cites the innovative environment in Switzerland, access to highly qualified and motivated employees, and the good research and production infrastructure as key elements for success. The location also offers a great network of chemical and pharmaceutical companies for downstream chemistry and favourable access to financing for future growth.

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#### AVA Biochem BSL AG

[www.ava-biochem.com](http://www.ava-biochem.com)

**AVABIOCHEM**

AVA Biochem produces the premium platform chemical 5-Hydroxymethylfurfural (HMF, CAS 67-47-0) from biomass. The company uses renewable feedstock which does not compete with food production. AVA Biochem aims to use its game-changing production process to achieve market leadership for 5-HMF production.

Year of incorporation: 2011

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The company's radical new production process for 5-HMF will be located in Switzerland so as to meet the high quality standards demanded by customers world-wide. AVA Biochem is one of 250 member companies of scienceindustries, the Swiss Business Association Chemistry Pharma Biotech. For export promotion, the company is supported by Switzerland Global Enterprise (S-GE). Very important for a company with a strong focus on quality is the high value attributed in the market to the 'Made in Switzerland' marque, according to Mr. Kläusli.

Industrial biotechnology – the use of enzymes and micro-organisms to produce a variety of substances from renewable resources – will increasingly complement and extend classical chemical synthesis pathways. Simultaneously it will improve industry's performance and product value while decreasing its environmental footprint. So far, only a small percentage of Swiss biotech companies (about 5%) focus their business on industrial biotechnology. However, the economic and environmental advantages mean that industrial biotechnology processes will play an increasing role in the production of chemicals, and this transition is strongly supported by policy measures at the European level.

In Switzerland, public and political awareness of the potential of industrial biotechnology is still lagging. scienceindustries supports the development of attractive framework conditions for industrial biotechnology in Switzerland. Together with the Federal Institute of Technology in Zurich, biotechnet Switzerland, and the Swiss Biotech Association, it launched a proposal for a national research program at the beginning of 2014. This project, *BiocatCH*, is intended to foster basic research as well as technology transfer in the field of biocatalysis. The aim is to contribute to the development of a dynamic 'innovation space biocatalysis' in Switzerland. Industrial biotechnology, in its many potential fields of application, will play an increasing role in boosting the economic performance and global competitiveness of Swiss companies, as well as ever more sustainable production practices.

scienceindustries – The Swiss Business Association Chemistry Pharma Biotech  
scienceindustries supports some 250 member companies by fostering an innovation-friendly environment in Switzerland, a competitive production and business framework, attractive market conditions and by facilitating worldwide market access. For more information visit [www.scienceindustries.ch](http://www.scienceindustries.ch).

# Fueling the upswing: financing in the biotech sector



Andrea von Bartenwerffer,  
Senior Relationship Manager, Issuer Relations  
SIX Swiss Exchange AG  
(moderator)



Seraina Benz,  
Relationship Manager  
SIX Swiss Exchange AG  
(moderator)

Over the past year, Swiss biotech companies have been defying post crisis, market uncertainties; increasingly accessing capital markets and delivering solid returns to shareholders. With Swiss biotech companies riding a wave of renewed investor confidence, the question as to whether market conditions provide a sustainable basis for this trend, is back in focus.

## Participants:



Dr. Toralf Haag  
Chief Financial Officer  
Lonza



Chris Tanner  
Chief Financial Officer  
Cosmo Pharmaceuticals



Jakob Dynnes Hansen  
Chief Financial Officer  
Evolva

**SIX Swiss Exchange:** This year, we have seen capital increases and bond issues by life sciences biotech companies on the Swiss market. After being listed on SIX Swiss Exchange, how difficult or easy is it to raise capital in the secondary market?

**Hansen:** For several years, financing for small biotech companies like Evolva was difficult due to the financial crisis, setbacks in the sector, low liquidity in many biotech stocks, etc. Since early 2013 however, many investors have regained their appetite for stocks with high risks because of the potential for high reward. But having burnt their fingers in previous cycles, investors seem more critical in their life science investments; looking for not only strong technology but also a clear road to commercialization and profitability, a certain market cap, and good liquidity.

**Tanner:** We have not needed to raise additional capital so my comments are only observational. In general, capital raising by smaller biotech companies has come in times of individual corporate crisis. At that time individual shareholders rarely participate and activity has been restricted to specialized VCs, many from the USA, that step in with new forms of capital.

**Haag:** Lonza has been able to issue bonds at very favorable conditions. All financial market instruments have been in good shape.

**SIX Swiss Exchange:** Your stocks have seen a steady and sometimes steep rise over the last 12 months.\* What is the secret of this success? Do you have any advice for the new generation of companies looking to replicate your success stories?

**Haag:** The year 2013 was transformational for Lonza, and 2014 will be the same. Early 2013 we announced a substantial restructuring program and new focus. In the middle of the year we clearly communicated the various measures that we were taking to hit our targets. In addition, after the change in leadership in the middle of 2012, investors' confidence in Lonza certainly came back.

**Hansen:** Young companies should obviously focus on building a strong technology base. But equally important is to be able to demonstrate the commercial potential of your strategy, not least by entering into partnerships with other companies at an early stage. Partnering may reduce your total share of the project value but it shows that your science and/or products are in demand; giving comfort to investors who may not be experts in the field. Finally, a bit of luck doesn't hurt.

**Tanner:** There is certainly an element of market timing. All biotech and pharma markets have improved in their valuations. But more importantly, you need to have a steady stream of good or encouraging news.

\* Company performance over the past 12 months.

**SIX Swiss Exchange:** How do you benefit from the strong life sciences sector focus of Switzerland's capital market? How important is your peer group to you (public and private companies)?

**Tanner:** This advantage is gradually eroding. In the past there were a number of analysts who provided competent research and there were a number of specialized health care investment funds. The small banks have all closed their biotech research and the large ones have scaled theirs down. The number of specialized investors has declined. If there are no specialized buyers then the buying must be done by the general investment community but this community needs external competent research.

**Haag:** Lonza has no direct peer. Subsequently Lonza cannot be compared on a 1:1 basis. The majority of our sales are coming from outside of Switzerland. However, the life sciences sector in Switzerland is certainly important.

**Hansen:** It is very important for us that many Swiss investors (both institutions and retail investors) have a strong understanding of life science companies because sometimes they will have to be patient before they see a return on their investment. Analyst coverage of the sector has been declining in recent years in Switzerland but I hope that banks will react to the renewed interest for



biotech among their clients. We have already worked with some of our Swiss peers and expect to further develop this, in particular with companies in the food sector. However, as a basis of comparison it is not so easy to find a good peer group for Evolva.

**SIX Swiss Exchange: What are the main differences between life sciences investors who are active in Switzerland, and other life sciences investors (sector knowledge, long-term investment decisions, risk-aversion, etc.)?**

**Hansen:** Swiss (and other European) investors are generally very concerned about the dilution arising from the capital-raising that biotech companies have to do from time to time. In contrast, for US investors with their longer experience with life science, a solid financing is essential for an R&D based company. Hence they will often have a very positive view of financing. Otherwise, life science investors tend to have an international focus and invest outside their domestic market. This way they learn from each other and develop quite similar investment strategies.

**Tanner:** The most competent life science investors are in the USA. These have their own panels of physicians that they ask for opinions to double check the statements of companies. Many of the Swiss tend to be momentum-type investors that ride a wave and then get off and dedicate relatively little time to understanding the deeper issues.

**Haag:** All investors have a very deep sector knowledge and have a fundamental understanding. Investors in Lonza tend to have a long-term investment strategy. Risk aversion amongst Swiss life science investors may be a bit higher when compared to some other European and US investors.

**SIX Swiss Exchange: What is your view on the future of the life sciences sector in Switzerland and in particular of the financing environment in which life sciences firms are operating?**

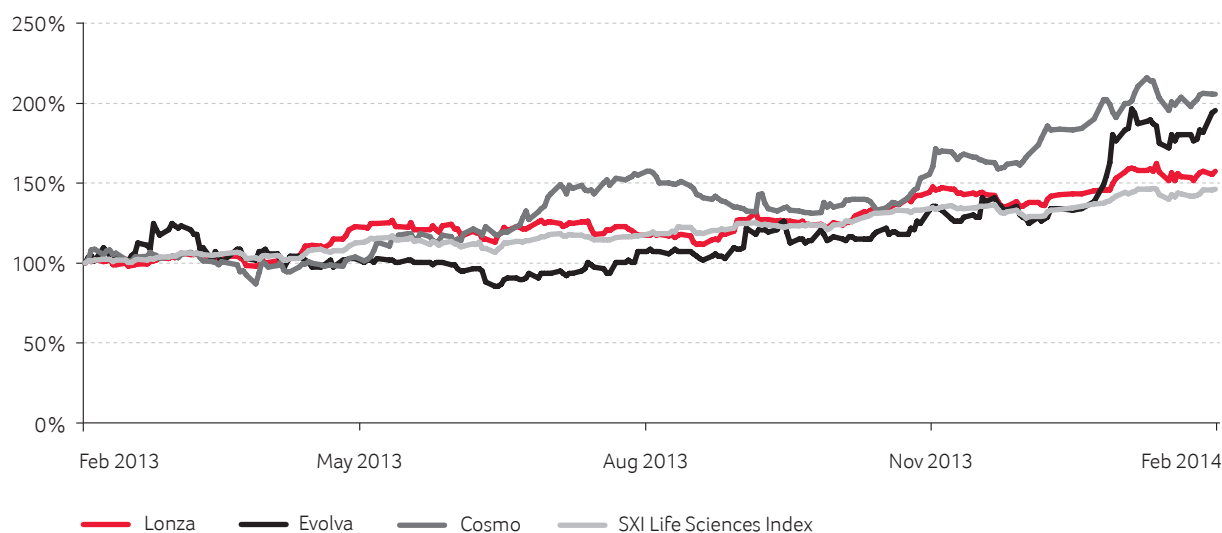
**Hansen:** As the positive development during 2013 has shown, investors are again willing to invest in life science companies, provided they meet the quality criteria I mentioned before. In addition, we have seen several product approvals and other successes. This is very welcome after some disappointing years and could improve the sentiment towards the sector going forward.

**Tanner:** The early stage sector needs to be driven by specialized VCs. It is of utmost importance that some of the people that made great fortunes in the sector expand their involvement. Efforts should be made to bind these in. In Germany, which really has a smaller tradition than Switzerland, the Struengmanns and the Hopps are investing considerably more, and in a more dedicated fashion, than the old Swiss pharma and medtech families.

**Haag:** As a well-established name in the Swiss Franc bond market, Lonza was able to fund its needs at attractive terms and conditions during the last couple of years. Working in the life science sector was one of the reasons why Lonza's bond issues were generally well received by Swiss investors. Companies within the sector are regarded to have a stable business with good cash flows. We do not expect this to change substantially in the near future.

**SIX Swiss Exchange: Why did you go public in the first place and why did you choose SIX as a listing location?**

**Figure 1: Performance comparison against the SXI Life Sciences Index**



**Hansen:** We went public because we believed that it would make financing easier and lift our public profile.

**Tanner:** We went public because we had minority investors who needed to be given the theoretical opportunity of an exit. Switzerland was chosen because it had a large number of listed pharma and biotech companies along with analysts and specialized investors. Were we to do an IPO again we would most probably give serious consideration to NASDAQ.

**Haag:** Being a Swiss based company it was obvious to choose SIX as a listing location. The close collaboration with the SIX was, and is, important to us.

**SIX Swiss Exchange:** **In the US, biotech is back with a vengeance – the best IPO market since 2000 and the Nasdaq Biotech Index as well as the Arca Biotech Index have seen a massive outperformance.**

**a. Do you consider this trend to be sustainable?**

**Haag:** Yes.

**Hansen:** I strongly believe that biotech will remain a popular investment area and not only in the US. But I think that we still experience periods where investors are more reluctant to invest because of product failures or general slow-down in the stock market. But how long the current IPO window will remain open is hard to say.

**Tanner:** Not with this growth rate. Obamacare with lower prices will also serve as a dampener in the long run.

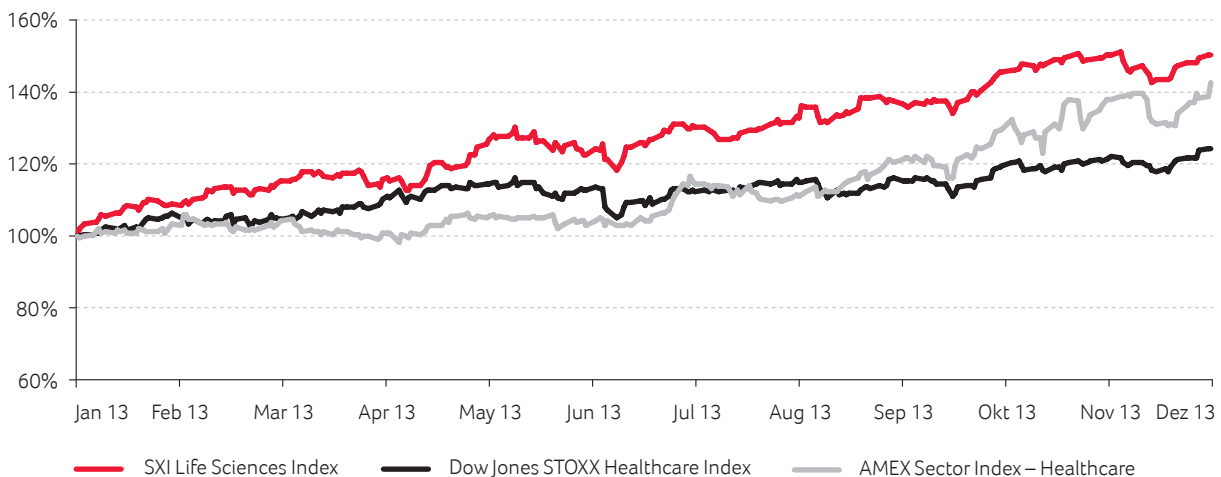
**b. Has Switzerland/Europe been lagging behind?**

**Haag:** Yes, to a certain extent.

**Hansen:** The performance of the Swiss Life Science index is nothing to be ashamed of: it is up 55% in 2013 versus 60% for the Nasdaq Biotechnology index. Only in terms of biotech IPOs has it been rather quiet in Switzerland in recent years.

**Tanner:** Not really. Any pharma/biotech shares have performed very well. If this trend could be maintained, then that would be excellent.

**Figure 2: A comparison between the SIX Life Science Index and other major healthcare indices**



Note: Over the past year, the SIX Life Science Index has outperformed its main peers. The SIX Life Science Index is up 50% while the AMEX Healthcare and the STOXX Healthcare indices have gained 43% and 24% respectively.

**SIX Swiss Exchange – Focus on Life Sciences**

SIX Swiss Exchange is a leading regulated securities exchange in Europe and unrivalled in the life science area. As a key pillar of the Swiss financial sector's infrastructure, it is an ideal listing location and helps create the best possible trading conditions, connecting investors, issuers and participants from across the world. It forms the efficient and transparent reference market for trading in its attractive segments of equities, bonds, ETFs, ETPs and securitized derivatives. Its trading platform supports multiple currencies and features an impressive selection of modular connection options as well as low latency and high capacity. As a reliable, well connected and highly engaged partner, SIX Swiss Exchange enables the success of its customers. For further information visit [www.six-swiss-exchange.com](http://www.six-swiss-exchange.com).

# Switzerland – an ideal location for Biotech companies!



Liv Minder,  
Director Investment Promotion,  
Switzerland Global Enterprise

Switzerland is the most competitive business location in the world according to the 'Global Competitiveness Report 2013'. A liberal economic system, continuous innovation and a highly trained workforce represent the most important capital for a country like Switzerland which has scant natural resources. Additional assets include the healthy capital market, outstanding infrastructure, plus a competitive tax system as well as long-term political and economic stability.

This unique advantage of Switzerland has been pivotal in the decision taken by CSL Behring to relocate to Switzerland. The company is a global leader in the plasma protein biotherapeutics industry. It manufactures and markets a range of safe, effective plasma-derived and recombinant products. With more than 800 people at its Berne site, CSL Behring develops and manufactures plasma products for international markets, and is CSL Behring Group's center of excellence for immunoglobulins. CSL Behring is a subsidiary of CSL Limited, a biopharmaceutical company which has its headquarters in Melbourne, Australia.

**CSL Behring AG**  
[www.cslobehring.ch](http://www.cslobehring.ch)

CSL Behring is a global leader in the plasma protein biotherapeutics industry. We research, develop, manufacture and market biotherapies that are used to treat serious and rare conditions. Users of our therapies rely on them for their quality of life and, in many cases, for life itself.  
Year of incorporation: 2000

According to Uwe E. Jocham, senior vice president and general manager, CSL Behring, the relocation to Switzerland has been beneficial for the company: "At the Berne site we very much appreciate the good cooperation with the authorities, the community and the cluster organizations. A high educational background, a stable personnel situation, the multilingual skills of many employees and our location in a university town – all these

things contribute to making Bern attractive on a global level. And of course the geographic position in the heart of Europe is a positive asset."

An increasing number of companies are recognizing the importance of Switzerland as a business location for targeting the European market. Foreign companies interested in establishing themselves in Switzerland are supported by Switzerland Global Enterprise (S-GE) which has been commissioned by the Swiss government. Its services for foreign companies include assessing the potential of their projects before they are presented to the cantons. S-GE then helps them to meet legal and administrative requirements as well as evaluating the best corporate structure, explaining the Swiss tax system and making contacts with regional and cantonal bodies.

In addition to supporting foreign companies S-GE informs, advises and guides SMEs from Switzerland in their international business ventures. S-GE links companies, experts and private and public organizations around the world, thus facilitating efficient promotion of foreign trade.

Typical services include market analysis and evaluation, contacts with business partners, and participation in major international fairs abroad, as part of the Swiss Pavilion. Martin Howald is founder of BioConcept, a supplier company and a long-standing member of the Swiss Biotech Association. His company participates in many industry fairs and in his view, the Biotech Pavilions, organized in partnership with S-GE, display the utmost professionalism.

**BioConcept AG**  
[www.bioconcept.ch](http://www.bioconcept.ch)



BioConcept is a leading supplier and service partner to the biological research community and provides customers all over the world with a high quality specialised cell and tissue culture medium portfolio. Our customer service and manufacturing operations are covered by an ISO 9001:2008 certified quality management system involving also c-GMP guidelines to ensure that our customers receive products of the highest consistent quality.  
Year of incorporation: 1978

Switzerland Global Enterprise (S-GE) works all over the world to support entrepreneurs and promote Switzerland as a business location. Its role as a center of excellence for internationalization is to foster exports, imports and investments, to help clients develop new potential for their international businesses and to strengthen Switzerland as an economic hub. S-GE is a strong and trusted partner for its clients, the cantons and the Swiss government, with a global network of experienced advisers and experts. For further information visit [www.s-ge.com](http://www.s-ge.com).

# Year in review

## (selection of events in 2013)

| Trigger                        | Company/Institution        | Description  |
|--------------------------------|----------------------------|--|
| <b>January 2013</b>            |                            |  |
| Study Initiation               | Kareus Therapeutics        | Kareus has announced the start of a phase I clinical study for the development of KU-046, a first-in-class disease modifying new chemical entity for the treatment of Alzheimer's disease. |
| License Agreement              | GlycoVaxyn                 | GlycoVaxyn signed an exclusive license agreement with Janssen Pharmaceuticals (J&J).   |
| Positive Study Results         | Addex Therapeutics (ADXN)  | Addex achieved a positive proof of concept for ADX71441 in a pre-clinical transgenic model of Charcot-Marie-Tooth 1A disease (CMT1A).  |
| Regulatory authorization       | Telormedix                 | Telormedix has received FDA authorization for a phase II trial of its lead product TMX-101, a TLR-7 agonist, in CIS (carcinoma in situ) in the bladder.                                    |
| License Agreement              | Debiopharm Group™          | Chugai and Debiopharm entered into a licensing agreement regarding FF284 (Debio 1347) in oncology.   |
| Capacity Expansion             | Lonza (LONN)               | Lonza announced plans to invest CHF 14 million to expand its antibody drug conjugate (ADC) manufacturing capacity in Visp, in particular for oncology therapeutics.                        |
| Financing                      | Spinomix                   | Spinomix closed a series A equity investment of USD 3 million. The financing round was led by Debiopharm.  |
| Patient enrolment              | Debiopharm Group™          | Debiopharm has completed the recruitment of patients for its phase III clinical study in Central Precocious Puberty (CPP) with triptorelin 22.5 mg   |
| Financing                      | Debiopharm Group™          | Debiopharm participated in first round of financing for compliant concept AG. The company makes electronic bed-side care assistants to monitor patient's movements.                        |
| Collaboration Agreement        | Evolva (EVE)               | Evolva entered into a collaboration agreement with Ajinomoto Co. Inc. The companies will develop fermentation production routes for a natural functional ingredient.                       |
| Positive Study Results         | Molecular Partners         | Molecular Partners has announced the results of a phase I/II study evaluating the safety and preliminary activity of MP0112 in patients with Diabetic Macular Edema (DME).                 |
| Study Setback/Discontinuation  | Santhera (SANN)            | Santhera received a negative opinion on its MAA for Raxone, a potential therapy for Leber's Hereditary Optic Neuropathy (LHON).  |
| Patent Issued                  | Addex Therapeutics (ADXN)  | Addex Therapeutics (ADXN) has obtained a composition of matter patent (US Patent 8,344,138) covering ADX71441 and other GABA-B receptor PAMs.  |
| License Agreement              | Prexton Therapeutics       | Domain Therapeutics has granted Prexton an exclusive option to license and develop mGluR4 PAM drugs targeting Parkinson's disease.   |
| Regulatory authorization       | Anergis                    | Anergis has obtained patent protection for its AllerT birch pollen allergy treatment in the US.  |
| Study Setback/Discontinuation  | Cytos Biotechnology (CYTN) | Cytos announced that Novartis will discontinue the NICO02 project, a therapeutic vaccine candidate for the treatment of nicotine addiction.  |
| Financing                      | Gene Signal                | Gene Signal completed the latest funding round principally through the same private investors who backed the company since its formation.  |
| Financing                      | Mondobiotec (RARE)         | BioPharma Invest exercised its right to convert the CHF 2.5 million loan facility into common shares of Mondobiotec (RARE).  |
| Merger                         | Mondobiotec (RARE)         | Pierrel SpA and Mondobiotec (RARE) entered into a binding agreement for the combination of the two companies.  |
| Research Agreement             | 4-Antibody                 | 4-Antibody and the Ludwig Institute for Cancer Research signed a multi-target R&D collaboration with Recepta Biopharma SA.   |
| Milestone Payment              | Evolva (EVE)               | Evolva achieved a key milestone in its collaboration with BASF. BASF made a low six-digit Swiss Franc milestone payment to Evolva.   |
| New product                    | InSphero                   | InSphero has launched easyEST™, the first automated EST, for embryonic stem-cell toxicity testing.   |
| Study Setback/Discontinuation  | AC Immune                  | AC Immune stopped the development of ACI-91 followed by results of a phase II trial in 63 patients with mild to moderate Alzheimer's disease.  |
| Financing                      | NBE Therapeutics           | NBE has raised additional seed-financing from the Boehringer Ingelheim Venture Fund (BIVF).  |
| Positive study interim results | OncoEthix                  | OncoEthix has announced progress in its phase I study of OTX015, a novel BET bromodomain inhibitor, with the first dosing of a patient.  |

**February 2013**

|                                  |                                 |  |
|----------------------------------|---------------------------------|--|
| Financing                        | Cardiolynx                      | Cardiolynx had successfully completed a series D financing round with existing as well as new investors.   |
| Collaboration Agreement          | Cell Culture Technologies       | Cell Culture Technologies has entered in a collaboration with NovImmune for the generation of a CHO cell-based process platform in fully synthetic minimal media.                    |
| Marketing/Distribution Agreement | EffRx Pharmaceuticals           | EffRx has announced the signing of a distribution agreement with Hikma Pharmaceuticals for Binosto® for the Middle East and North Africa ('MENA') region.                            |
| Restructuring                    | Lonza (LONN)                    | Lonza announced its plans to adapt the management structure of the company to focus on its target markets.   |
| Collaboration Agreement          | Evolva (EVE)                    | International Flavors & Fragrances Inc. and Evolva have entered pre-production phase for natural vanillin for global food and flavor markets   |
| Patent Filing                    | Neurotune                       | Neurotune has filed patent application for modified agrin-fragment capable of restoring muscle strength for use as a medicament.   |
| License Agreement                | Genedata                        | Ono Pharmaceutical has extended its Genedata collaboration with a license of Genedata Expressionist for Mass Spectrometry.   |
| Positive Study Results           | VAXIMM                          | VAXIMM has announced topline data from the first clinical trial of its investigational oral cancer vaccine, VXMO1.   |
| Study Initiation                 | Cardiorentis                    | Cardiorentis has initiated the first-ever acute heart failure (AHF) phase III trial to be specifically designed to assess the effect of early treatment on cardiovascular mortality. |
| Product Approval                 | Celgene International           | Celgene announced that REVLIMID® (lenalidomide) has been granted full approval by the China State Food and Drug Administration (SFDA).   |
| Study Setback/Discontinuation    | Delenex Therapeutics            | Delenex has discontinued the development of DLX 903, an antibody fragment targeting VEGF for the topical treatment of psoriasis. Preclinical studies were conducted.                 |
| Patient enrolment                | Auris Medical                   | Auris Medical completes enrolment in TACTT1 study with AM-101 for the treatment of acute peripheral tinnitus   |
| Collaboration Agreement          | Geneva Bioinformatics (GeneBio) | The SIB Swiss Institute of Bioinformatics, Geneva Bioinformatics (GeneBio) and Quartz Bio have announced the establishment of a long-term collaboration.                             |
| Collaboration Agreement          | ChromaCon                       | JSR Corporation and ChromaCon have formed a strategic partnership to promote ChromaCon's MCSGP and CaptureSMB chromatographic process technologies.                                  |
| Product Approval                 | Actelion (ATLN)                 | Actelion has received approval for Epoprostenol ACT for the treatment of pulmonary arterial hypertension by the Japan's Ministry of Health, Labor and Welfare.                       |
| Certifications                   | Redbiotec                       | Swiss Economic Forum has labeled Redbiotec as 'High Potential SME' through a certified process.  |
| Capacity Expansion               | Cerbios                         | Cerbios' plant for CHO based mAb or recombinant protein manufacturing is completed and ready for the qualification phase.  |
| Contractual agreement            | Lonza (LONN)                    | The US National Institutes of Health Center for Regenerative Medicine agreed with Lonza to generate induced pluripotent stem cells for research purposes.                            |
| Patent Issued                    | Pevion Biotech                  | Pevion Biotech has received patent for 'Virosomes Comprising Hemagglutinin Derived from an Influenza Virus' on February 5, 2013.   |
| License Agreement                | Selexis                         | Selexis expanded their R&D license agreement with Amgen to include an evaluation of the SURE CHO-M Cell Linefor.   |
| Grant                            | Biocartis                       | Biocartis received a EUR 1.9 million subsidy from the Flemish Innovation by Science and Technology (IWT) for the development of new cancer tests.                                    |
| Product Withdrawal               | Santhera (SANN)                 | Santhera announced the voluntary withdrawal of Catena from the Canadian market. The decision followed the consultation with Health Canada.   |
| Patent Issued                    | Pevion Biotech                  | Pevion Biotech has received patent for 'RSV F-Protein and Its Use' on February 12, 2013.   |

**March 2013**

|                         |                           |  |
|-------------------------|---------------------------|--|
| New product             | Atheris Laboratories      | The company has launched alpha-Melusine discovery kits with 176 pre-treated venoms designed to conduct low to medium throughput assays or feasibility studies.                   |
| Product Extension       | CELLnTEC                  | After a successful beta testing period, CELLnTEC has launched the final version of the VitroAge medium CnT-AG2.  |
| Financing               | Piqur Therapeutics        | Piqur secured funding to start the development of innovative anti-cancer therapies   |
| Collaboration Agreement | Addex Therapeutics (ADXN) | Addex has partnered with Viva Biotech for advancing the development of allosteric modulators targeting Adenosine 2A Receptors.   |
| Financing               | Calypso Biotech           | Calypso received EUR 2.5 million in a seed financing round from Merck Serono Ventures. Calypso continues R&D of preclinical antibody programs in immunology of Merck Serono.     |
| New product             | Biognosys                 | Biognosys has introduced the LiverDig™ 100 assay panel, that is specifically developed to address the need of enabling early prediction of drug toxicity are of very high value. |
| Collaboration Agreement | Evolva (EVE)              | Evolva entered into an agreement with Cargill to develop and commercialize fermentation-derived steviol glycosides.  |
| Study Continuation      | AmVac                     | AmVac announced new preclinical data on its vaccine candidate AMV602 for the prevention of infections caused by respiratory syncytial virus.                                     |

|                                  |   |  |
|----------------------------------|---|--|
| Acquisition                      | Ares Life Sciences                      | Ares Life Sciences signed a definitive agreement to acquire Albion Medical Holdings, a leader in allergy immunotherapy in the US.  |
| Patient enrolment                | Telormedix                              | Telormedix recruited the first patient in a phase II trial of its lead product TMX-101, a TLR-7 agonist, in carcinoma in situ (CIS) in the bladder.  |
| Financing                        | Lonza (LONN)                            | Lonza issued a CHF 300 million straight bond with a maturity of 6 years and an annual coupon of 1.75%.   |
| License Agreement                | Lonza (LONN)                            | Lonza and Hyglos settled a license agreement for certain Lonza patents in the area of endotoxin detection.   |
| Financing                        | Addex Therapeutics (ADXN)               | Addex obtained a USD 1 million grant by The Michael J. Fox Foundation to help fund human clinical testing of dipraglurant for the treatment of Parkinson's disease.                                      |
| Milestone Payment                | Numab                                   | Numab announced the successful selection of an antibody fragment lead. The achievement triggered a CHF 3 million milestone payment from the agreement with Sucampo.                                      |
| Collaboration Agreement          | Genedata                                | Genedata has partnered with EpiFemCare, the EU-funded research project aimed at improving the diagnosis and therapy of breast and ovarian cancer.  |
| Positive Study Results           | Addex Therapeutics (ADXN)               | Addex presented positive data obtained from a phase 2a trial of dipraglurant (ADX48621) in Parkinson's patients.   |
| MAA Withdrawal                   | Santhera (SANN)                         | Santhera withdrew the Marketing Authorization Application for Raxone in Leber's Hereditary Optic Neuropathy (LHON).  |
| Financing                        | Evolva (EVE)                            | Evolva has completed the capital increase announced on March 6, 2013. The offering provides Evolva with gross proceeds of CHF 31.3 million before transaction costs.                                     |
| Anniversary                      | Swiss Institute of Bioinformatics (SIB) | On March 30, the SIB Swiss Institute of Bioinformatics celebrated its 15th anniversary. The institute is now represented by almost 40 groups.  |
| <b>April 2013</b>                |   |  |
| Collaboration Agreement          | Bachem                                  | Bachem and Axon Neuroscience entered into a collaboration. Bachem is to manufacture Axon's API and supplies it as a finished dosage form under Bachem's Clinalfa brand.                                  |
| Patent Issued                    | Delenex Therapeutics                    | Australian Patent Office has granted patent to Delenex Therapeutics for 'Antibodies binding to the extracellular domain of the Receptor Tyrosine Kinase ALK.'  |
| Positive Study Results           | Polyphor                                | Polyphor completed a phase I clinical trial of the Pseudomonas specific antibiotic POL7080.  |
| Marketing/Distribution Agreement | CovalX                                  | CovalX and AMR, Inc. will collaborate for the distribution of CovalX's products in Japan.  |
| License Agreement                | Debiopharm Group™                       | Shasun Pharmaceuticals and Debiopharm entered into a licensing agreement for the manufacturing and commercialization of Huperzine-A against Alzheimer's disease.   |
| Capacity Expansion               | InSphero                                | InSphero has invested in US presence to facilitate all aspects of customer support and has inaugurated InSphero, Inc. in Cambridge, MA.  |
| Study Continuation               | Santhera (SANN)                         | Santhera has announced that the phase III DELOS study of orally administered Catena® in patients with Duchenne Muscular Dystrophy (DMD) has successfully passed a planned fertility and safety analysis. |
| Patent Issued                    | AC Immune                               | USPO has issued patent to AC Immune for 'Therapeutic Vaccine Targeted against P-Glycoprotein 170 for Inhibiting Multidrug Resistance in the Treatment of Cancers'  |
| Financing                        | Auris Medical                           | Auris secured CHF 47.1 million series C financing from Sofinnova Ventures and Sofinnova Partners to advance inner ear therapies through phase III clinical development.                                  |
| Positive Study Results           | Addex Therapeutics (ADXN)               | Addex has announced positive preclinical data for its mGlu5 negative allosteric modulator oral small molecule, dipraglurant.   |
| Collaboration Agreement          | Debiopharm Group™                       | Ascepcion and Debiopharm agreed to develop Debio 1144, an anti-cancer agent in preclinical development tailored to the Chinese market for the treatment of tumors.                                       |
| Patent Issued                    | Addex Therapeutics (ADXN)               | Addex has obtained a broad composition of matter patent (European patent, EP 1 765 795) covering dipraglurant and other mGlu5 NAMs.  |
| Patent Issued                    | Cardiolynx                              | The US Patent Office granted Cardiolynx the patent 'Nitrate Derivatives of Cilostazol for the treatment of Vascular and Metabolic Diseases'  |
| Financing                        | Sophia Genetics                         | Sophia Genetics, an EPFL Science Park start-up, attracted a CHF 2.8 million investment by undisclosed investors.   |
| Study Initiation                 | Addex Therapeutics (ADXN)               | Addex have obtained Netherlands' regulatory authorities' approval for initiating a phase 1 study of ADX71441, a GABA-B receptor PAM.   |
| Positive Study Results           | ProteoMediX                             | ProteoMediX announced positive results of the PI3K pathway biomarkers. They were tested in a phase II study of everolimus in patients with metastatic prostate cancer.                                   |
| License Agreement                | Selexis                                 | Selexis formed an agreement with Ligand Pharmaceuticals to sell potential milestone and royalty payments for more than 15 biologic development programs from Selexis.                                    |
| <b>May 2013</b>                  |   |  |
| Collaboration Agreement          | Auris Medical                           | Auris has entered in an agreement with Medidata Solutions to support Auris' pivotal clinical trials for commercializing its new therapies for tinnitus and acute hearing loss.                           |

|                                  |                              |   |
|----------------------------------|------------------------------|---|
| Study Continuation               | Actelion (ATLN)              | The Independent Data Monitoring Committee (DMC) informed Actelion of its recommendation to continue the phase III GRIPHON study.  |
| New product                      | Biognosys                    | Biognosys introduced SkinDig100™ – a new MRM assay panel for quantification of 100 proteins in human skin biopsies as well as in keratinocyte cell culture samples.       |
| Collaboration Agreement          | Prionics                     | Prionics has entered into a strategic partnership with the Belgian company Bio-X Diagnostics to make their innovative diagnostic solutions available to global markets.   |
| Patent Issued                    | ChromaCon                    | US patent has been issued to ChromaCon on 14 May 2013 for 'Multifraction purification processes and devices for such processes' (Swiss inventors).                        |
| Acquisition                      | Kenta Biotech                | Aridis Pharmaceuticals has entered in an agreement with Kenta for acquiring latter's entire portfolio of anti-infective hmAb products and technologies.                   |
| Positive Study Results           | Helsinn Healthcare           | Helsinn has reported positive phase III chemotherapy-induced nausea and vomiting (CINV) data.   |
| License Agreement                | Helsinn Healthcare           | Helsinn and Vifor have entered into an exclusive license and distribution agreement for netupitant-palonosetron fixed dose combination (NEPA).                            |
| Patient enrolment                | Cytos Biotechnology (CYTN)   | A*STAR and Cytos have enrolled first healthy volunteers in a phase 1 clinical trial with their H1N1 influenza vaccine candidate.  |
| Award                            | Transcure Biociences         | Transcure wins venture kick award of CHF130'000. TransCure provides access to humanized immune system (HIS) and HIV mouse models.   |
| Research Agreement               | Debiopharm Group™            | Debiopharm and Cenix BioScience have signed a research agreement to support Debiopharm in its ongoing efforts to develop novel therapeutic drug candidates.               |
| Orphan Drug Designation          | Basilea Pharmaceutica (BSLN) | Basilea has received USFDA's orphan drug designation to isavuconazole for the treatment of invasive aspergillosis.  |
| Acquisition                      | Okairos                      | GlaxoSmithKline has acquired Okairos, a specialist developer of vaccine platform technologies, for EUR 250 million.   |
| Restructuring                    | Addex Therapeutics (ADXN)    | Addex has completed its restructuring. Additionally, the company has formally terminated 17 of its remaining 19 employment agreements.                                    |
| <b>June 2013</b>                 |                              |   |
| Marketing/Distribution Agreement | EffRx Pharmaceuticals        | EffRx has signed an exclusive distribution agreement with Ahn-Gook Pharmaceutical Co. Ltd for Binosto, EffRx's osteoporosis medication, for the Korean market.            |
| Grant                            | NBE Therapeutics             | The Swiss CTI has awarded a CHF 1.0 million grant covering a two-year R&D collaboration between NBE and the Department of Biosystems Science and Engineering, ETH Zürich. |
| Positive study interim results   | Basilea Pharmaceutica (BSLN) | Basilea has reported positive interim data for its oncology drug BAL101553 from its ongoing phase 1 study in patients with advanced solid tumors.                         |
| Study Initiation                 | Debiopharm Group™            | Debiopharm Group™ announces additional phase I clinical trial evaluating Debio 1143 combined with chemotherapies for patients with selected solid malignancies.           |
| Research Agreement               | CovalX                       | CovalX and Bruker Daltonics Inc. have announced a new agreement in the area of protein interactions and macromolecular characterization.                                  |
| License Agreement                | Santhera (SANN)              | Santhera has obtained an exclusive license from the NIH to its rights on a patent granted in the US for the use of idebenone for the treatment of ppMS.                   |
| Financing                        | Diagnoplex                   | Diagnoplex has secured CHF 1.3 million from a financing round led by Debiopharm. Other investors include Neomed and Initiative Capital Romandie.                          |
| Research Agreement               | Neurimmune Holding           | The ALS Therapy Development Institute has formed a research partnership with Neurimmune to advance potential treatments for ALS.  |
| Financing                        | InSphero                     | InSphero has secured CHF 2 million in series B financing to ensure future growth of the company in the US and East Asian market.  |
| Collaboration Agreement          | Atheris Laboratories         | Atheris and Peptides International, Inc. have announced the launch of synthetic venom libraries under the brand delta-melusine™.  |
| Collaboration Agreement          | ADC Therapeutics             | Genmab and ADC have entered in a co-development collaboration for an antibody drug conjugate combining HuMax-TAC and PBD Warhead.   |
| Patent Filing                    | Anergis                      | Anergis has filed for a provisional patent protection of its AllerDM dust mite allergy treatment in the US.   |
| Project Completion               | Debiopharm Group™            | Aurigene and Debiopharm report nomination of development candidate Debio 0617B in oncology.   |
| Grant                            | AmVac                        | AmVac receives EU funding in two FP7 projects worth EUR 5.5 million and EUR 6 million to develop innovative vaccines against flu and leishmaniasis.                       |
| License Agreement                | ADC Therapeutics             | VivaMab and ADC have announced an antibody licensing deal for a novel ADC candidate to target hematologic cancers.  |
| Collaboration Agreement          | Debiopharm Group™            | Alacrita and Debiopharm collaborate to identify early stage drug candidates from the Massachusetts life science cluster   |
| License Agreement                | Dualsystems Biotech          | Dualsystems closes licensing agreement with ETH Zurich on a ligand receptor capture technology.   |

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|--------------------------|------------------------------|--|
| Patent Issued            | Prionics                     | US patent has been issued to Prionics on June 18 for 'Method for the determination of trichinella infections and diagnostic composition for such methods'.   |
| Patent Issued            | Ribovax Biotechnologies      | Australian Patent Office has granted patent for 'Novel antigens and antibodies associated to Pancreatic Ductal Adenocarcinoma.'  |
| Research Agreement       | Basilea Pharmaceutica (BSLN) | Basilea has been awarded a contract by the BARDA of up to USD 89 million for the development of its novel antibiotic BAL30072.   |
| Collaboration Agreement  | Biognosys                    | Biognosys has started a new partnership with CELLnTEC, an expert in cell culturing solutions.  |
| Financing                | BioVersys                    | BioVersys has successfully completed a series A financing round for an undisclosed but oversubscribed amount.  |
| Collaboration Agreement  | Genedata                     | AB SCIEX, Genedata, and LECO announced a technology partnership for a collaborative software system to process data across different GC/MS and LC/MS platforms.  |
| Patent Issued            | Lassco                       | The United States Patent and Trademark Office (USPTO) has issued US patent to the use of Lassco's biomarker, Pancreatic Stone Protein (PSP), for the prediction of sepsis.   |
| <b>July 2013</b>         |                              |  |
| Sale agreement           | Dualsystems Biotech          | Dualsystems has announced the sale of its yeast two-hybrid (Y2H) activities to Hybrigenics Services. The financial terms of this transaction are not disclosed.  |
| Grant                    | Preclin Biosystems           | Imaxio, the Jenner Institute, the European Vaccine Initiative and Preclin have been awarded EUR 5.5 million by the EU to develop a Staphylococcus aureus vaccine.  |
| Collaboration Agreement  | Debiopharm Group™            | Debiopharm has signed a one-year collaboration agreement with Quartz Bio, the Clinical Bioinformatics Research Organization leader in precision biomarker discovery.   |
| Financing                | OncoEthix                    | OncoEthix has closed a series B financing raising CHF 18 million.  |
| Collaboration Agreement  | Santhera (SANN)              | Santhera has announced a collaboration with the (EVICR.net) to assess the natural course of Leber's Hereditary Optic Neuropathy.   |
| License Agreement        | ADC Therapeutics             | ADC and BZL Biologics have announced an exclusive licensing and collaboration agreement for an antibody against PSMA-positive prostate cancers.  |
| Patent Issued            | Neurotune                    | US Patent has been issued to Neurotune on a process for the preparation of Dimiracetam.  |
| Deal termination         | Lonza (LONN)                 | Teva and Lonza have terminated their collaboration for the development, manufacturing and marketing of biosimilars under the Teva-Lonza Joint Venture (TL-JV).   |
| Restructuring            | Therametrics (TMX)           | THERAMetrics announces today the change of its ticker symbol at SIX Swiss Exchange from RARE to TMX.   |
| Award                    | GlycoVaxyn                   | GlycoVaxyn has announced that it has secured a strategic translation award from the Wellcome Trust to finance its Shigella program.  |
| Research Agreement       | Lonza (LONN)                 | BioWa and Lonza have formed a research agreement with Pfizer.  |
| Acquisition Milestone    | Neocutis                     | Merz Pharma Group has acquired the Swiss pharmaceutical company Neocutis   |
| Payment                  | Polyphor                     | Polyphor has achieved first milestone in its macrocycle drug discovery collaboration with Boehringer Ingelheim.  |
| <b>August 2013</b>       |                              |  |
| Patent Issued            | Pevion Biotech               | United States patent was assigned to Pevion for 'Trans-adjuvant system' (Swiss inventors).   |
| Grant                    | Telormedix                   | Telormedix has raised funding from the European Eurostars Programme to coordinate an international research project involving a consortium of the organizations Biopta, Midatech Biogune, Molecular Profiles and the University Hospital Zurich (USZ). |
| Regulatory authorization | Evolva (EVE)                 | Evolva's resveratrol has been classified into the non-drug material group by the Japanese Ministry of Health, Labor and Welfare.   |
| Financing                | Addex Therapeutics (ADXN)    | Addex has raised gross proceeds of CHF 3.2 million in a private placement of 1,170,612 new issued registered shares to international institutional investors.  |
| Financing                | Actelion (ATLN)              | Actelion has completed its share repurchase program initiated in November 2010. Actelion repurchased 17,075,675 of its own shares.   |
| Patent Issued            | Auris Medical                | US patent has been issued to Auris Medical on August 13 for 'Methods for the treatment of tinnitus induced by cochlear excitotoxicity' (French inventors).   |
| Positive Study Results   | Piqur Therapeutics           | The company announced that its most advanced compound, PWR309, has successfully completed preclinical profiling and the GLP toxicology.  |
| Product Approval         | Actelion (ATLN)              | Ceptaris Therapeutics (acquired by Actelion) has announced (FDA) marketing approval for VALCHLOR(TM) (mechlorethamine) Gel 0.016%.   |
| Financing                | ObsEva                       | ObsEva has raised CHF 32 million (USD 34.6 million) in a series A round co-led by Sofinnova Partners, Sofinnova Ventures, and Novo A/S.  |
| Joint Venture            | Redbiotec                    | Redbiotec and TeselaGen have announced a joint venture to build a rapid design and prototyping infrastructure for the creation of a Herpesvirus vaccine development library.   |



**September 2013**

|                                  |                              |  |
|----------------------------------|------------------------------|--|
| Study Initiation                 | Debiopharm Group™            | Debiopharm has initiated a phase I, open label multicenter study of a selective FGFR 1, 2, 3 inhibitor, Debio 1347 (CH5183284) in patients with advanced solid tumors.               |
| Agreement modification           | Santhera (SANN)              | Santhera has reached an agreement with Takeda to license back previously granted European rights to Catena® in Duchenne Muscular Dystrophy (DMD).                                    |
| Financing                        | Mind-NRG                     | Mind-NRG has raised EUR 6 million in series B round of funding led by LRM NV along with participation from Index Ventures.   |
| Positive Study Results           | Cytos Biotechnology (CYTN)   | Cytos has announced additional results of the phase 2a clinical trial with CYT003, a first-in-class immune modulator as a potential new treatment for allergic asthma.               |
| Research Agreement               | Debiopharm Group™            | Debiopharm and TCG Lifesciences have entered in an exclusive discovery collaboration to develop innovative antibiotics targeting drug-resistant bacteria.                            |
| Financing                        | Piquor Therapeutics          | The company has secured additional financing from a number of new private investors.   |
| Study Continuation               | Actelion (ATLN)              | Actelion announced the initiation of a phase III clinical development program to assess the efficacy and safety of cadazolid in patients with Clostridium CDAD.                      |
| Financing                        | Therapeutics (TMX)           | THERAMetrics has implemented the ordinary capital increase. This increase include issuing of 321,786,546 new registered shares.  |
| Regulatory authorization         | Basilea Pharmaceutica (BSLN) | Swiss regulatory authority Swissmedic has accepted the ceftobiprole Marketing Authorization Application for review.  |
| Patent Issued                    | Butalco                      | US patent has been issued to Butalco on September 13 for 'Fermentative production of isobutanol with yeast' (German, Swiss inventors).   |
| Collaboration Agreement          | Hutman Diagnostics           | Axela and Hutman collaborate on rapid bacterial detection from uncultured blood.   |
| Award                            | BioVersys                    | BioVersys has won 2nd place in the TOP 100 Startup Award of the best Swiss startups.   |
| Marketing/Distribution Agreement | Diagnoplex                   | Diagnoplex signed a collaboration agreement with Unilabs to commercialize Colox®, a minimally invasive colorectal cancer assay, within the Unilabs network.                          |
| Acquisition                      | Actelion (ATLN)              | Actelion US Holdings Company has acquired Ceptaris Therapeutics. Actelion paid to Ceptaris USD 25 million upon signing and will pay USD 225 million upon closing of the transaction. |
| New Business/Business expansion  | Biosafe                      | Biosafe, in partnership with its Indian Distributor Span Healthcare Private Ltd., has achieved major expansion of its stem cell banking business in India.                           |
| Project funding                  | Evolva (EVE)                 | Evolva's antibiotic GC-072 (EV-035 series) was selected for contract negotiations for preclinical funding by US DTRA.  |
| Capacity Expansion               | InSphero                     | To meet the demand of 3D microtissues across Europe, InSphero has opened a new sales office in Germany to make the buying process for EU customers fast and simple.                  |
| License Agreement                | Symetis                      | Symetis has entered into a license agreement with Endoluminal Sciences (Australia) to gain rights to their active anti-paravalvular leak technology for the TAVI field.              |
| Award                            | Anergis                      | Anergis has been awarded the Swiss Life Sciences Prize 2013 by the Swiss Biotech Association and BioValley Basel.  |
| Positive Study Results           | Basilea Pharmaceutica (BSLN) | Basilea has announced positive topline data from the phase 3 Isavuconazole invasive aspergillosis study (SECURE).  |

**October 2013**

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|-------------------------|----------------------------|--|
| Financing               | Dualsystems Biotech        | Dualsystems has closed a series C financing round with support from existing and new investors.  |
| Grant                   | EffRx Pharmaceuticals      | EffRx received a EUR 5.9 million FP7 research grant for the development of EX404 for Polycystic Ovary Syndrome (PCOS) in paediatric populations.     |
| Research Agreement      | Debiopharm Group™          | Experimental Therapeutics Centre and Debiopharm to collaborate for the development of an epigenetic innovative oncology target.                      |
| Financing               | Cytos Biotechnology (CYTN) | Cytos has announced a planned financing transaction that will raise up to CHF 17.6 million by selling up to 6.3 million shares in a rights offering. |
| Patent Issued           | NovImmune                  | United States patent was assigned to NovImmune for 'Anti-CD3 antibodies and methods of use thereof'.   |
| Collaboration Agreement | ADC Therapeutics           | MedImmune and ADC Therapeutics have entered in a collaboration agreement for two of ADC's oncology programs.   |
| Grant                   | NBE Therapeutics           | Together with ERA Biotech (Spain) and Tube Pharmaceuticals (Austria), NBE has been awarded a 2-year EUR 1.4 million European FP7 grant.              |
| License Agreement       | Biocartis                  | Biocartis and Hospital del Mar have announced their licence agreement on the EGFR biomarker for colon cancer.  |
| Product Approval        | Actelion (ATLN)            | Actelion has received US FDA approval of Opsumit for the treatment of PAH.   |
| Positive Study Results  | Anergis                    | Immunology data further underline the positive outcome of a phase IIb trial of Anergis' birch pollen allergy vaccine, AllerT.                        |
| Patient enrolment       | Cytos Biotechnology (CYTN) | Cytos has announced that patient enrolment has been completed in the on-going phase 2b study with its lead product CYT003.                           |

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| New product                      | Biocartis                    | Biocartis has introduced Idylla™, the brand name for its innovative and high-quality diagnostic platform.  |
| Study Initiation                 | Debiopharm Group™            | Curis and Debiopharm have announced initiation of phase I dose finding clinical study with a combination of HSP90 inhibitor Debio 0932 and Everolimus.                     |
| Collaboration Agreement          | EPIRUS Switzerland           | EPIRUS and Orygen Biotecnologia have announced a multiproduct biosimilar development, manufacturing and commercialization collaboration for Brazil.                        |
| Regulatory authorization         | Basilea Pharmaceutica (BSLN) | Basilea's antibiotic ceftobiprole has obtained regulatory approval in Europe for pneumonia.  |
| Grant                            | Redbiotec                    | Redbiotec is one of the partners who were granted EUR 4.6 million in the EU FP7 Edufluvac project. The project aims towards 'universal' influenza vaccines.                |
| Collaboration Agreement          | Atheris Laboratories         | Atheris and Debiopharm have announced the signature of a collaboration agreement regarding the Atheris Reverse-Discovery™ lead optimization platform.                      |
| Regulatory authorization         | Actelion (ATLN)              | The Committee for Medicinal Products for Human Use (CHMP) and the scientific committee of the EMA have issued a positive opinion for the use of Opsumit.                   |
| Product Approval                 | APR Applied Pharma Research  | APR have announced the European CE approval for Nexodyn®, a newly developed product for the management of acute and chronic wounds.  |
| Financing                        | Delenex Therapeutics         | Delenex has announced the closing of a CHF 7.3 (USD 8.0) million series A3 round. All existing venture investors participated in the round.                                |
| Agreement modification           | Numab                        | Numab has reacquired from Sucampo the rights to ND003, a bispecific anti-IL5Rx-CD3 antibody fragment for the targeted lysis of eosinophils in severe asthma.               |
| Financing                        | Santhera (SANN)              | Santhera secures up to CHF 10 million in equity financing from YA Global.  |
| <b>November 2013</b>             |                              |  |
| Collaboration Agreement          | Cell Culture Technologies    | Cell Culture Technologies has entered in a technical collaboration with European Research Foundation to cultivate primary cells in fully synthetic minimal media.          |
| Collaboration Agreement          | Addex Therapeutics (ADXN)    | Addex and National Institute on Drug Abuse (NIDA) enter collaboration to advance ADX71441 and ADX88178 in drug abuse and addiction.  |
| Study Initiation                 | Auris Medical                | Auris has reached Special Protocol Assessment agreement with FDA for pivotal phase III clinical trial with AM-101 in treatment of acute peripheral tinnitus.               |
| Marketing/Distribution Agreement | EffRx Pharmaceuticals        | EffRx has entered in an agreement with Ascendancy Healthcare Inc., to focus on the commercialization of therapeutic products in China and other Asian markets.             |
| Positive Study Results           | GeNeuro                      | GeNeuro successfully completes phase 2a clinical study with novel approach to treat multiple sclerosis.  |
| License Agreement                | Polyphor                     | Polyphor has announced an exclusive worldwide license agreement with Roche to develop and commercialize Polyphor's investigational macrocycle antibiotic POL7080.          |
| License Agreement                | ADC Therapeutics             | ADC and Five Prime Therapeutics have announced an exclusive license agreement for human antibodies directed to an undisclosed target in various types of cancers.          |
| Financing                        | Biocartis                    | Biocartis has announced the completion of an EUR 30 million series E equity fundraising.   |
| Study Initiation                 | Genkyotex                    | Genkyotex initiates multinational phase II study with first in class NOX inhibitor GKT137831 in diabetic nephropathy patients.   |
| Acquisition                      | Anteis                       | Anteis, specialized in the development, manufacture and commercialization of biomedical products in the area of aesthetics, has been purchased by Merz Pharma.             |
| Patent Issued                    | Kuros Biosurgery             | United States Patent and Trademark Office (USPTO) has assigned patent for 'Supplemented matrices for the repair of bone fractures' to Kuros.                               |
| Study Initiation                 | Asceneuron                   | Asceneuron is conducting a program to develop M1 muscarinic acetylcholine receptor (mAChR) PAMs for the treatment of the cognitive deficits associated with Alzheimer's.   |
| Product Approval                 | Actelion (ATLN)              | Actelion has received Health Canada approval of Opsumit for the long-term treatment of pulmonary arterial hypertension.  |
| Patent Issued                    | Lonza (LONN)                 | US patent has been issued to Lonza for 'Process for the identification and preparation of a (R)-specific omega-transaminase' (German, Swiss inventors).                    |
| Deal termination                 | Evolva (EVE)                 | Evolva has announced that its collaboration with International Flavors & Fragrances, targeted at an undisclosed flavouring ingredient, will be discontinued in early 2014. |
| Orphan Drug Designation          | Basilea Pharmaceutica (BSLN) | Basilea has reported that the US Food and Drug Administration (FDA) has granted orphan drug designation to isavuconazole for the treatment of zygomycosis.                 |
| Collaboration Agreement          | Genedata                     | Genedata has announced its collaboration with GOBI (General Optimization of Biogas Processes) to improve the overall efficiency of biogas production.                      |
| Agreement modification           | Covagen                      | Covagen and Tanabe Research Laboratories have announced that they are expanding their strategic research collaboration.  |
| Financing                        | Creoptix                     | Creoptix announced the closing of a CHF 3 million series A round.  |
| Positive study interim results   | Santhera (SANN)              | Santhera has announced that the phase III DELOS study of orally administered Catena®/Raxone® remains on track.   |

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|-----------------------------------|------------------------------|---|
| Project funding                   | GeNeuro                      | GeNeuro has announced that its clinical program in schizophrenia has been awarded more than USD 700,000 by the Stanley Medical Research Institute.                          |
| Deal termination                  | Biocartis                    | Biocartis has announced that bioMérieux and Biocartis have signed an agreement to end their alliance for the development and commercialization of IduLLa™.                  |
| Patent Issued                     | Prionics                     | Prionics has received patent for 'Novel sequences of Brachyspira, immunogenic compositions, methods for preparation and use thereof.'                                       |
| <b>December 2013</b>              |                              |   |
| Study Setback/<br>Discontinuation | Actelion (ATLN)              | Actelion has announced that following a scheduled meeting, the independent DMC has recommended that the phase III DUAL-2 study should be terminated.                        |
| Financing                         | Telormedix                   | Telormedix has raised CHF 6 million in an extension to its series B financing from existing investors Aravis Venture and Proquest Investments.                              |
| Product Approval                  | Basilea Pharmaceutica (BSLN) | Basilea has announced that the FDA has designated isavuconazole as a Qualified Infectious Disease Product (QIDP) for the treatment of invasive aspergillosis.               |
| Collaboration<br>Agreement        | Genedata                     | Genedata has announced its successful collaboration with AstraZeneca on data analysis for compound combination experiments.   |
| Grant                             | InSphero                     | InSphero was awarded funding for a Eurostars project to develop a high-throughput compatible screening platform for the study of drug-induced liver injury (HTS-DILI).      |
| Collaboration<br>Agreement        | Red Biotec                   | Redbiotec has entered into a collaboration with GSK Vaccines. In a feasibility study GSK will apply Redbiotec's assets and its proprietary technology platform rePAX®.      |
| Collaboration<br>Agreement        | Selexis                      | JHL Biotech and Selexis have signed a non-exclusive strategic agreement to deliver safe and high-quality biologics to the Chinese market.                                   |
| Study Initiation                  | Asceneuron                   | Asceneuron is conducting a program, designated ASN 61, to develop inhibitors of O-linked beta-N-acetylglucosaminidase for the treatment of Alzheimer's disease.             |
| License<br>Agreement              | Molecular Partners           | Molecular Partners and Roche have announced that they have entered into a research collaboration and licensing agreement.   |
| Financing                         | Actelion (ATLN)              | The Board of Directors of Actelion has approved a new program to buy back up to 8.31% (up to 10 million shares) of the outstanding share capital over the next three years. |
| Grant                             | Evolva (EVE)                 | Evolva has announced that it will participate in the EU-funded PROMYS research project. The project has a duration of four years and a total EU funding of EUR 7.2 million. |
| License<br>Agreement              | Biocartis                    | Biocartis and VIB have announced their exclusive license agreement on a novel panel of microsatellite instability (MSI) biomarkers for several cancers.                     |
| Financing                         | Covagen                      | Covagen secured CHF 42 million in a tranching series B round led by new investor Gimv. Covagen can obtain an additional CHF14 million if undisclosed milestones are met.    |
| Acquisition                       | Hamilton                     | Hamilton has concluded an agreement to acquire the biotech sensors business of the French company Fogale Nanotech.  |
| Patent Issued                     | AC Immune                    | Australian Patent Office has approved Genentech and AC Immune's patent application for 'Humanized antibody against amyloid beta.'   |
| License<br>Agreement              | Lonza (LONN)                 | BioWa, Inc. and Lonza have announced that they have entered into a licensing agreement with MedImmune.  |
| Collaboration<br>Agreement        | Octapharma                   | Octapharma enters into agreement with Pfizer for the commercialization of an investigational intravenous therapy for the urgent reversal of an oral anticoagulant.          |
| Capacity<br>Expansion             | Biosafe                      | Biosafe has established a new subsidiary in Brazil and a new office covering the Latin American region.   |
| Financing                         | NBE Therapeutics             | NBE has closed the extension of its seed funding round led by the Boehringer Ingelheim Venture Fund and additional private investors.                                       |
| Patent Issued                     | Telormedix                   | Australian Patent Office has granted patent filed by The Regents of the University of California and Telormedix for 'Treatment of bladder diseases with a TLR7 activator.'  |
| Study Initiation                  | Octapharma                   | Octapharma's phase II/III trial for the targeted treatment of relapsing multiple sclerosis enrolls first patients.  |
| Regulatory<br>authorization       | Actelion (ATLN)              | Actelion is granted marketing authorization for Opsumit in pulmonary arterial hypertension (PAH) by the European Commission.  |
| Milestone<br>Payment              | AC Immune                    | The Alzheimer's Prevention Initiative (API) trial in cognitively healthy individuals has reached a significant milestone with the first participants in Colombia.           |
| License<br>Agreement              | Pevion Biotech               | Biolife Science Qld Limited has entered in a licensing agreement with Pevion for a patent covering the virosome vaccine delivery platform, used to manufacture Her-Vaxx.    |
| Patent Issued                     | Lonza (LONN)                 | US patent has been issued to Lonza for 'Process for the production of a fatty acid/carnitine derivative' (Tunisian inventor).   |
| License<br>Agreement              | Evolva (EVE)                 | Evolva Holding and Serodus have signed a final licensing agreement for EV-077, Evolva's compound targeted at diabetic nephropathy.  |

**Disclaimer:**

This information was selected and compiled on the basis of publicly available information only. We therefore cannot guarantee that all events are included in the above summary for 2013.

# Swiss biotech at a glance



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Overall, the Swiss biotech sector performed well in 2013. The news from the product development and approval front can be considered remarkable.

## Revenues up in Swiss Biotech

The industry achieved total revenues of more than CHF 4.7 billion against CHF 4.6 billion in 2012. This is an outstanding result given the tough economic conditions worldwide. Adverse factors included the ongoing impact from the European debt crisis, continued pressure on healthcare costs, as well as the strong Swiss franc.

## Fund raising ever more difficult

There was an upswing in financing during 2013. The capital situation can be considered rather good with a total of CHF 418 million raised, up 60 % on 2012. Some CHF 73 million was raised by public companies – up 62 % on the previous prior year – with the bulk going to Evolva. It was able to attract a strategic alliance partner – Cargill – willing to coinvest in the company at the same time. The top three private investment rounds by value were achieved by the following companies: Auris, Covagen and Biocartis. In addition, it should be noted that more than 20 private companies were able to attract capital from investors around the globe. However, securing early stage financing continued to be hard. In this context, it is worth noting a new development in the Swiss Senate. It passed a motion – Future Fund Switzerland – that should make it possible to attract new investment for innovative future trends and technological developments from pension funds.

## Public markets/ products/ clinical development

October 2013 was a successful month for two public biotechs in Switzerland. First, Basilea got its product Ceftobiprole approved by EMA (European Medicines Agency) for pneumonia. Two days later, Actelion's Opsumit obtained approval by the FDA (Federal Drug Agency) for PAH (pulmonary arterial hypertension), fol-

lowed by EMA approval just before Christmas. On top of this, some of the private companies announced progress in clinical development – see examples in our Year in Review summary on pages 20 to 27. However, further restructuring initiatives also shook up the industry in 2013. Addex in Geneva and Santhera Pharmaceuticals in Liestal had to announce further reorganization measures due to setbacks both in clinical development and the product approval process. MondoBIOTECH pursued another route by changing its name to THERAMetrics and entering into a reverse merger transaction with Pierrel Research International, a subsidiary of Pierrel SpA, an Italian listed pharma group.

## M&A drives business development and growth

Swiss biotech companies are always on the radar and watch list of larger biotechs or big pharma companies. This led to a series of transactions in 2013. GlaxoSmithKline (GSK) acquired Okairos, a specialist developer of vaccine platform technologies for EUR 250 million in cash in May. During the second half of the year, Merz Pharma Group acquired Neocutis as well as Anteis, both of which are located in the Swiss Romandie. In December, Marathon Pharmaceuticals announced that it had acquired the worldwide rights to desirudin (Iprivask®/Revasc®) from Canyon Pharmaceuticals Group. The trend towards collaborations continued in 2013. Evolva entered into several collaboration agreements. One with Ajinomoto is generating CHF 10 million fees and milestones over 3.5 years; another with Cargill, that entitles Evolva to receive USD 7.5 million in milestones and a right to a 45% participation in the final business. Further notable collaborations were entered into by Roche with Polyphor (CHF 35 million upfront and deal value up to CHF 465 million) and Molecular Partners (CHF 55 million upfront and deal value of more than CHF 1 billion). Zurich-based Covagen started a collaboration with Tanabe Research with a potential deal value of up to CHF 135 million.

## Promise in the west of Switzerland?

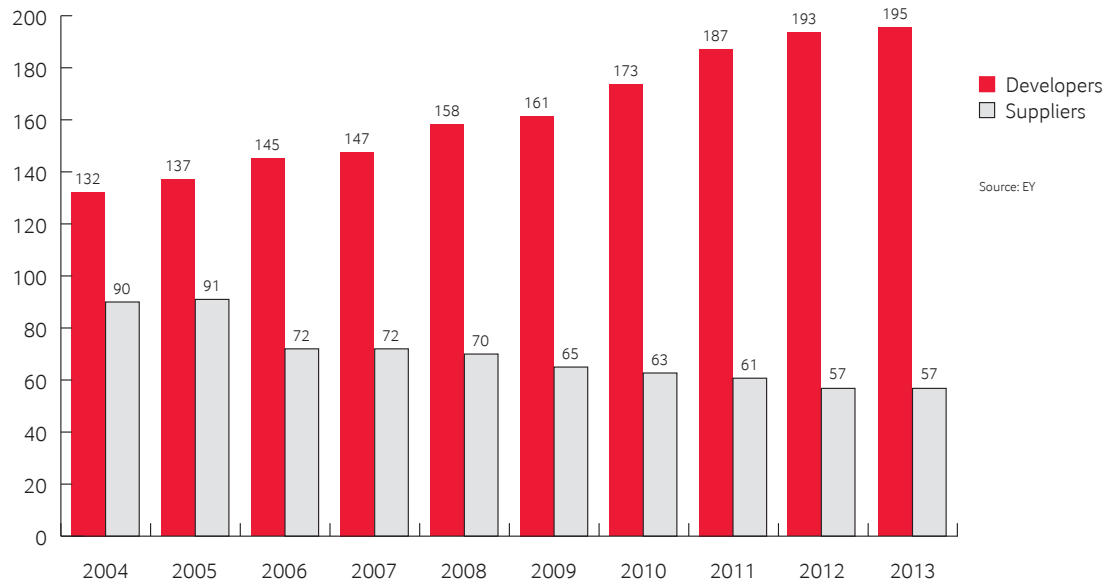
After the shock of the closure of the Merck Serono site in Geneva in early 2012, the announcement by the Bertarelli family and the Wyss foundation that they had acquired the building complex was very warmly welcomed in the Swiss Romandie. Under the label 'Campus Biotech' the site will become the home to new biotech companies as well as parts of the University of Geneva and the Federal Polytechnic School of Lausanne (EPFL). The decision of the European Commission to select the Human Brain Project (HBP), under the coordination of the EPFL, as one of its two Future and Emerging Technologies (FET) flagship projects represents a major step forward for the Swiss life sciences industry.

### About Ernst & Young

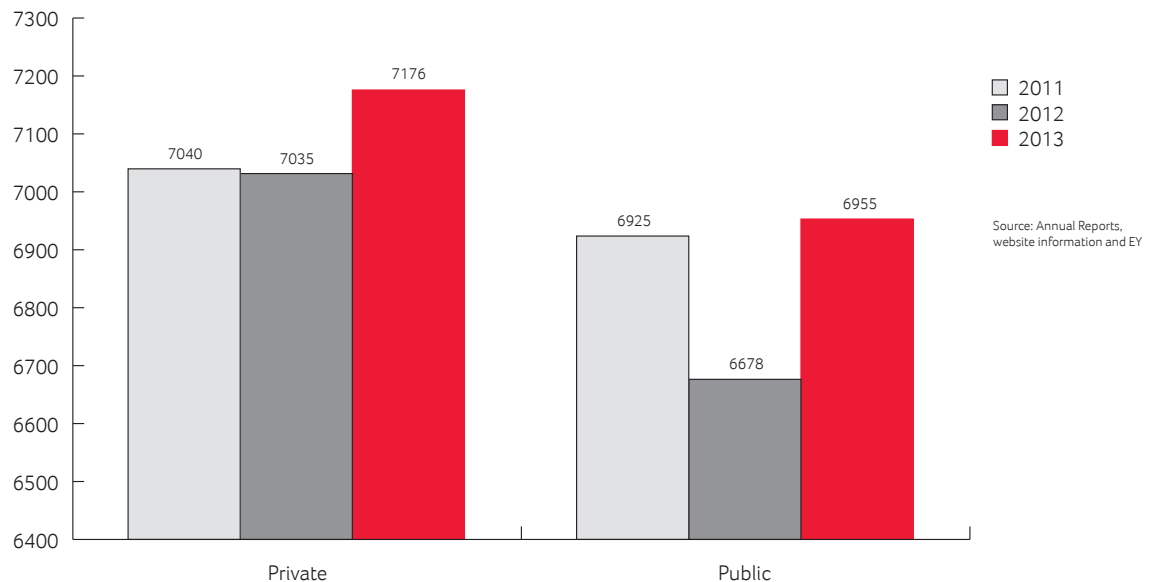
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# Facts & figures

Number of biotech companies in Switzerland



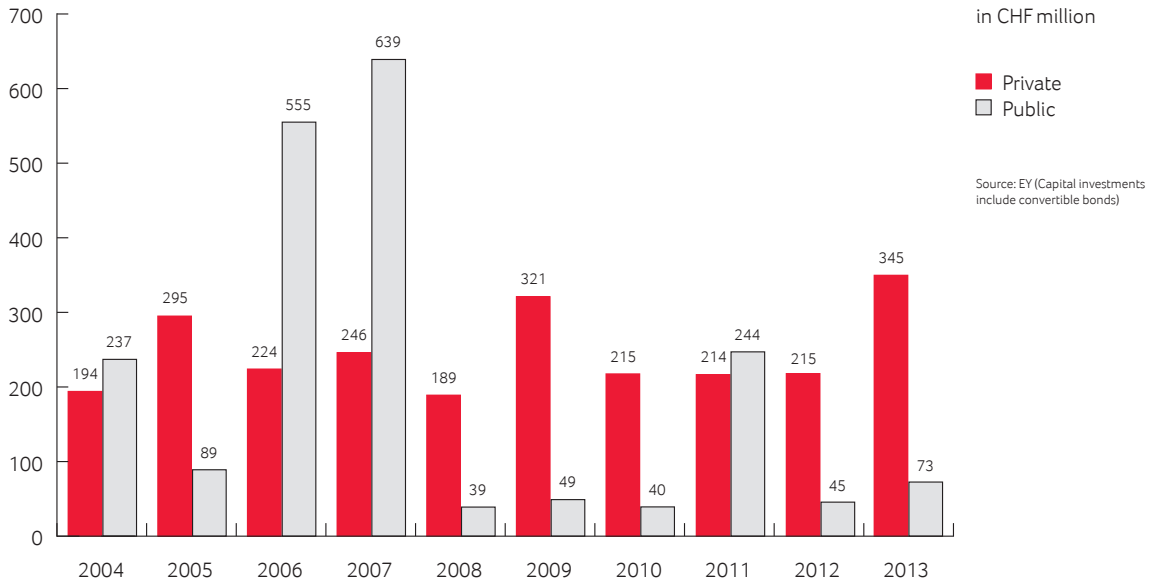
Number of employees



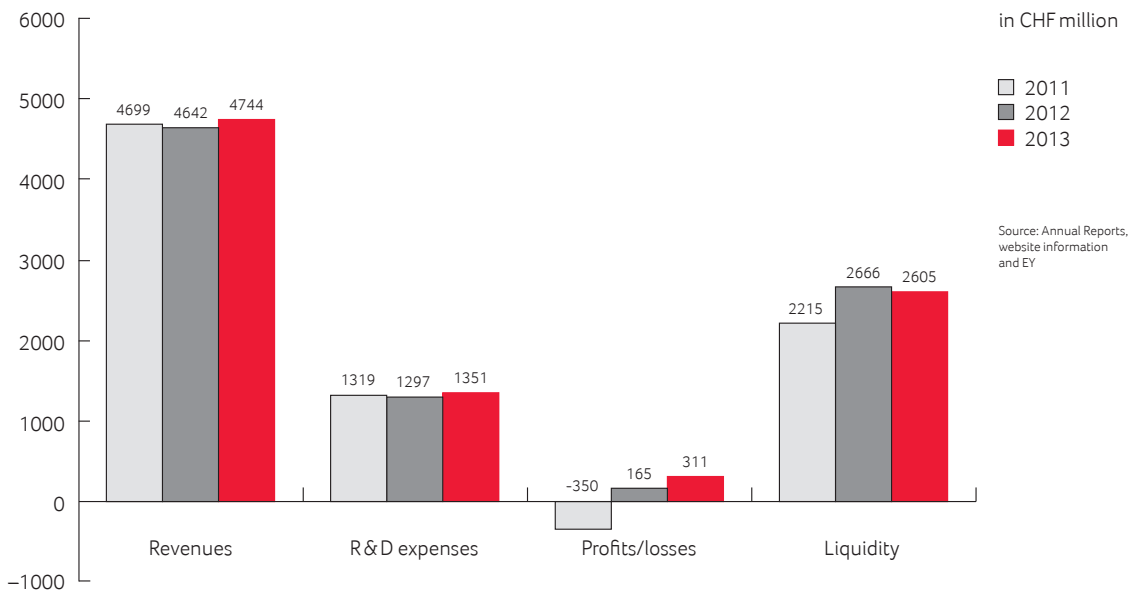
## Notes

- The 2013 data in this table is based on information that has become available until early March 2014 when this report was compiled. At this time, some of the companies had not yet disclosed their final financial figures for 2013. Therefore, some figures were carefully extrapolated on the basis of the latest interim data publicly available (e.g. Q3 2013).
- Selected financial figures for biotech activities of Lonza's business segment "Pharma & Biotech Market Segment", which has been established as part of the reorganization at Lonza, are included for 2013. For the previous periods presented, Lonza's "Bioscience" and "Biological Manufacturing" are included based on actual figures publicly available or careful estimates. Lonza's "Pharma & Biotech Market Segment" respectively "Bioscience and Biological Manufacturing business sectors" are presented due to Lonza's transformation into a life sciences company and its inclusion into the ICB Biotech Sector and the SIX LIFE SCIENCE® and SIX Bio+Medtech® indices at the SIX Swiss Exchange.

### Capital investment in Swiss biotech companies

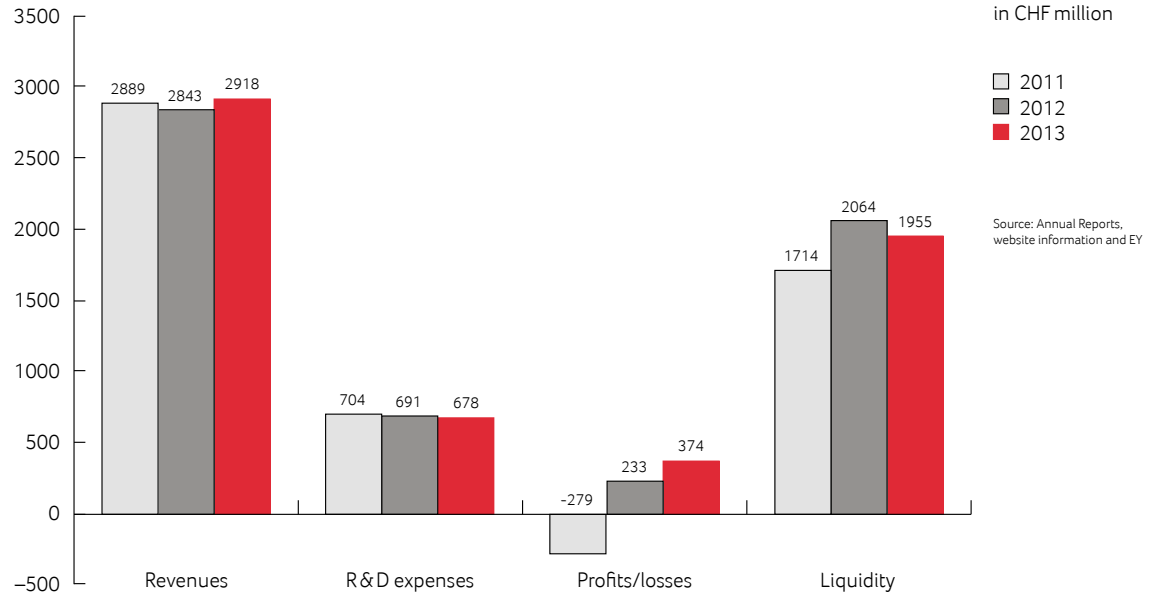


### Total Swiss biotech companies

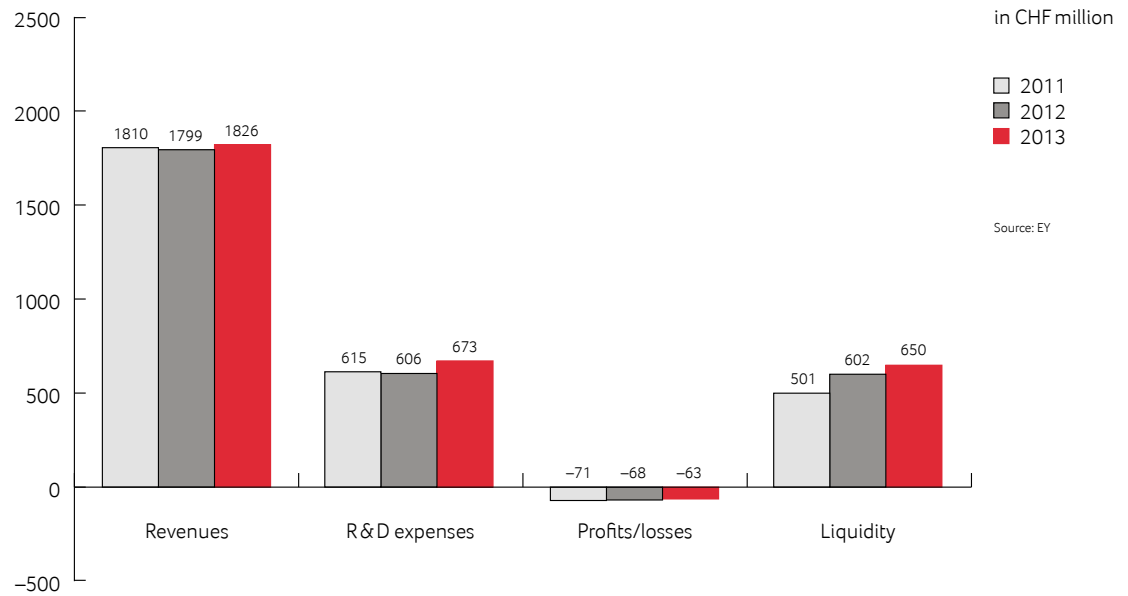


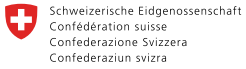
- In 2013, Pierrel Research International AG acquired THERAMetrics (former: mondoBIOTECH) which resulted in certain one-time effects on the figures presented above.
- As some private companies do not disclose financial figures, the figures above represent EY's best estimate.
- All figures are headquarter-counted.

## Public Swiss biotech companies



## Private Swiss biotech companies





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