

# Swiss Biotech

## Report 2018



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# Editorial:

## Success is only the beginning



Coming back from the US in the mid-nineties, I have vivid memories of how complex and exotic it was to create a biotech start-up in Switzerland. The progress of the last twenty years has been extraordinary. Last year, venture capital firms invested close to half a billion francs in Swiss biotech start-ups. In parallel, several sizeable venture funds dedicated to biotech have been launched. And Actelion, one of the most successful biotech companies worldwide, was acquired for USD 30 billion; proof, if required, of the quality of Swiss biotech.

Switzerland is an ideal location for the development of the biotech industry as it has several world class research universities with strong life and physical sciences activities. Innovation parks and accelerators have developed nicely in close proximity to these universities. The location of top pharma and food companies such as Roche, Novartis, Nestle, together with life science manufacturing giants like Lonza, provides tremendous partners for proven biotech start-ups.

In order to strengthen and improve our industry in the coming years, we need to further enhance framework conditions:

- provide more favorable conditions for the creation of funds to facilitate the growth of Swiss biotech firms
- establish a returnee program for successful CEOs and investors
- keep our borders open to access the additional diverse talents needed
- adapt the taxation system in so far as it affects young entrepreneurs.

A handwritten signature in black ink, appearing to read 'P. Aebischer'.

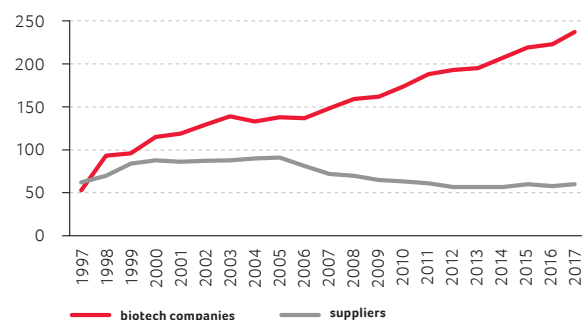
Patrick Aebischer  
President Emeritus of the Swiss Federal Institute  
of Technology of Lausanne

# Origins and evolution of Swiss biotech

Some 40 years ago, in 1978, one of the world's oldest biotech companies, Biogen, was founded in Geneva, Switzerland. Twenty years later there was a coming of age when representatives from the Swiss biotech industry gave the young industry a voice with the formation of the Swiss Biotech Association (SBA). We look back at the challenges met on the industry's path to maturity and look forward to the key trends in its further evolution.

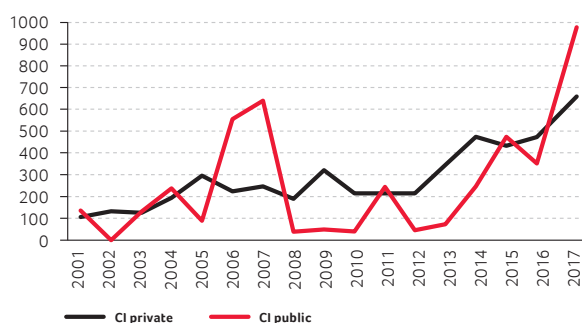
Swiss biotech is a growing and competitive industry. The huge investments made into the construction of mammalian cell biotech production facilities is particularly remarkable: Key companies include American Biogen, Australian CSL Behring, Belgian UCB, as well as Swiss Lonza and Roche, a pharma company with the world's largest embedded biotech product portfolio.

>> page 15 >> page 17



Number of Swiss biotech companies (health)

Companies and suppliers in the health biotech sector have shown consistent development over the last 20 years. Today this is one of the strongest segments of biotech activity in Switzerland. This growth has occurred despite sometimes challenging access to private investment or venture capital and very volatile public investment from IPOs (initial public offerings) and stock exchanges.



Capital investment (in CHF million)

Over the time some companies discontinued operations, others were removed from the biotech statistics as they moved their

headquarters outside of Switzerland or were reclassified as pharma due to mergers or acquisitions. Apart from health biotech, featured in the Swiss Biotech Report over the years, it is difficult to quantify Switzerland's industry in other biotech sectors such as industrial biotech or agricultural biotech. Having said that, if we analyze the data from the SBA directories since 2007 we see very little change. The chart on page 7 shows distribution of activities of the listed Swiss biotech companies (multiple entries possible).

## Evolutionary challenges

Many organizations – including the European Parliament and the Swiss National Science Foundation (SNSF) – constantly screen and identify trends, challenges and risks. The annual World Economic Forum's (WEF) Global Risks Landscape (page 6) presents most of the challenges or trends mentioned by other organizations. Will biotechnology play a role in addressing some of these challenges and risks? Or are biotech stakeholders merely subject to these risks and therefore having to cope simply with their consequences?

WEF's Global Risk Report identifies biotechnology as technology with above average benefits. It seems that biotechnology could be part of the solution addressing risks such as population ageing and health risks (chronic diseases, pandemics, spread of infectious diseases). At the same time it is also viewed as a technology with above average negative consequences that could worsen environmental and geopolitical risks, and one that needs more governance.

## Addressing challenges

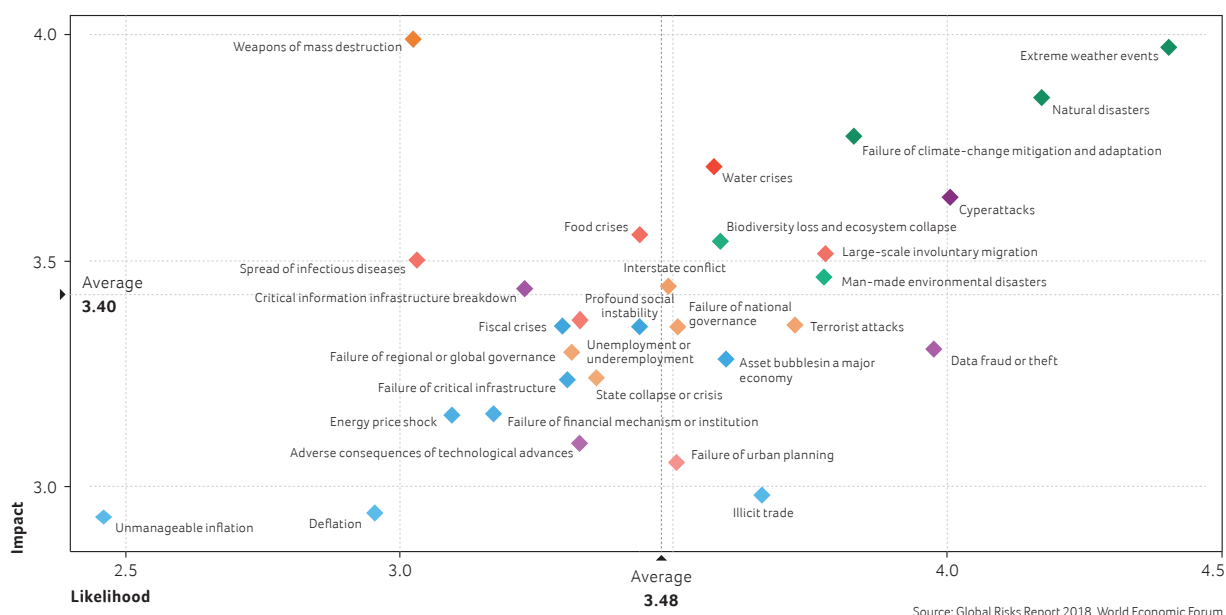
Society has multiple options to deal with challenges and risks deriving from the analysis of trends:

- Ignore the findings;
- Ban technologies;
- Develop roadmaps or strategies to address challenges;
- Invest in research; or
- Install regulations and governance instruments.

Switzerland has used some of these strategies to make best possible use of the benefits of biotechnology to cope with global risks as well as address the risks around biotechnology itself.

**Technology bans:** In 2005 Switzerland installed a moratorium (until 2021) on the cultivation of Genetically Modified Organisms (GMOs) in agriculture, silviculture or horticulture. Public research is funded so that Swiss universities can maintain their scientific standing and to study the risks of the technology. The ban hampers development of a Swiss agricultural biotech industry while the rest of the world has raced ahead, sometimes in unstable and non-governed states.

**Road maps:** In contrast to Europe and the USA, Switzerland has no biobased economy roadmap. This may be due to the coun-



### Global Risks Landscape

try's limited supply of biobased raw materials or because the Swiss industrial biotech market is not perceived as relevant enough. The activities of Swiss chemical and pharmaceutical industry in biocatalysis to replace chemical processes in high-value products should not be underestimated. One can only guess what the sector could achieve with the support of a roadmap. >> page 15

**National strategies and policies:** Relevant Swiss strategies and policies are the National Rare Disease Policy (passed in 2014) and the Swiss Antibiotic Resistance Strategy (StAR, adopted in 2015). Both tackle important issues but neither address research to (clinically) develop innovative medicines. This is regrettable given the potential of the Swiss biotech industry to provide leverage. The value creation potential of Swiss biotech industry is under-appreciated: it could serve the local market and be a global player spreading Swiss-based standards to counter global threats.

**Investing in research:** Overall research investments in Switzerland amount to roughly 3% of the Swiss GDP. Two thirds are invested by Swiss industry with at least 8.6% spent within biotech research (bfs.ch 2004 data). Only about 25% is financed by public funding (e.g. SNSF or Innosuisse), mostly bottom-up research. For the rest, these Swiss institutions are continuously aligning funding with research areas that are perceived as important (>> page 8 >> page 10). However, to maintain or increase the huge commitment of Swiss industry to fund research in Switzerland the implementation of supporting framework conditions is key.

**Legislation and regulations:** The Federal Act on Research involving Human Beings (Human Research Act, HRA) governs Swiss biotech research in industry and academia. The 2015 annual report from all Swiss Ethics Committees reported that of some 585 clinical trial applications, only 210 were on novel and not yet approved medicinal products (category C). Given that selected members of SBA members alone develop some 180 compounds (SBA members' product pipeline, February 2018), this leads to the conclusion that Swiss companies largely conduct clinical research on innovative medicines outside of Switzerland.

### Conclusions and current developments

**Regulating a global industry:** From a Swiss or European point of view, the perception of risk in biotechnology seems inadequate. The potential for negative consequences is continuously discussed and the likelihood decreased through regulatory frameworks. Because Swiss legislation does not influence the situation in non-regulated or instable states, it seems to make sense for the Swiss regulatory framework conditions to be designed to increase research and manufacture in Switzerland. When biotech manufacture and research activities remain and are strengthened in Switzerland, then Swiss legislation will have indirect international outreach through the global exports.

**New players in drug development:** Increasingly we find that academia is initiating early clinical trials financed by public research funding, because the pharmaceutical industry mainly in-licenses late-stage drug projects. As the next step towards translational medicine, academia will either have to build up GLP (Good Laboratory Practice), GCP (Good Clinical Practice) and GMP (Good Manufacturing Practice) competences or outsource.

In addition, nonprofit organizations within civil society receive public funding or donations to develop and produce medicine for under-served populations or against neglected or rare diseases. These organizations generally have direct access to patients, but typically do not have the competences and infrastructure to safely produce their products for global markets.

Where there is a specific area of national interest in pharmaceuticals – such as in the development of antibacterials or antivirals – some nations are actively involved in drug development or finance programs in industry. Due to global agreements on restricted use and the lack of financial models to compensate for the development of such emergency drugs, it seems that society or governments are best suited to finance the development of these medicines.

These market failures in drug development and the lack of new business models, means that increasing numbers of organizations from civil society, academia and government are taking an active role in the development of drugs using either money from the public purse (tax money) or donations from private persons.

**Next generation of technology companies:** Investment in basic research results in new technologies that are patented and after some years of further development transferred into (Swiss) industry. A review of the Swiss patent landscape (>> page 12) and the research programs of the funding agencies reveals increased activity in digitalization and data-handling technologies such as Blockchain software platforms for digital assets. Biotechnology as a platform technology affects various industry segments and also fuses with other technology fields such as information or production technologies. These technology fusions will further enlarge the classic biotech industry base by incorporating companies from outside the biotech sector.

**Resilience:** Swiss biotech is versatile, it includes suppliers, service organizations and companies from product development to manufacture and global distribution in various industry sectors. The presence of all expertise and biotech stakeholders within a rather small geographic area is one of the key strengths of Swiss biotech and the cause of its resilience.

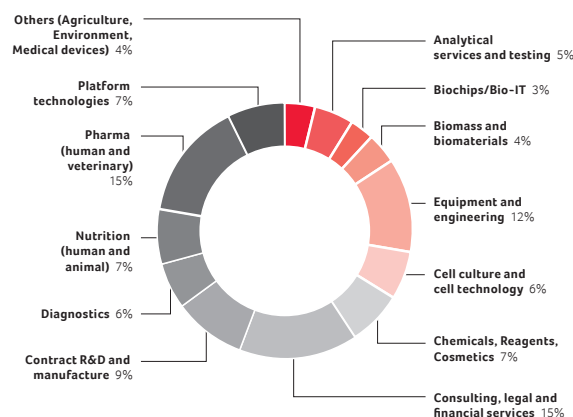
This is reflected in the fact that most merger and acquisitions have not resulted in job losses for Switzerland. On the contrary, activities continued and investments into production and research infrastructure in Switzerland were maintained. In 2015, alongside the 14,890 persons employed in Swiss-based biotech companies (Swiss Biotech Report), 72 international companies were active in pharmaceutical production and employed another 13,058 persons in Switzerland (bfs.ch).

### Outlook on evolution

Looking to the future, it is vital to position biotechnology as the means to address global challenges and risks and to contribute to global sustainable solutions. At the same time, benefits have to be demonstrated not just in theory but especially in practice. Technology transfer and fast movers in industry are essential elements in bringing innovation to market and changing the world by enabling global access and affordability.

And for the Swiss biotech industry, it is vital that the high standards of “Swiss Made” are visible and in-place. If framework conditions strengthen Swiss based research and manufacture and Swiss legislation governing risks is applied, then the country’s high standards will be transmitted worldwide through international trade.

Switzerland is no island and the biotech industry and research institutions are in a constant state of flux, exchange and international competition. The entity developing drugs in the future will have to rely on seasoned organizations for clinical research and contract manufacture as well as on a healthy and robust biotech industry to manufacture and market drugs. The question is, who will undertake these projects; the lowest bidder, national providers or the most suited and qualified? National and international governance may be able to reduce the likelihood and impact of global risks but we need informed consumers, end-users and purchasers in society and industry to take responsibility for reducing risk and promoting good governance through their own purchasing decisions.



Fields of activities of Biotech companies listed in the Swiss Biotech Directory 2017 (Swiss Biotech Association)

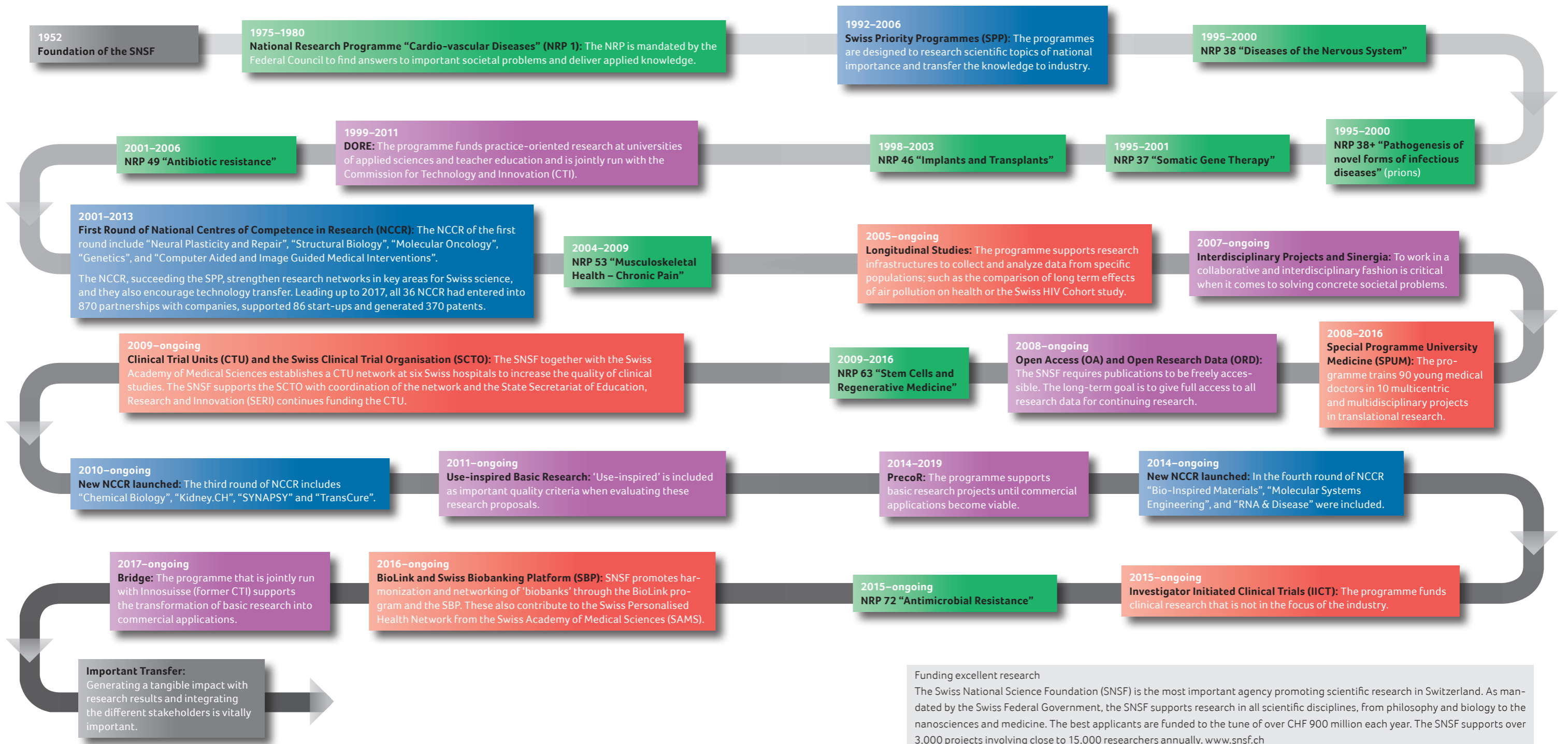
# 65 Years of the Swiss National Science Foundation: Transferring research results into practice



Florian Fisch,  
Science Editor  
Swiss National Research Foundation

Swiss National Science Foundation (SNSF) has increasingly encouraged researchers to transfer their knowledge and technologies into industry and government for the benefit of the whole society.

- National Research Programmes (NRP)
- National Centres of Competence in Research (NCCR)
- Biomedical programmes
- Other transfer-oriented instruments





# Moving forward with Innosuisse



Annalise Eggimann,  
CEO,  
Innosuisse

Past, present and future: the change of focus is particularly relevant to Innosuisse. On 1 January 2018, the organisation previously known as the Commission for Technology and Innovation (CTI) was transformed into Innosuisse – Swiss Innovation Agency. This is a new name and organisational structure but the mission to support science-based innovation in Switzerland is still the same.

Biotechnologies are among the main driving forces behind innovation in Switzerland and they retain their permanent place in Innosuisse's funding strategy. The two featured examples – Piquar Therapeutics AG and MaxiVAX SA – demonstrate that innovation of this kind has the potential to change the world. 'Benefits have to be demonstrated not just in theory but especially in practice. Technology transfer and fast movers in industry are essential elements in bringing innovation to market and changing the world by enabling global access and affordability.' (Source: Origins and evolution of Swiss biotech, page 7)

Turning theory into practice is the core competence of Innosuisse. Innosuisse enables companies in Switzerland to increase their capacity and ability to innovate. Its support will particularly focus on the challenges of digitisation, especially with regard to the maintenance and creation of new jobs with added value and the promotion of prosperity in Switzerland.

Innosuisse helps companies to gain easy access to the expertise of research institutions. In doing so, it focuses on projects that boast exceptionally high innovation potential. The aim is to encourage SMEs (small and medium sized enterprises) to take calculated risks and approach challenges in new ways, as well as offering them new prospects by promoting innovative business models and forming international partnerships. Further improvements to the start-up ecosystem are in the pipeline. The innovation promotion agency has an annual budget of around CHF 200 million for this purpose.

Innosuisse bases its support for innovation projects on the bottom-up principle. This means that it does not specify the disciplines or business sectors where it will provide support for projects and start-ups. This decision is made by industry and academia. A glance at the statistics shows that innovation projects in the field of biotechnology have a permanent place in the CTI/Innosuisse funding program. From 2013 up until the end of 2017, between 35 and 47 projects were funded each year with the total amount of funding ranging from CHF 14.4 million to CHF 18.1 million.

## More from life in the fight against cancer

Piquar Therapeutics AG is a young company founded in 2011 as a spin-off from the University of Basel. From 2010 to 2013, it received start-up coaching from the former CTI. An experienced business coach helped the start-up draw up its strategy, create a business plan and access its target markets. Conventional treatments for cancer put the body under huge stress. Piquar is developing therapies that specifically target cancer cells. The company has successfully completed several funding rounds.

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

## The route to change

The organisation of the former CTI was the subject of several parliamentary procedural requests. In 2011 the Federal Council used one of these requests as an opportunity to carry out an analysis of the potential for organisational changes to the CTI. The findings showed that improvements were needed, particularly in the area of governance, and that these could only be introduced by means of fundamental reform. By transforming the organisation into an entity under public law, it was possible to not only guarantee a clear separation between its strategic and operational activities, but also to enable it to benefit from greater financial flexibility. The fundamental mission of the former CTI, which was to promote science-based innovation, remains unchanged and will be continued by Innosuisse.

In June 2016 the Swiss Parliament passed the Innosuisse Act and in December of the same year the board of the new agency was appointed. The new innovation promotion agency has been in operation since 1 January 2018.



The board of directors with the chief executive officer of the Innosuisse Secretariat. From the left: Edouard Bugnion, Nicola Thibaudeau, Martina Hirayama, Annalise Eggimann (CEO), André Kudelski (Board Chairman), Marco Illy, Trudi Hämmerli, Thierry Calame.

### Boosting the immune system in cancer patients

MaxiVAX SA is working with the Geneva University Hospitals and the École Polytechnique Fédérale de Lausanne (EPFL) to develop a new vaccination that will strengthen the immune system of cancer patients and help it to combat tumour cells. During the course of several innovation projects supported by the former CTI, the project partners developed the immune booster GM-CSF which involves genetically reprogramming human cells. These cells are inserted into a small bio-compatible hollow fibre capsule that is placed under the patient's skin. This allows for the continuous delivery of the booster and strengthens the immune system. An initial study has shown that the treatment is safe, well-tolerated and effective, particularly in patients with a more robust immune system. [www.maxivax.ch](http://www.maxivax.ch)

### Four bodies with responsibilities

The Innosuisse Board is the strategic body heading up the new organisation. Seven expert representatives from industry and academia are responsible for managing Innosuisse in line with the Federal Council's objectives and with an eye on the future. The Chairman of the Board is André Kudelski, an entrepreneur from Western Switzerland. The core task of the Innovation Council, Innosuisse's specialist body, is to make decisions about funding applications. It comprises 21 people from industry and academia who have an excellent track record in innovation. Experts support the Innovation Council in assessing applications and supporting project work.

The operational body of Innosuisse is the Secretariat under the leadership of the management team with Annalise Eggimann as Chief Executive Officer. The auditing body is the Swiss Federal Audit Office SFAO.

### Innovation projects centre stage

Innosuisse's funding instruments will remain the same in principle, with funding of innovation projects being its most important instrument from a financial point of view. Partners from the worlds of industry and research join forces to implement clearly defined innovation projects. Innosuisse will assume half of the project costs, covering the salaries of the researchers involved in the project and the companies will contribute the other half.

Innosuisse innovation mentors are available free of charge in all regions of Switzerland so that companies can find the right research partners and work with them to draw up an application. New businesses can also take advantage of professional start-up coaching and Innosuisse offers a set of courses and training modules for those looking to found a business. Innosuisse will no longer assign a coach to start-ups that it supports, but rather gives the companies vouchers so that they can select their own partners from a pool of accredited coaches.

### National Thematic Networks: innovation drivers in Switzerland

The Swiss Biotech Association is involved in the publication of the Swiss Biotech Report and in one of eleven National Thematic Networks (NTN) supported by Innosuisse. These networks cover the whole of Switzerland and each specializes in one specific area of innovation. They encourage research institutions and industry to share ideas, promote the transfer of knowledge and technologies, and act as innovation drivers in their specialist fields. They form an important part of Innosuisse's funding instruments and play a major role in initiating innovation projects.

Innosuisse removes the obstacles to innovation. Start-ups, businesses and researchers need to be able to focus fully on realizing their ideas. It offers financial support and expertise and links them up with the right partners. In this way Innosuisse brings clear added value to the Swiss economy. Specifically, the support involves:



START AND GROW YOUR BUSINESS

- Start-up training courses throughout Switzerland for aspiring entrepreneurs, founders and start-ups
- Personalized start-up coaching programs to further develop businesses and ensure sustainable growth



START YOUR INNOVATION PROJECT

- Co-funding of innovation projects carried out jointly by research institutions and companies
- Innovation cheque: funding of preliminary studies and feasibility tests worth up to CHF 15,000



GO GLOBAL

- Internationalization camps for start-ups aiming to access international markets
- Participation in transnational calls for innovation projects
- Networking and advisory services from the Europe Enterprise Network EEN



BE CONNECTED

- Funding of 11 National Thematic Networks (NTN) in key innovation fields to boost the transfer of knowledge and technology
- Innovation mentoring for SMEs in order to find research partners, assess possible innovation projects and set up funding applications
- Support for specialized thematic events
- Support for publications and events to ensure dissemination of information about Innosuisse's innovation funding

#### Thematic programmes

- Financing and managing, in association with the Swiss National Science Foundation (SNSF) and the Swiss Federal Office of Energy (SFOE), the operation of eight Swiss Competence Centers in Energy Research (SCCER)
- Running the BRIDGE funding programme, in association with the SNSF, to close the gap between basic research and science based, market-oriented innovation

Innosuisse is the Swiss Innovation Promotion Agency. It is a federal entity under public law with a separate legal personality. Innosuisse's role is to promote science-based innovation in the interests of industry and society in Switzerland. For further information visit [www.innosuisse.ch](http://www.innosuisse.ch), [www.twitter.com/\\_Innosuisse](https://twitter.com/_Innosuisse), [www.linkedin.com/company/Innosuisse](https://www.linkedin.com/company/Innosuisse), [www.facebook.com/Innosuisse](https://www.facebook.com/Innosuisse).

# Swiss biotech patents: A history of quantitative and qualitative growth



Heinz Müller,  
Swiss Federal Institute  
of Intellectual Property



Christian Moser,  
Swiss Federal Institute  
of Intellectual Property

Switzerland has always been an important player in biotechnology and maintains its position amongst the leaders in the face of dynamic global developments. Since 2000, the Swiss biotech patent portfolio has grown significantly; in the first decade the focus was on quantity and thereafter the emphasis has been predominantly on quality. In 2017, half of the Swiss biotech patents qualified as world-class.

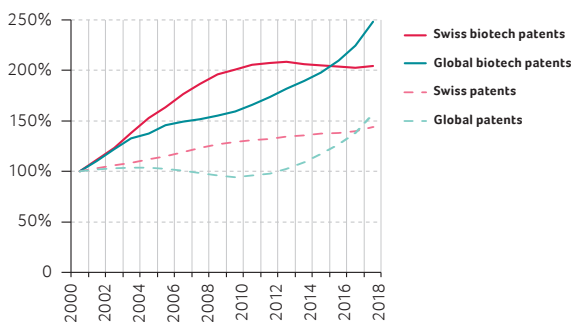
## Global versus Swiss patents

In 2017, approximately 290,000 or 2.6% of all active patent families worldwide related to biotechnology. The 66,000 active patent families of Swiss origin accounted for 0.6% of the global portfolio. This includes approximately 3,900 Swiss biotech patent families, representing 5.9% of the total Swiss portfolio. On this basis, the importance of biotechnology to the Swiss economy is substantially higher than it is globally.

Within the Swiss portfolio, nine other technology fields, including measurement, pharmaceuticals and medical technology, account for more patents than biotech. However, the biotech patents feature the highest average when it comes to 'quality per patent family', thus indicating that the Swiss biotech patents represent more economic value than the patent count suggests.

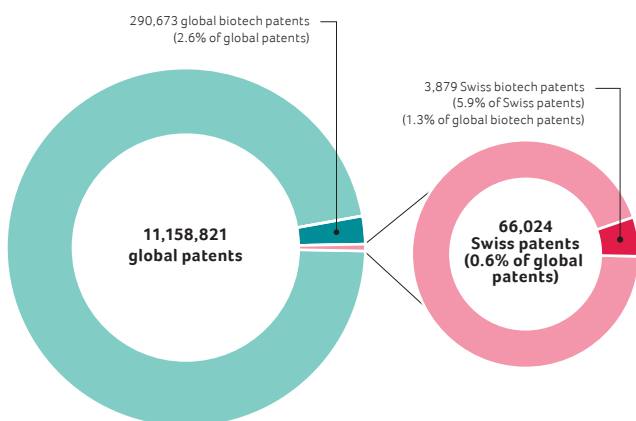
## Quantitative growth 2000 to 2017

Between 2000 and 2010, the number of all active patents worldwide remained largely constant at around seven million. From 2010 to 2017, however, the number rose to eleven million. The reason for this was that over the last 10 years there has been a massive surge in the number of Chinese patents across virtually all technology fields, including biotechnology. As a result, China has replaced the USA as the world's leading country of origin for numbers of biotech patents. The Swiss patent portfolio shows a modest yet constant increase in numbers over the 17-year period, resulting in a net growth similar to the global portfolio. The global biotech portfolio has grown faster and continuously as a consequence of substantial growth in North American and European countries during the first decade, and massive growth in China and South Korea starting around 2005.

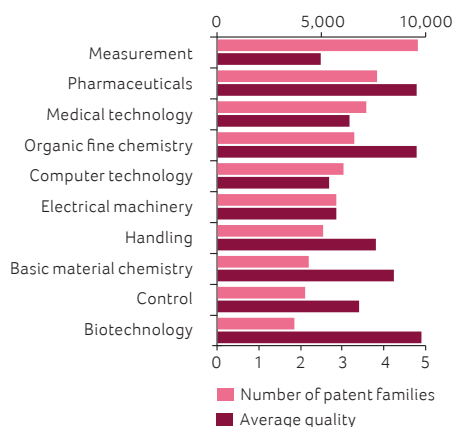


Growth by portfolio size

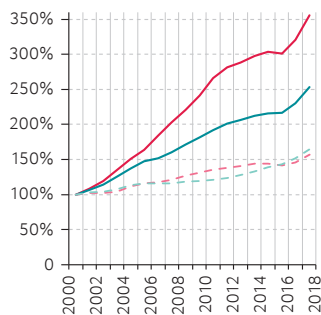
The growth curve of Swiss biotech patents looks different. After strong initial growth in the period 2000–2010, the number of Swiss biotech patents has remained largely constant in recent years. Not surprisingly, the biotech portfolios of North American and most European countries of origin show a similar profile. One reason may be that many companies, in particular the large ones, have consolidated their biotech patent portfolios during the past decade and are pursuing a patent strategy focused on quality rather than quantity.



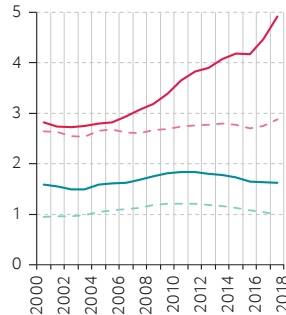
Share of Swiss biotech patents within the global patent portfolio



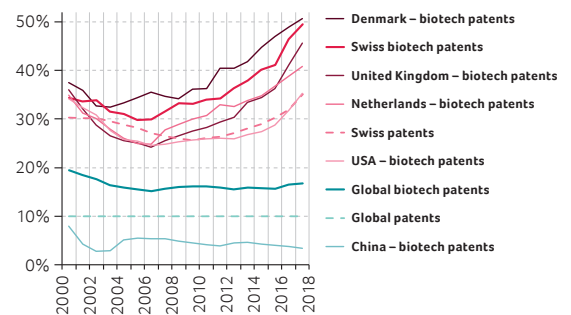
Swiss patents: Number versus quality of the top ten technology fields



Growth by portfolio value



Growth by average portfolio quality



Share of world-class patents within portfolio

## Qualitative growth 2000 to 2017

In contrast to the quantity of patents, the quality of patents provides a differentiated view of the value of a technology to a particular economy. The cumulated portfolio value, the average portfolio quality, and the percentage of world-class patents represent three distinct approaches to assessing and comparing the quality of patent portfolios.

PatentSight assigns quality parameters to each patent family. The Competitive Impact™ used in this report as quality indicator is the product of the parameters Technology Relevance™ relating to the number of citations received and the Market Coverage™ referring to the market size protected by the respective patent family. The Patent Asset Index™ represents the cumulated business value of a patent portfolio, calculated as the sum of the competitive impacts of the patents included therein<sup>3</sup>.

Over the past 17 years, all four patent sets (Swiss, Swiss biotech, global, global biotech) show a continuous increase in cumulated portfolio value. However, the growth rates differ significantly: overall global and overall Swiss portfolio values grew about 50% in the period 2000–2017 while the value of biotech portfolios grew much faster with the Swiss biotech portfolio registering a remarkable 350% growth in value over that period. In contrast, the average portfolio quality, i.e. the cumulated portfolio

value divided by the number of patents, remained largely constant for both global portfolios and the overall Swiss portfolio, albeit at different levels. Thus, none of these portfolios showed an improvement in average quality over time. In contrast, the value for the Swiss biotech patents has continuously increased over the last 15 years, reflecting sustained qualitative growth.

World-class patents are defined as the top ten percent of all patent families by business value<sup>1</sup>. By definition, the global portfolio constantly includes a share of 10% of world-class patents. The global biotech portfolio displays a slightly higher percentage, with little change over time. In contrast, both Swiss portfolios comprise a substantially higher percentage of world-class patents and this has been constantly increasing over the last 10 years. By 2017, over 30% of all Swiss patents and 50% of the Swiss biotech patents qualified as world class. Among the top 12 countries of origin for biotech patents, Switzerland ranks second after Denmark since 2003, followed by the United Kingdom and the Netherlands.

As with all high-tech sectors, the biotech sector strongly relies on patents as a means to protect its products. Accordingly, patent data and technology categorizations represent a reliable source of information. Biotechnology is one of 35 technology fields defined by the World Intellectual Property Organization (WIPO)<sup>2</sup>.

Note: The patent data were processed with the software PatentSight, based on patent families. A patent family condenses all patent documents relating to a specific invention, as defined by an initial priority application. Only active patent families, i.e. those in force or pending at a given point in time, are included in the evaluation. The country of origin for patents is determined via the inventor's addresses provided in the patent applications.

<sup>1</sup> Digitalisierungstechnologien in Patentaktivitäten. BAK Economics AG, 31.10.2017. Kurzstudie im Auftrag vom Staatssekretariat für Bildung, Forschung und Innovation SBFI, ISSN 2296-3847 [https://www.bak-economics.com/fileadmin/documents/reports/BAK\\_Economics\\_Digitalisierung.pdf](https://www.bak-economics.com/fileadmin/documents/reports/BAK_Economics_Digitalisierung.pdf)

<sup>2</sup> World Intellectual Property Indicators 2017. WIPO publication 9412\_017, ISBN: 978-92-805-2903-6; [http://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_941\\_2017.pdf](http://www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2017.pdf)

<sup>3</sup> The Patent Asset Index—A new approach to benchmark patent portfolios. Ernst, Holger, and Nils Omland. World Patent Information 33.1 (2011): 34-41. <https://www.sciencedirect.com/science/article/pii/S0172219010000864>

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 training courses on various aspects of intellectual property and tailor-made searches for trademarks and patent information, including strategic patent analyses involving patent quality parameters. For further information visit [www.ige.ch](http://www.ige.ch).

# NTN Swiss Biotech: Matchmaker for academia and industry



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



Michael Altorfer,  
CEO,  
Swiss Biotech Association

The ecosystem of Switzerland's biotech community is very robust. It has established the critical mass to compete internationally and it delivers innovative products and technologies which contribute strongly to a prosperous economy.

The opportunities offered by novel technologies require brokers, which support and organize the transfer of technologies from academia to absorptive companies. To enhance, strengthen and further leverage this transfer, two organizations – biotechnet Switzerland and the Swiss Biotech Association (SBA) – established the NTN (National Thematic Network) Swiss Biotech. This partnership has developed through different phases and configurations but always under programs sponsored by CTI/Innosuisse.

In its twentieth year, the SBA is supporting Swiss biotech companies across all development stages, including start-ups, clinical stage and profitable companies that offer novel therapies or innovative technologies.

biotechnet Switzerland is a network founded by academic institutions as well as research and technology organizations. biotechnet performs a bridging function by providing companies with access to a wide variety of high-caliber competencies. Over a period of almost 20 years, the biotechnet Switzerland has promoted more than 100 network projects between academic and industrial partners.

The strong position of Swiss universities in the life sciences sector has been, and continues to be, a huge asset and a source of

competitive advantage for the Swiss biotech industry. The effective collaboration and transfer of know-how, IP and new technologies from academia to industry partners has therefore been one of the key success factors in the Swiss biotech sector and one of the reasons that it has grown and broadened so strongly in the past two decades. The spin-out of new companies and licensing contracts enable academia to benefit from the successful industrial application of their inventions.

The Innosuisse funded NTN Swiss Biotech will formally cease activities by the end of 2018. The planned closure is part of the life-cycle concept that Innosuisse (CTI) installed for all National Thematic Networks back in 2012. Already today it is evident that the NTN Swiss Biotech has successfully broadened its member-base and achieved major tasks, such as the initiation of national and international innovation research projects and the set-up of member networking platforms.

Leaving the safe and well-resourced harbor of Innosuisse/CTI will be challenging but the importance of the close collaboration between academia and industry is well recognized, documented and enjoys broad support. The SBA and biotechnet are putting together a new package of joint activities which becomes operative in 2019 as National Innovation Network Swiss Biotech. The corner stones of the future partnership, which will aim at strengthening the competitiveness of the biotech ecosystem, include:

1. Combining core competences of absorptive companies with academic knowledge and practices
2. Concentrating knowledge and technologies around thematic platforms
3. Exploiting a broad range of collaboration formats with SMEs
4. Installing training programs to attract talents, improve relevant skills and know how
5. Exploiting the potential of novel technologies to generate new business models

This initiative will ensure that the benefits of the close collaboration between academia and industry can be captured effectively and will continue to boost the competitiveness of the Swiss biotech industry.

The Swiss Biotech Association (SBA), founded in March 1998, is the national industry association representing some 200 small and medium-sized enterprises active in all areas of biotechnology. By fostering optimal framework conditions, establishing national and international stakeholder networks and by disseminating the accomplishments of the biotech companies, the SBA aims to sustain the growth and competitiveness of this innovative industry sector. For further information visit [www.swissbiotech.org](http://www.swissbiotech.org).

biotechnet Switzerland is the network of Swiss and Austrian Universities of Applied Sciences (FHNW, HES-SO, ZHAW, MCI), the research institution CSEM, the Swiss Center for Regenerative Medicine at the University Hospital and University Zurich and the Competence Center Personalized Medicine UZH/ETH. It is the one-stop shop for innovation in technology where companies, especially small and medium-sized ones, can easily access relevant specialists for their development work. For further information visit [www.biotechnet.ch](http://www.biotechnet.ch).

# Biotech growth drives investment in Swiss production sites



Jan Lucht,  
scienceindustries

Alongside the global shift from classical chemical synthesis to biotech approaches in the production of active pharmaceutical ingredients, there has been strong expansion in the manufacturing capacities for recombinant proteins and biologics in Switzerland. This has all happened over the last two decades with attractive framework conditions helping to make the chemistry, pharma and biotech sector Switzerland's largest export industry.

In 1982, the first biotech drug, a human insulin developed by Genentech and Eli Lilly, was approved by the US Food & Drug Administration in the United States. Four years later in 1986, the first recombinant vaccine for humans (hepatitis B), the first biotech cancer drug (Interferon), and the first recombinant mAb (monoclonal antibody) against kidney transplant rejection received marketing authorization. The FDA approval of the first chimeric mAb (Rituximab, against B cell lymphoma) in 1997 jump-started the development of an ever-expanding range of mAbs for a variety of medical applications. More than 60 therapeutic mAbs are on the market now, with hundreds in the development pipeline. Biotechnology has transformed the way pharmaceutical ingredients are manufactured. It offers an alternative to the classical chemical synthesis of active compounds. Today, eight out of the ten top-selling prescription drugs are products of biotechnology. This trend has shaped the global healthcare landscape and of course the manufacturing environment in Switzerland.

As in other European countries, the development of the healthcare biotechnology sector in Switzerland started in the second half of the 1990s; almost two decades later than in the USA. However, public and private research and development, as well as biotech manufacturing facilities, quickly caught up. Today, Switzerland is one of the central players on the global healthcare biotechnology landscape.

## Developing infrastructure in Switzerland

One of the first major biotech production sites planned for Switzerland was the Ciba-Geigy Biotechnikum. Back in 1991 it met with such political and public opposition in Basel that the company decided to build the facility close by in the French town of Huningue. Now owned by Novartis, the site has been regularly expanded and several biotech-based active pharmaceutical ingredients (APIs) are produced there. When the current expansion round is completed in 2018/19, the site will be one of the world's largest biotech production sites.

In 1999, Serono opened its Biotech Center at Vevey, canton Vaud, for the production of Rebif®, an interferon for the

treatment of multiple sclerosis. Now part of the Merck Group, the Biotech Center was enlarged in 2008-2010. The company invested about EUR 300 million to meet the growing global demand for therapeutic antibodies such as Erbitux®, used in the treatment of several cancers, and for a range of biosimilars. With further expansions at its sites in Vevey and Aubonne, Switzerland is now the most important country for the production of biopharmaceuticals within the Merck Group.

Roche, the world's largest biotech company, relies on a global network of manufacturing sites for biopharmaceuticals. In 2004, the company decided to invest about CHF 400 million in the construction of a modern production site for a variety of monoclonal antibodies (mAbs) at the company's Basel headquarters. This opened in 2007. In 2013, Roche invested a further CHF 190 million to build a state-of-the-art facility in Basel for the production of antibody-drug conjugates. This highlights the faith Roche has in the role of these treatments in future medical practice and its commitment to the Basel site.

In 2014, global biopharmaceutical company UCB opened its first industrial-scale biotechnology production center in Bulle, canton Fribourg, one of the largest and most modern sites in Europe. It was built with an investment of about CHF 300 million and was completed in just 30 months. The facility manufactures Cimzia® TNF-blocker (mAb) for the treatment of immunological diseases. In 2015, CSL Behring started construction of a new biotech plant in Lengnau, canton Bern. The final investment will be about CHF 1 billion and the new plant is scheduled to produce recombinant coagulation factors to treat hemophilia starting in 2020. Another recent large-scale construction project is Biogen's next-generation biologics manufacturing facility in Luterbach, canton Solothurn. Work started in 2016 with an investment of approximately CHF 1.5 billion. The plant is due to come on stream in 2019. >> [page 17](#)

When deciding on the location of a new biotech manufacturing plant, Switzerland offers some key advantages that are cited again and again by key players: modern infrastructure, stable political system, liberal labor legislation, and constructive industrial relations. On top of this, the Swiss educational system offers excellent vocational and educational training and provides a highly-qualified and motivated workforce.

## Manufacturing flexibility and speed to market

Switzerland is much more than just an interesting location for the production of recombinant therapeutic proteins. It offers many years' experience in the chemical, pharmaceutical and biotech sectors and a large pool of skilled experts. There is also a willingness to explore new paths and to combine complementary methods from different fields in a flexible way. This allows for new and more adaptable approaches to the manufacturing of active pharmaceutical compounds.

A case in point is the new strategic partnership between Lonza and Sanofi announced in 2017. It combines Lonza's expertise in large-scale mammalian cell culture facilities with Sanofi's strength in developing and launching biologics-based treatments. The collaboration will establish a large-scale facility for monoclonal antibody production at the Lonza site in Visp, canton Valais. Construction started in September 2017 with an initial investment of CHF 290 million. The facility is expected to be fully operational by 2020.

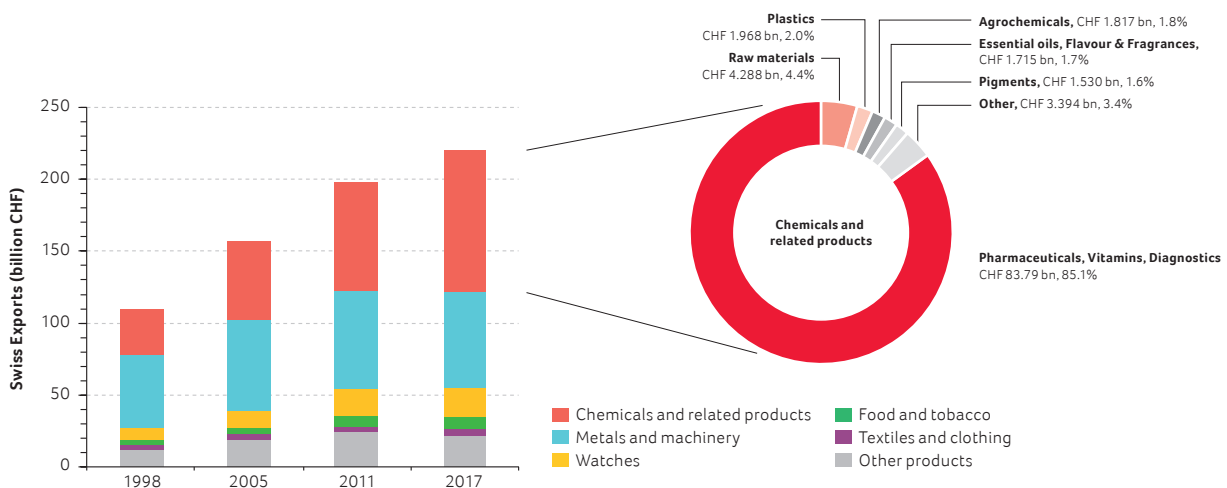
The flexible arrangement is a win-win situation for both companies. The sharing of production capacity will give Sanofi access to additional biomanufacturing capacity if required, to react quickly to fluctuations in demand. For its part, Lonza will profit from marketing its share of capacity as well as any unused Sanofi capacity. This allows Lonza to respond to growing own-customer demand for therapeutic protein manufacturing capacity. This flexible allocation of resources will also help to optimize biologics production capacity across the industry as a whole.

The build-up of mammalian cell culture capacity at Lonza is part of a new, integrated biologicals concept. This provides for a modular, technology-independent, development and manufacturing complex that is capable of supporting activities across multiple technologies; mammalian, microbial, cellular or bio-conjugate, and from late discovery to manufacture. The flexible design makes it possible to offer tailor-made solutions

to meet customer's rapidly evolving needs. The responsiveness and the adaptability of the biomanufacturing complex is further enhanced by its integration into the Lonza site at Visp. Key features include a long track record in the use of various manufacturing technologies, a highly qualified workforce, and an established service network. The modular complex is expected to reduce time-to-market by 12 months or more. This gives customers a decisive competitive advantage and significantly decreases the risks surrounding major strategic investment decisions.

### Life sciences' major contribution to Swiss exports

In 2017, exports from the Swiss chemistry, pharma and biotech sector amounted to CHF 98.5 billion. Over the last 20 years, the sector's proportion of total exports has steadily increased from 28.7% in 1998 to 44.7% in 2017. In 2009, it became Switzerland's largest export industry (see figure below). While total Swiss exports increased by 102% from CHF 109.1 billion to CHF 220.4 billion over the last two decades, the contribution of the life sciences subsector (pharmaceuticals, vitamins and diagnostics, with a significant proportion of biopharmaceuticals and biotech products) soared by 355% from CHF 18.4 billion to CHF 83.8 billion. In 2017, the life sciences industry exports grew by 4.3% and contributed 85.1% of the total exports of the chemistry, pharma and biotech sector. Given current investment in production capacities for biopharmaceuticals in Switzerland, further export growth can be expected in the coming years.



Swiss export statistics according to industry sector demonstrate the lead of the chemistry, pharma and biotech industry (scienceindustries/Federal Customs Administration 2018)

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).

# Biogen locates largest plant in Luterbach



Markus A. Ziegler,  
Director Corporate Affairs,  
Biogen



Interviewed by:  
Liv Minder,  
Director Investment Promotion,  
Switzerland Global Enterprise (S-GE)

One of the pioneers in biotechnology, Biogen, is building its next-generation biologic manufacturing facility in Luterbach, Switzerland. It will be the company's largest production site; fully automated and around four times more productive than existing facilities.

Biogen was founded in Geneva in 1978 by a group of leading international researchers in the field of biotechnology. These included the Swiss researcher Charles Weissmann. Two founding members, Walter Gilbert (chemistry) and Phillip A. Sharp (medicine), were later awarded the Nobel Prize. The company moved its headquarters to Cambridge, Massachusetts USA in 1982. In 2004, there was a return to Switzerland. The interna-

tional headquarters moved from Paris to Zug, where it has grown to employ over 400 people. Ten years after this return, the first location inquiry for the new Biogen manufacturing facility was made via the S-GE location promotion organization. S-GE then launched and coordinated an application process for interested Swiss cantons.

**In December 2014, we received a request from Biogen to find a suitable location for a production facility in Switzerland. The goal was to begin production in 2019. This allowed four years for the selection and acquisition of the land, the planning procedures including all permits, and the construction and commissioning of the plant. These were, and still are, very challenging requirements. How far along is Biogen with the project now, and has it been possible to meet these ambitious requirements?**

Despite various challenges that naturally arise in a project of this size, we're currently still on track at all levels.

## Why is timing so important?

Timing is crucial for Biogen both in an entrepreneurial and medical sense. Biogen wants to produce enough biopharmaceutical products to serve one million people as soon as possible. The drugs help to delay illnesses, extend life and, in the best case, even provide a cure.



Biogen's biologic manufacturing facility – From the outside

Source: [www.biogen-solothurn.ch](http://www.biogen-solothurn.ch)

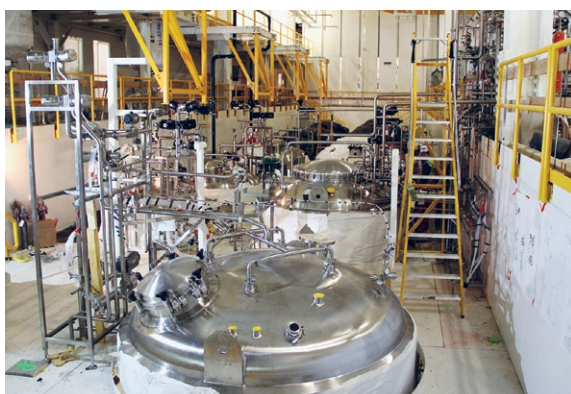


**What were the crucial factors in the selection of Switzerland, and more specifically Luterbach in Solothurn, as a location?**

The decision was based on a structured selection process that took in various locations worldwide. First of all, the figures had to be right and a possible industrialized country had to be found. Infrastructure such as electricity and water had to be available, as did the supply of local talent. However, time was of the essence here as well. Switzerland managed to quickly bring a selection of top industrial areas to the table. It was also able to comprehensibly demonstrate how the approval process and planning could be completed in time, including construction. It came out on top over the other global applicants.

**What's the current status of the project: How far along are you with the construction work and will operation begin according to plan?**

To enable production to begin according to plan in 2019, there are currently more than 1,500 people on the site each day carrying out construction work, installing equipment and getting everything ready for operation. The first parts of the plant have already begun operation and are currently undergoing intensive testing.



Source: [www.biogen-solothurn.ch](http://www.biogen-solothurn.ch)

**Fermenter installations in Biogen's biologics manufacturing facility**

**The construction of the facility is expected to provide positive economic impetus, especially in the Solothurn region. Are there already signs of this?**

A study by the economic research institute BAK Economics shows that the project has generated a gross value added of around CHF 800 million in Switzerland. This involves around 2,000 jobs. Local industry also benefits from the project: for example, around 1,700 nights of accommodation have been booked. For the operational phase beginning in 2019, the economists at BAK predict that the canton's gross domestic product has the potential to grow by 1.5 to 2.0%.

**The project will create around 600 new jobs. How is recruitment being carried out in a time of skill shortages?**

Regardless of location, recruiting 600 skilled people is a challenge. Biogen is considered to be an attractive employer and this is confirmed again and again by external institutes. The prospect of joining a pioneer in neuroscience with a promising product pipeline and the opportunity to develop a production facility almost from the ground up makes Biogen a highly attractive package for potential candidates. Recruitment is going according to plan and more than 130 people are already working for Biogen in Luterbach. Around 15 to 20 new employees are joining them every month and there are currently over 40 jobs available on our [biogen-solothurn.ch](http://biogen-solothurn.ch) website.

**Biogen**

Through cutting-edge science and medicine, Biogen discovers, develops and delivers innovative therapies for people living with serious neurological, autoimmune and rare diseases. Biogen is one of the world's oldest independent biotechnology companies and worldwide, patients benefit from its leading multiple sclerosis and innovative hemophilia therapies. Today Biogen employs 7,500 people in 30 countries. [www.biogen.com](http://www.biogen.com)

Switzerland Global Enterprise (S-GE) works all over the world to support entrepreneurs and promote Switzerland as a business location. In its role as a center of excellence for internationalization the agency's mission 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, with a global network of experienced advisers and experts, is a strong and trusted partner for its clients, the cantons and the Swiss government. For further information visit [www.s-ge.com](http://www.s-ge.com), [www.s-ge.com/handbookforinvestors](http://www.s-ge.com/handbookforinvestors), [www.s-ge.com/invest-biotech](http://www.s-ge.com/invest-biotech), [www.s-ge.com/innovation](http://www.s-ge.com/innovation), [www.s-ge.com/company-foundation](http://www.s-ge.com/company-foundation).

# Retrospective: Biotech listings on SIX Swiss Exchange



Christian Fehr,  
Relationship Manager,  
Primary Markets,  
SIX Swiss Exchange

An IPO is a veritable option for funding biotech companies. This has been proven by the successful listing of a number of companies on SIX Swiss Exchange in the past two decades.

The success of Lonza going public in 1999 paved the way for the Actelion listing on SIX Swiss Exchange in the following year. Actelion pioneered biotech company listings and it became the largest European pure-play listed biotech firm over time. In 2016, the Actelion success story culminated in a USD 30 billion takeover bid by Johnson & Johnson.

Today, SIX Swiss Exchange is one of the leading biotech exchanges in Europe and it hosts the highest capitalized European biotech company. Things started to take off following the Cytos (now Kuros Biosciences) IPO in 2002. In the period 2004 to 2007, SIX Swiss Exchange welcomed four new biotech companies: Basilea, Santhera, Newron and Addex. And it was also around this time that the SXI Bio+Medtech Index was created, underpinning the strong commitment of SIX Swiss Exchange to the biotech sector.

After the listing of Evolva and Mondobiotec (now Relief Therapeutics) in 2009, there was something of a break in biotech listings and then Molecular Partners in 2015 heralded a new era. The most recent listing was Idorsia, the company spun off as a contribution-in-kind to the former shareholders of Actelion. It was listed in the summer of 2017.

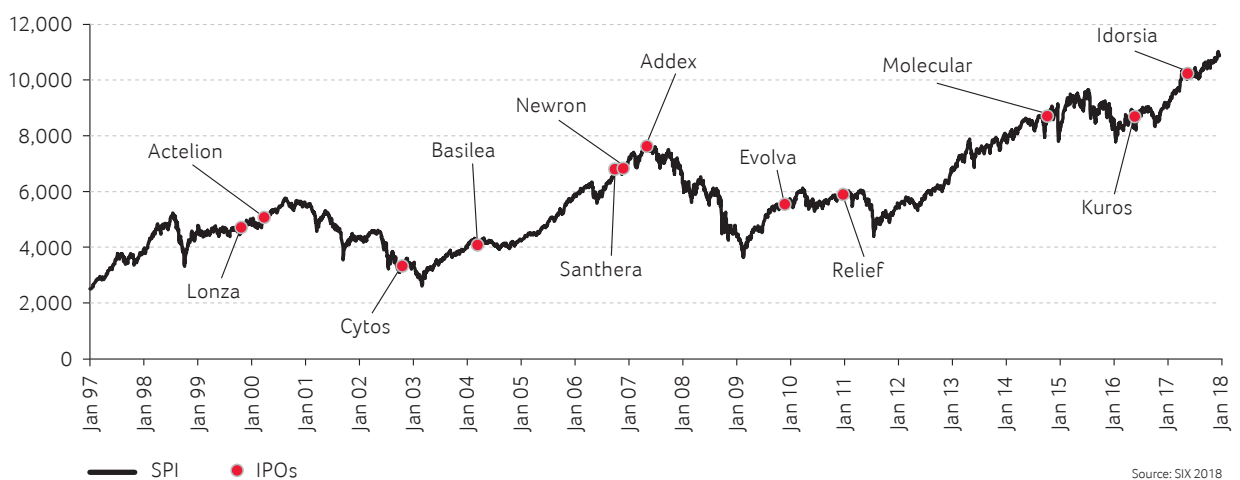
In summary, a dozen biotech companies listed in the time-frame and they aggregated a market capitalization of around CHF 25 billion at year-end 2017. There have been other impressive examples of listed companies in the space, which are not counted in this number. For instance Cosmo, which over time developed from its biotech origins into more of a pharmaceutical company.

The prominent global pharmaceutical players Novartis and Roche feature in the issuer base of SIX Swiss Exchange and they lay the foundation for a well-diversified peer group whose strong appeal reaches far beyond Switzerland's borders. It therefore comes as no surprise that SIX Swiss Exchange ranks as Europe's most important life science exchange and leading biotech listing location.

*“It’s very important for Idorsia to be quoted on the same stock exchange as big companies such as Novartis, Roche but also Lonza, many suppliers and many companies involved in biotech.”*

*Jean-Paul Clozel, CEO Idorsia*

Switzerland's capital-rich investor base, powerful banking system and its industry expertise make up the country's dynamic life sciences ecosystem. This allows companies to efficiently raise capital with a view to driving scientific discovery through to market launch. The Lonza experience (see quote) is proof of this as are the other SIX-listed biotech companies which raised more than CHF 200 million equity capital in 2017.



## Biotech IPOs on SIX Swiss Exchange: that makes a dozen

Note: Only companies classified as “biotechnology” according to the Industry Classification Benchmark (ICB) subsector 4573 (biotechnology) as of February 2018 are listed above. Any predecessor companies or companies that ceded their activities have not been considered.

*“Successful IPOs and capital raised in 2017 confirm the deep pools of capital available in Switzerland. For example, Lonza raised over CHF 3.1 billion in two capital increases which marked the largest equity funding by a SIX Swiss Exchange listed non-financial corporate last year.”*

*Thomas Zeeb, Head Securities and Exchanges SIX Swiss Exchange*

### How SIX Swiss Exchange supports listed biotech companies

Achieving trading liquidity and adequate analyst coverage has become more challenging given the increase in regulations. As a result, listed biotech companies need to recognize that these are important issues and address them accordingly. Alongside other initiatives, the SIX Swiss Exchange Stage Program provides the means for doing so.

One of the most important reasons for listing on an exchange is the facilitated access it gives to the capital market and therefore to growth capital. However, to use capital markets effectively, a company needs to have a minimum volume of trading liquidity. Shares of small and medium-sized companies are often less liquid for a variety of reasons.

SIX Swiss Exchange offers several services and initiatives such as the Stage Program to support companies in the process of building their presence in the market and achieving an appropriate valuation. Companies benefit from a regularly updated factsheet and research reports prepared by experienced partners and can thus reach a larger number of capital market participants.

*“We were the first company to join the Stage Program in 2016 and have noted increased investor awareness and interest due to the additional analyst coverage, since.”*

*Stefan Weber, CEO Newron*

Through SIX Swiss Exchange, companies also gain access to statistics and services that facilitate the “Being Public”. To guarantee the independence of the reports and strengthen the trust of investors in the research, no contractual relationship exists between the listed company and the research provider. SIX Swiss Exchange acts as a link between the two. In addition, a research committee has been set up to ensure the interests of the different parties are taken into account. It is an advisory body to SIX Swiss Exchange.

#### The Stage Program Services

	Light	Standard	Premium	Deluxe
<b>Information, Education &amp; Network</b> by SIX Swiss Exchange	✓	✓	✓	✓
<b>Factsheet</b> by Morningstar	✓	✓	✓	✓
<b>Research Coverage</b> by Baader Helvea, Bank Vontobel, Zürcher Kantonalbank	X	by one bank ✓	by two banks ✓	by three banks ✓

SIX Swiss Exchange  
SIX Swiss Exchange is one of the most important European stock exchanges. It offers outstanding liquidity in trading of Swiss securities and connects companies from around the world with international investors and trading participants. As a self-regulated exchange, it is able to provide particularly market-friendly conditions for listing and trading in Swiss and foreign equities, bonds, ETFs, ETPs, funds, and structured products. SIX Swiss Exchange multiplies the locational advantages of the Swiss financial center with first-class services and is an ideal listing location for companies of every origin, size and sector. It operates its own range of indices, which includes the SMI®, Switzerland’s most important equity index. For further information visit [www.six-swiss-exchange.com](http://www.six-swiss-exchange.com) and [www.six-structured-products.com](http://www.six-structured-products.com).

## Year in review:

### Selection of events in 2017

#### January 2017

License agreement	NovImmune	NovImmune granted Tiziana an exclusive license to NI-1201, an anti-IL-6R monoclonal antibody for the treatment of autoimmune and inflammatory diseases.
Study results	Xigen	Xigen's Brimapitide, an innovative JNK inhibitor, delivered positive Phase 2 results in inflammatory eye disease.
Collaboration agreement	Anokion	Anokion announced exclusive strategic collaboration with Celgene to develop novel tolerance-inducing therapeutics for autoimmune diseases.
CE Mark	Abionic	Abionic received CE Mark for most rapid sepsis and iron deficiency point of care diagnostics.
Collaboration agreement	Ferring	Ferring partnered with Intralytix to develop bacteriophage treatments for conditions associated with the microbiome and drug-resistant bacteria.
Market approval	Debiopharm Group™	Debiopharm Group's Triptorelin 6-month formulation received approval for the treatment of central precocious puberty (CPP) in Europe.
Preclinical study results	Addex Therapeutics (ADXN)	Addex ADX71441 demonstrated statistically significant efficacy in a highly translational preclinical model of chronic osteoarthritis pain.
Study results	Debiopharm Group™	Debiopharm International announced positive Phase 2 clinical trial with Debio 1450 in ABSSSI patients.
ISO Certification	ProteoMediX	ProteoMediX received ISO 13485:2012 certification.
Study completion	ObsEva (OBSV)	ObsEva announced completion of Phase 1 first-in-women study of OBE022 for the treatment of preterm labor.
Acquisition	Cilatus Biotech AG	Malin acquired Swiss biotech company Cilatus BioPharma.
Financing	ObsEva (OBSV)	Women's health biotech company ObsEva set terms for USD 87 million IPO.
Study results	Actelion (ATLN)	Actelion announced results of the MAESTRO study with macitentan in patients with PAH due to Eisenmenger Syndrome which did not meet the primary endpoints.
Acquisition	Actelion (ATLN)	Johnson & Johnson to acquire Actelion for USD 30 billion with spin-out of new R&D company.
Patient enrollment	Auris Medical	Auris Medical resumed enrollment in TACTT3 Phase 3 trial of Keyzilen in acute and post-acute tinnitus.

#### February 2017

Financing	Lonza (LONN)	Lonza successfully placed CHF 5.0 million new shares, raising gross proceeds of CHF 865 million.
Research grant	Addex Therapeutics (ADXN)	Addex awarded USD 835,000 grant from Michael J. Fox Foundation to advance TrkB PAMs for the treatment of Parkinson's Disease.
Product development	Auris Medical	Auris Medical expanded clinical development pipeline with intranasal betahistine for the treatment of Meniere's Disease and vestibular vertigo.
Financing	Prexton Therapeutics	Prexton Therapeutics Series B financing round raised EUR 29 million (USD 31 million) to advance its novel Parkinson's therapeutic.
Research grant	GeNeuro (GNRO)	GeNeuro signed CRADA agreement with NIH to develop novel antibody treatment for ALS.
Financing	Glycemicon	Glycemicon raised CHF 3.25 million in Series A closing and appointed three new BoD members
Patient enrollment	Anergis	Anergis completed patient recruitment in large-scale ATIBAR trial with ultra-fast allergy immunotherapy AllerT.
Research grant	Polyphor	Polyphor received CHF 2.3 million award from Wellcome Trust to accelerate the development of a novel antibiotic drug class.
Financing	Santhera Pharmaceuticals (SANN)	Santhera successfully placed CHF 60 million senior convertible bonds.
Collaboration agreement	Vifor Pharma	Vifor Pharma and ChemoCentryx announced expansion of Avacopan agreement for rare renal diseases.
License agreement	Helsinn Group	Mundipharma and Helsinn expanded exclusive licensing and distribution agreements for leading anti-emetic products in Middle East, Africa, Latin America and Indonesia.
Financing	BioMedPartners	BioMedpartnered raised CHF 75 million in first closing of their new healthcare venture fund.

Market approval	Leman Micro Devices	World's first medically-accurate health monitoring system integrated in a smart-phone now readied for FDA approval by Leman Micro Devices.
Patent issued	MetrioPharm	MetrioPharm expanded patent protection for its lead compound MP1032 to Japan.
Study initiation	Neurimmune	BIIB076 moved into Phase 1 for Alzheimer's disease.
Financing	Auris Medical	Auris Medical announced closing of USD 10 million public offering.
Fast Track	Auris Medical	Auris Medical received FDA Fast Track Designation for AM-111 in acute sensorineural hearing loss.
Designation		
Market approval	Celgene International	REVLIMID® (Lenalidomide) approved by the European Commission as monotherapy for the maintenance treatment of patients with newly diagnosed multiple myeloma after autologous stem cell transplantation.
Facility expansion	Lonza (LONN)	Sanoï and Lonza entered into a strategic partnership to establish a large-scale biologics production facility in Visp.
Financing	Addex Therapeutics (ADXN)	Addex raised CHF 3.0 million through private placement of treasury shares and extended cash runway through 2018.
Study initiation	AC Immune (ACIU)	AC Immune partner Genentech started second Phase 3 clinical trial for Alzheimer's therapy crenezumab.
<b>March 2017</b>		
CTI label received	Dorphan Polyneuron Pharmaceuticals	The Swiss Commission for Technology and Innovation has awarded Dorphan and Polyneuron Pharmaceuticals the CTI label. Dorphan is focusing on treating rare diseases, and Polyneuron focuses on treatments for autoimmune disorders.
Financing	GenKyoTex (GKTX)	Listing at EURONext through reverse merger with Gentical.
Market approval	Actelion (ATLN)	Actelion obtained "Epoprostenol ACT" label extension for pediatric PAH patients in Japan.
Collaboration agreement	BioVersys	BioVersys and Aptuit announced collaboration to identify novel approaches to treat serious infections from gram-negative pathogens.
Market approval	Actelion (ATLN)	Actelion was granted marketing authorization by the European Commission for Ledaga (chlormethine gel) for the treatment of MF-CTCL.
Study initiation	ObsEva (OBSV)	ObsEva started Phase 3 clinical program for nolasiban in ART.
Research grant	BC Platforms	BC Platforms participated in Horizon 2020 Programme designed to facilitate research to prevent sudden cardiac arrest.
Study results	MetrioPharm	MetrioPharm announced positive top line results from a Phase 2a study in moderate-to-severe psoriasis with its oral lead compound MP1032.
Distribution/marketing agreement	Novigenix	Novigenix signed distribution agreement with Dr Risch Medical Laboratory to access Swiss German market for Colox®, its blood based colorectal cancer test.
Financing	Evolva (EVE)	Evolva secured equity financing of up to CHF 30 million and provided further preliminary financials for 2016.
Financing	Relief Therapeutics	Relief Therapeutics completed a new round of financing.
Collaboration agreement	Numab Therapeutics	Numab and Ono Pharmaceutical entered into a research and option agreement. Numab to receive up to CHF 258 million plus tiered royalties on sales.
Patent issued	CRISPR Therapeutics (CRSP)	CRISPR Therapeutics announced European Patent for CRISPR/Cas gene editing.
Financing	Versantis	Versantis raised CHF 4.4 million in Series A financing to advance new generation of liver disease medicines.
Financing	Auris Medical	Auris Medical announced receipt of Nasdaq notice of bid price deficiency.
<b>April 2017</b>		
FDA Breakthrough Therapy Designation	A2B Bio	A2B's Tadekinig alfa therapy received Breakthrough Therapy Designation from the US Food and Drug Administration (FDA) for the treatment of monogenic, Interleukin-18 associated autoinflammatory conditions with ongoing systemic inflammation.
Financing	Inofea	Basel based start-up INOFEA successfully closed its financing round with contributions from returning as well as new private investors.
Study initiation	Asceneuron	Asceneuron received regulatory approval for Phase 1 healthy volunteer study of oral tau inhibitor.
Financing	Polyphor	Polyphor announced closing of CHF 40 million private financing round.
Patent appeal	CRISPR Therapeutics (CRSP)	CRISPR Therapeutics, Intellia Therapeutics, Caribou Biosciences and ERS Genomics announced appeal of CRISPR/Cas9 U.S. Patent Board decision.
Study initiation	GeNeuro (GNRO)	GeNeuro initiated Phase 2a study with GNbAC1 in type 1 diabetes in Australia.
FDA agreement	Basilea Pharmaceutica (BSLN)	Basilea announced agreement with FDA on Special Protocol Assessments for antibiotic ceftobiprole Phase 3 clinical studies in bloodstream and skin infections.
Study results	Auris Medical	Auris announced key results from AMPACT2 (AM-101 in the post-acute treatment of peripheral tinnitus 2), the open-label extension study of the Phase 3 TACTT3 clinical trial.
Study initiation	ObsEva (OBSV)	ObsEva initiated Phase 3 clinical program for OBE2109 in uterine fibroids.

Collaboration agreement	InSphero	InSphero announced agreement with Pfizer to develop novel assays for predicting drug-induced liver injury.
Orphan Drug Designation	PIQUR Therapeutics	PIQUR received EMA Orphan Drug Designation for PQR309 in diffuse large B-cell lymphoma.
Study results	Amazentis	Amazentis announced successful Phase 1A/1B study results in healthy elderly subjects with the food metabolite Urolithin A.
<b>May 2017</b>		
Distribution agreement	Santhera Pharmaceuticals (SANN)	Santhera signed distribution and supply agreement for Raxone® (idebenone) with Pharmathen for Greece and Cyprus.
Study approval	GenKyoTex (GKTX)	Genkyotex announced FDA approval of IND for Phase 2 trial of GKT831 in patients with primary biliary cholangitis.
Collaboration agreement	InSphero	InSphero announced collaboration with NIH National Center for Advancing Translational Sciences (NCATS).
Collaboration agreement	Vaximm	VAXIMM announced collaboration with Merck KGaA and Pfizer to evaluate combination of VXM01 with Avelumab in glioblastoma and colorectal cancer in Phase 1/2 clinical studies.
Financing	BC Platforms	BC Platforms closed USD 10 million Series B financing led by Debiopharm and Tesi to accelerate knowledge platform development.
Market approval	Santhera Pharmaceuticals (SANN)	Scottish Medicines Consortium approved Santhera's Raxone® (idebenone) for restricted use in patients with LHON within NHS Scotland.
Patient enrollment	Molecular Partners (MOLN)	Molecular Partners' strategic partner Allergan completed patient recruitment in both abicipar pegol nAMD Phase 3 studies.
Facility expansion	Selexis	Selexis opened new world-class laboratory facility and corporate headquarters in Geneva, Switzerland.
Research grant	CRISPR Therapeutics (CRSP)	CRISPR Therapeutics and collaborators at the University of Florida awarded Target ALS Grant to develop CRISPR/Cas9-based approaches for ALS.
Study completion	ObsEva (OBSV)	ObsEva announced the completion of a Phase 1 drug-drug interaction study with OBE022.
Product development	Polyphor	Polyphor announced successful end of Phase 2 meeting with FDA for Murepavadin in nosocomial pneumonia.
Financing	Virometix	Virometix closed financing round.
Acquisition	Debiopharm Group™	Debiopharm International entered the field of antibody-drug conjugates through acquisition of Phase 2 asset from ImmunoGen.
Research grant	AC Immune (ACIU)	New funding from The National Institute on Aging (NIA), part of the National Institutes of Health, for Alzheimer's disease prevention trial, using crenezumab as investigative drug.
Study results	Molecular Partners (MOLN)	Molecular Partners provided additional details on clinical studies of proprietary lead oncology asset MP0250.
Financing	Addex Therapeutics (ADXN)	Addex increased issued share capital and creates treasury shares.
Financing	Inthera	Inthera Bioscience raised CHF 10.5 million in Series A financing round.
<b>June 2017</b>		
Study results	Basilea Pharmaceutica (BSLN)	Basilea announced updates on the ongoing clinical Phase 1/2 a program with its anticancer drug candidate BAL101553 at the American Society of Clinical Oncology (ASCO) annual meeting.
Study completion	ObsEva (OBSV)	ObsEva announced the completion of a Phase 1 PK/PD clinical trial evaluating different doses of OBE2109 and add-back therapy.
Capacity expansion	Becton, Dickinson and Company	BD opened new innovation and engagement center at its European headquarters in Switzerland.
Capacity expansion	Biopôle	Biopôle announced Startlab, tailor-made incubator for life science entrepreneurs.
Market access	EffRx Pharmaceuticals	EffRx Pharmaceuticals: Osteoporosis patients in Germany and Russia get access to Binosto®.
Study update	Actelion (ATLN)	Actelion provided an update on the Phase 3 IMPACT program with cadazolid in CDAD.
Financing	Idorsia (IDIA)	Publication of Idorsia's prospectus relating to the listing of Idorsia Ltd on SIX Swiss Exchange.
Collaboration agreement	Basilea Pharmaceutica (BSLN)	Basilea announced clinical study agreement with Adult Brain Tumor Consortium to explore BAL101553 in newly diagnosed glioblastoma.
Collaboration agreement	Numab Therapeutics	Numab and Kaken Pharmaceutical Co. entered into a collaboration and option agreement.
Research grant	Basilea Pharmaceutica (BSLN)	Basilea awarded USD 54.8 million of additional funding by BARDA to support Phase 3 development of ceftobiprole.
Acquisition	Selexis	JSR Life Sciences acquired pioneering cell line developer Selexis and integrated Selexis with KBI Biopharma, Inc.

Marketing/distribution agreement	Basilea Pharmaceutica (BSLN)	Basilea announced distribution agreement with Avir Pharma for Cresemba® (isavuconazole) and Zevtera® (ceftobiprole) in Canada.
Acquisition	Actelion (ATLN)	Johnson & Johnson completed acquisition of Actelion.
Study results	ADC Therapeutics	ADC Therapeutics presented first clinical data from its novel antibody-drug conjugate ADCT-402 at the international conference on malignant lymphoma.
Patent issued	CRISPR Therapeutics (CRSP)	CRISPR Therapeutics announced patent for CRISPR/Cas genome editing in China.
Patient enrollment	GeNeuro (GNRO)	GeNeuro announced first patient treated in Phase 2a study with GNBAC1 in type 1 diabetes.
Positive opinion	Santhera Pharmaceuticals (SANN)	Santhera's Raxone® received first positive EAMS scientific opinion from UK's MHRA in Duchenne Muscular Dystrophy.
Study initiation	GenKyoTex (GKTX)	Genkyotex announced investigator-initiated Phase 2 clinical trial to evaluate 48-week treatment with GKT831 in patients with type 1 diabetes and kidney disease.
<b>July 2017</b>		
Patient enrollment	Auris Medical	Auris Medical completed enrollment of Phase 3 HEALOS trial of AM-111 for the treatment of sudden deafness.
Collaboration agreement	TargImmune Therapeutics	Race Oncology and TargImmune Therapeutics to form joint venture called Race Immunotherapeutics.
Study initiation	Prexton Therapeutics	Prexton announced initiation of Phase 2 clinical testing in Parkinson's disease.
Orphan Drug Designation	Versantis	Versantis received FDA Orphan Drug Designation.
Collaboration agreement	NovImmune	Novimmune and Shire signed license agreement deepening bispecific antibody research collaboration.
Milestone achievement	Polyphor	Polyphor achieved ahead of schedule first milestone from Wellcome Trust for the development of novel antibiotics against Gram-negative multidrug-resistant pathogens.
Acquisition	Auris Medical	Auris Medical completed acquisition of AM-125 assets.
License agreement	Basilea Pharmaceutica (BSLN)	Basilea announced completion of the license agreement with Pfizer for antifungal Cresemba® for Europe, Russia, Turkey and Israel.
Orphan Drug Designation	Polyneuron Pharmaceuticals	Polyneuron Pharmaceuticals received EMA orphan drug designation.
Patient enrollment	Galderma	Galderma announced enrollment of first patient in Phase 2b nemolizumab trial in atopic dermatitis.
Study results	Idorsia (IDIA)	ACT-541468 (DORA) meets primary endpoint in Phase 2 program in adult and elderly patients with insomnia.
<b>August 2017</b>		
Patient enrollment	Helsinn Group	Helsinn Group and MEI Pharma announced first patient dosed in pivotal Phase 3 study of pracinostat and azacitidine in acute myeloid leukemia.
Collaboration agreement	Saphetor	Saphetor and Supratech leverage genome scale analyses to facilitate precision oncology treatments.
Preclinical study results	GenKyoTex (GKTX)	Genkyotex's GKT831 shown to delay tumor growth in multiple preclinical models by targeting cancer associated fibroblasts.
Financing	Vicarius Pharma	Newly launched Vicarius Pharma secured CHF 21 million financing.
Collaboration agreement	Biosynth	Tel Aviv University announced collaboration with Biosynth on pioneering chemiluminescent reporter molecules.
Study initiation	Cellestia	Cellestia entered clinical development for its lead compound CB-103, a new mode of action anticancer drug targeting NOTCH positive cancers.
Financing	Aurealis Pharma	Aurealis announced CHF 5.6 million Series A financing to advance chronic wound and oncology lead products.
Financing	Virometix	Virometix closed extension financing round and appointed Harry Welten as new independent board member.
Study results	GeNeuro (GNRO)	GeNeuro and Servier announced six-month results from CHANGE-MS Phase 2b study in Multiple Sclerosis.
Study results	Neurimmune	Biogen reported new data from Phase 1b study of investigational Alzheimer's disease treatment aducanumab.
Market approval	Santhera Pharmaceuticals (SANN)	Santhera announced approval of Raxone® for LHON in Israel.

**September 2017**

Financing	AMAL Therapeutics	AMAL Therapeutics raised EUR 8 million (CHF 8.8 million) in first closing of Series B financing round.
Rare Pediatric Disease Designation	Enzyvant	Enzyvant received FDA Rare Pediatric Disease Designation for investigational therapy RVT-802.
Rare Pediatric Disease Designation	NovImmune	Novimmune received Rare Pediatric Disease Designation from the FDA for its lead drug emapalumab.
Patient enrollment	ObsEva (OBSV)	ObsEva announced the completion of patient recruitment in the IMPLANT2 Phase 3 clinical trial in assisted reproductive technology ahead of schedule.
Study results	Anergis	Anergis announced top line results from large-scale ATIBAR trial with ultra-fast allergy immunotherapy AllerT.
Patent issued	MetrioPharm	MetrioPharm expanded patent protection for its lead compound MP1032 to South Korea.
Patient enrollment	Santhera Pharmaceuticals (SANN)	First patients enrolled in UK's Early Access to Medicines Scheme for Santhera's Raxone® in Duchenne Muscular Dystrophy (DMD).
Research grant	Evolve (EVE)	Evolve awarded contract by US government to advance novel pest control product.
Marketing/distribution agreement	Basilea Pharmaceutica (BSLN)	Basilea announced distribution agreement with Cardiome to commercialize antibiotic Zevtera®/Mabelio® (ceftobiprole) in Europe and Israel.
Patient enrollment	AC Immune (ACIU)	AC Immune completed recruitment for low-dose cohort in world's first clinical trial for anti-Abeta vaccine targeting Alzheimer's disease-like characteristics in individuals with Down syndrome.
Financing	Sophia Genetics	Balderton joined USD 30 million Series D for big data biotech platform play.
Milestone achievement	Numab Therapeutics	Intarcia and Numab reach key milestone with selection of multi-specific development candidate for autoimmune disease.
Negative opinion	Santhera Pharmaceuticals (SANN)	Santhera received negative opinion from the CHMP for its Marketing Authorization Application for Raxone® in DMD and intends to appeal this opinion.
Patient enrollment	Auris Medical	Auris Medical completed patient recruitment for Phase 3 TACTT3 trial of Keyzilen® in acute and post-acute tinnitus.
Financing	Auris Medical	Auris Medical announced transfer to Nasdaq capital market.
License agreement	Basilea Pharmaceutica (BSLN)	Basilea announced license agreement for antibiotic Zevtera® (ceftobiprole) with Shenzhen China Resources Gosun Pharmaceutical.
<b>October 2017</b>		
Research grant	AC Immune (ACIU)	AC Immune awarded continuation of 2015 grant from The Michael J. Fox Foundation for Parkinson's research.
Research grant	Addex Therapeutics (ADXN)	Addex Therapeutics ADX71441 program awarded USD 5.3 million grant from US National Institute on Drug Abuse to support human studies for the treatment of cocaine use disorder.
Study results	Myovant Sciences	Myovant Sciences announced positive top-line results from Takeda's Phase 3 study evaluating the efficacy and safety of relugolix compared with leuporelin for the treatment of uterine fibroids.
Collaboration agreement	Selexis	Selexis and Pelican Therapeutics signed agreement to advance Pelican's immunotherapy clinical programs.
Financing	Relief Therapeutics	Relief Therapeutics announced the exercise of warrants by GEM.
Financing	ObsEva (OBSV)	ObsEva announced USD 60.0 million private placement with existing and new investors.
Financing	Auris Medical	Auris Medical announced share purchase agreements with Lincoln Park Capital Fund.
Patient enrollment	Molecular Partners (MOLN)	First patient dosed in Phase 1 clinical study of Molecular Partners' second proprietary oncology asset MP0274.
Research grant	Polyphor	Funding up to proof-of-concept in man will be provided for EUR 5 million by Polyphor and for another EUR 5 million by IMI via the funding of a consortium dedicated to the development of Inhaled Antibiotics in Bronchiectasis and Cystic Fibrosis (iABC).
Research grant	CRISPR Therapeutics (CRSP)	CRISPR Therapeutics awarded grant from Friedrich's Ataxia Research Alliance to collaborate with University of Alabama at Birmingham on gene-edited treatments for Friedrich's Ataxia.
Acquisition	Humabs BioMed SA	Vir acquired Humabs BioMed gaining its platform for discovering anti-pathogen mAbs that have undergone natural selection in the human immune system.
Market approval	Abionic	Abionic announced FDA registration for world's most rapid allergy test and abio-SCOPE® diagnostic testing platform.
Financing	ADC Therapeutics	ADC Therapeutics announced closing of USD 200 million private financing to fund two lead programs through registrational trials.



Milestone achievement	Basilea Pharmaceutica (BSLN)	Strong Cresemba® (isavuconazole) sales in the United States triggered first sales milestone payment to Basilea.
Financing	Neurimmune	Neurimmune raised USD 150 million to finance its growth strategy.
Financing	CorFlow	CorFlow completed the first close of the seed+ financing round.
Collaboration agreement	InSphero	InSphero and Charles River announced PDX partnership.
Financing	Actelion (ATLN)	Cancellation of publicly held Actelion shares and delisting from SIX Swiss Exchange as of November 7, 2017.
<b>November 2017</b>		
Award	BioLingus	BioLingus named as one of "Top 20 Most Influential Companies" from CEO Insight.
Milestone achievement	AC Immune (ACIU)	AC Immune received milestone payment for anti-tau antibody moving into Phase 2 trial for Alzheimer's disease.
Capacity expansion	Celonic	Celonic acquired Glycotope's bio-manufacturing facility.
Financing	NousCom	NousCom raised EUR 42 million Series B financing to develop off-the-shelf cancer vaccine.
Patient enrollment	ObsEva (OBSV)	ObsEva announced the completion of patient recruitment in the EDELWEISS Phase 2b clinical trial of OBE2109 for the treatment of endometriosis.
Financing	Evolva (EVE)	Evolva announced the successful completion of the CHF 86 million rights offering and private placement.
Distribution	Creoptix	Creoptix announced entering UK market with Mologic as first customer and providing new research avenues for Mologic's Centre for Advanced Rapid Diagnostics ("CARD").
Collaboration agreement	LeadXpro	LeadXpro to work with Creoptix Wave Technology for their membrane protein drug discovery project.
Financing	BioVersys	BioVersys raised CHF 5 million in Series A2 round.
Market approval	Ferring Pharmaceuticals	Ferring received Swiss approval for Rekovelle®, the first personalised fertility treatment using an approved dosing algorithm.
Research grant	Geneva Biotech/ Sphere Fluidics	Geneva Biotech and Sphere Fluidics received EUR 1.6 million grant from Eurostars.
Study results	Auris Medical	Auris Medical reported top-line results from Phase 3 trial of AM-111 in sudden deafness. Overall, the HEALOS trial did not meet the primary efficacy endpoint of a statistically significant improvement in hearing compared to placebo.
Study results	Tillotts Pharma	Tillotts Pharma successfully completed DCP1 for Colpermin™ in Europe.
<b>December 2017</b>		
License agreement	Basilea Pharmaceutica (BSLN)	Basilea extended existing license agreement with Pfizer for antifungal Cresemba® (isavuconazole) to China and Asia Pacific; Basilea eligible to receive additional upfront and milestone payments of up to USD 226 million and mid-teen royalties on sales.
Collaboration agreement	Idorsia (IDIA)	Idorsia announced collaboration with Janssen Biotech on apocritentan (ACT-132577).
Study initiation	ObsEva (OBSV)	ObsEva initiated PROLONG, the Phase 2a Clinical Trial of OBE022 in preterm labor.
Study initiation	CRISPR Therapeutics (CRSP)	CRISPR Therapeutics submitted first clinical trial application for a CRISPR gene-edited therapy, CTX001 in β-thalassemia.
Study results	ADC Therapeutics	ADC Therapeutics announced clinical data from two ongoing Phase 1 clinical trials evaluating ADCT-301 (camidanlumab tesirine or "Cami-T") in important subtypes of lymphoma and leukemia.
Study results	ADC Therapeutics	ADC Therapeutics announced clinical data from two ongoing Phase 1 clinical trials evaluating ADCT-402 (loncastuximab tesirine or "Lonca-T") in important subtypes of lymphoma and leukemia.
Collaboration agreement	CRISPR Therapeutics (CRSP)	Vertex and CRISPR Therapeutics to co-develop and co-commercialize CTX001 as CRISPR/Cas9 gene edited treatment for sickle cell disease and β-thalassemia.
Collaboration agreement	Idorsia (IDIA)	Idorsia formed research collaboration with Roche in the field of cancer immunotherapy.
Milestone achievement	GeNeuro (GNRO)	GeNeuro to receive EUR 12 million milestone payment from Servier for final patient visit in GNBAC1 CHANGE-MS Phase 2b study.
QIDP designation	Basilea Pharmaceutica (BSLN)	Basilea reported that ceftobiprole received QIDP designation from U.S. FDA for the treatment of Staphylococcus aureus bacteremia (SAB).
Financing	GNUbiotics	GNUbiotics completed a private financing round.

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 2017.

# 2017 – What a year for the Swiss biotech sector!



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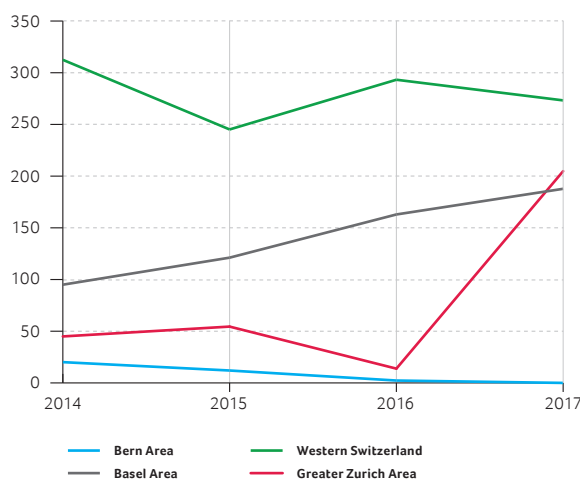


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The year 2017 started with an earthquake for the Swiss biotech sector as the Board of Directors of Actelion recommended to its shareholders to accept the takeover offer from Johnson & Johnson. The price of USD 30 billion was globally the largest amount paid in 2017 for a transaction in the life sciences industry.

The offer was also very attractive for Actelion's shareholder base as the purchase price was not only paid in cash but also included a contribution in kind in the form of new shares for a spin-off from Actelion, named Idorsia. The company started trading at SIX Swiss Exchange on 16 June 2017 and was among the best performing life sciences shares trading in Switzerland in 2017. However, this transaction will have a significant impact on some of the statistical information for the Swiss biotech sector in 2017 and the upcoming years as the exclusion of the Actelion data will lead to a reassessment of the overall industry performance.

The IPO class of 2017 also regained some momentum after the slowdown in 2016 with 47 IPOs and reached a total of 58 IPOs. 30 US IPOs were able to harvest fresh money in the amount of approximately USD 2.8 billion (2016: 24 US IPOs with USD 1.2 billion). There were 28 European IPOs which generated USD 1.1 billion (2016: 23 European IPOs/USD 0.7 billion).



Distribution of private capital investments in the different Swiss regions (in CHF million)

## Swiss Biotech Landscape

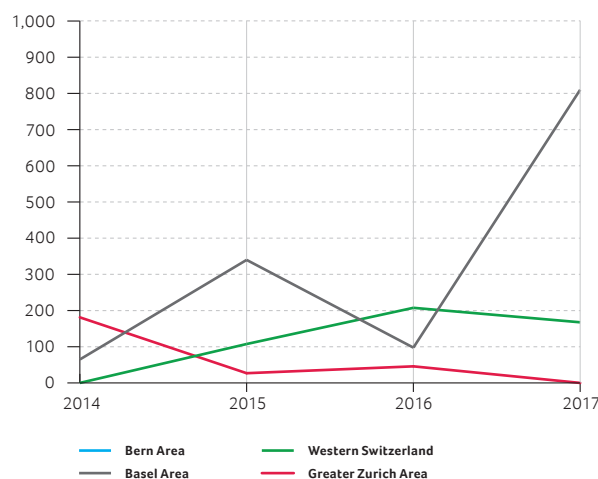
The Swiss biotech industry generated revenues of CHF 3,791 million, compared with restated CHF 3,314 million in 2016. Some of the smaller public companies were able to reduce the overall net loss situation through an increase in product sales as well as income generated from milestone payments from their collaboration partners.

## Record in Financing for the Swiss Biotech Sector

The Swiss biotech sector was able to attract more than CHF 1.6 billion of new capital in 2017. This amount was split as follows between the public and private companies:

- Public companies: CHF 978 million, mainly follow on financings by Evolva, Idorsia and Santhera
- Private companies: CHF 666 million, whereof almost CHF 200 million was collected by ADC Therapeutics from Lausanne (3<sup>rd</sup> highest VC financing globally in 2017)

The only Swiss biotech IPO was achieved in January 2017 by the Geneva-based company ObsEva which was almost reaching an initial offering of USD 100 million at NASDAQ. Later in 2017, ObsEva was doing a follow-on financing in the way of a private placement amounting to USD 60 million. Auris Medical was facing some unforeseen events in 2017; on one side the clinical trial results were not as good as expected and on the other side, the SEC transferred the Auris shares from NASDAQ Global Market to the NASDAQ Capital Market due to insufficient trading volumes. Other companies which were able to attract cash funds were Basilea (through a USD 55 million grant from BARDA) and Neurimmune Holding (USD 150 million from collaboration partner Biogen). Nouscom was able to attract EUR 42 million from highly reputed VCs in a Series A round and Polyphor raised CHF 40 million. An interesting observation around the financing is the fact that companies in the Swiss Romandie were able to attract a larger portion of the additional funds invested



Distribution of public capital investments in the different Swiss regions (in CHF million)

in Switzerland. This can almost be seen as a trend over the last four years and is also reflected in the fact that five out of the last six Swiss biotech IPOs were done by companies from the Arc Lemanique area.

Another positive financing element is the fact that BioMedPartners in Basel were able to launch their third fund with an initial financial contribution of CHF 75 million and the clear goal to increase this amount to a total of CHF 100 million over the next few months.

## M&A and collaborations

Swiss biotech companies continued to be an attractive target for acquisitions by pharma or large biotech companies. Besides the J&J/Actelion deal, the Irish Malin plc. acquired privately held Cilatus Biopharma, Vir Biotechnology acquired Humabs BioMed, and Elanix Biotechnologies acquired Inno 4 Cell in a capital increase by way of contribution in kind. In terms of divestitures, Selexis sold some of its assets to JSR Life Sciences in 2017.

Looking at all the announced, new or extended collaborations in Switzerland in 2017, the list might almost be labelled a 'Who's Who' of the life sciences industry. Some deals to support this statement:

- Anokion with Celgene
- Idorsia with Janssen Biotech and Roche
- InSphero with Charles River Laboratories, NIH and Pfizer
- NovImmune with Shire
- Numab with Ono Pharma and Kaken Pharma
- Piquor with Pierre Fabre
- Selexis with Merck KGA, Sanofi and Takeda

Another interesting development in 2017 was an uptick in 'portfolio management' type of deals, with several pharmaceutical companies partnering with private equity firms for assets that may not be 'top of the list' from the pharmaceutical company's perspective (as it relates to managing their portfolio and trying to be more specialized in certain indications), but that could still yield high returns with some investment. It will be interesting to observe when such private equity firms will also start to approach larger biotech companies as those increasingly face similar portfolio management and R&D prioritization questions as pharma companies. To address this new trend, Versant Ventures opened with Ridgeline Therapeutics a new discovery engine with its own laboratories in the Basel Technology Park.

## Product development

FDA approved a record number of 46 new drugs (2016: 22) which represents the highest approval rate in the past 10 years. The European counterpart, EMA, issued 92 positive opinions (2016: 81) whereof 35 (2016: 27) were for new active substances. Although there was no new drug directly originating from a Swiss biotech company, the overall progress was still remarkable in 2017 and several Swiss companies were able to collect milestone payments from their respective collaboration partners as they advanced their assets in the pipeline. Swissmedic itself approved 32 new drugs in 2017 which was below the 40 approvals for innovative new drugs in 2016. However, there is always some volatility in the timing of the approval cycle.

### About the global EY organization

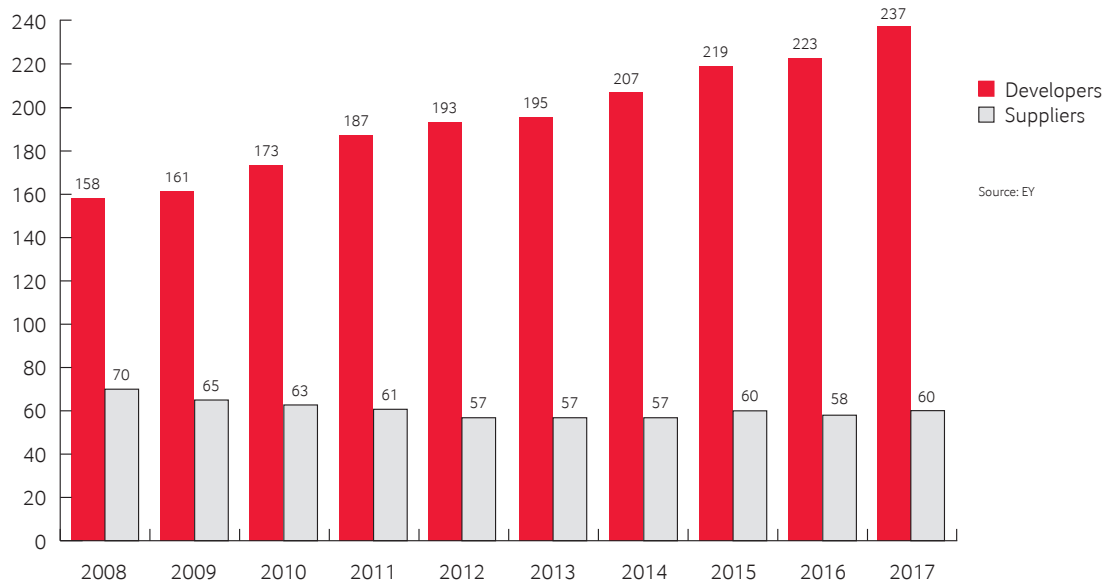
The global EY organization is a leader in assurance, tax, transaction, legal and advisory services. We leverage our experience, knowledge and services to help build trust and confidence in the financial markets and in economies all over the world. We are ideally equipped for this task – with well trained employees, strong teams, excellent services and outstanding client relations. Our global mission is to drive progress and make a difference by building a better working world – for our people, for our clients and for our communities. EY's organization is represented in Switzerland by Ernst & Young Ltd, Basel, with ten offices across Switzerland. For more information, please visit [www.ey.com/ch](http://www.ey.com/ch).

### About EY's Global Life Sciences Center

Life sciences companies – from emerging start-ups to multinational enterprises – face new challenges in a rapidly changing health care ecosystem. Payers and regulators are increasing scrutiny and accelerating the transition to value and outcomes. Big data and patient-empowering technologies are driving new approaches and enabling transparency and consumerism. These trends challenge every aspect of the life sciences business model, from R&D to marketing. EY's Global Life Sciences Sector brings together more than 7,000 sector-focused assurance, tax, transaction and advisory professionals to anticipate trends, identify implications and develop points of view on responding to critical issues. For more timely insights on the key business issues visit [ey.com/lifesciences](http://ey.com/lifesciences).

# Facts & figures

Number of biotech companies in Switzerland



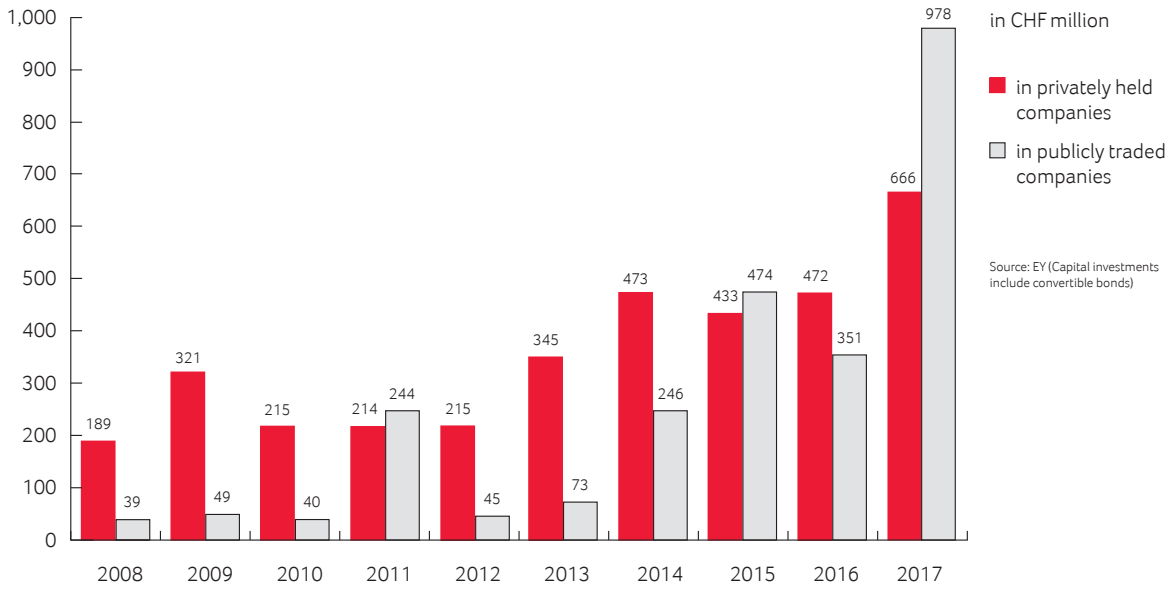
Number of employees



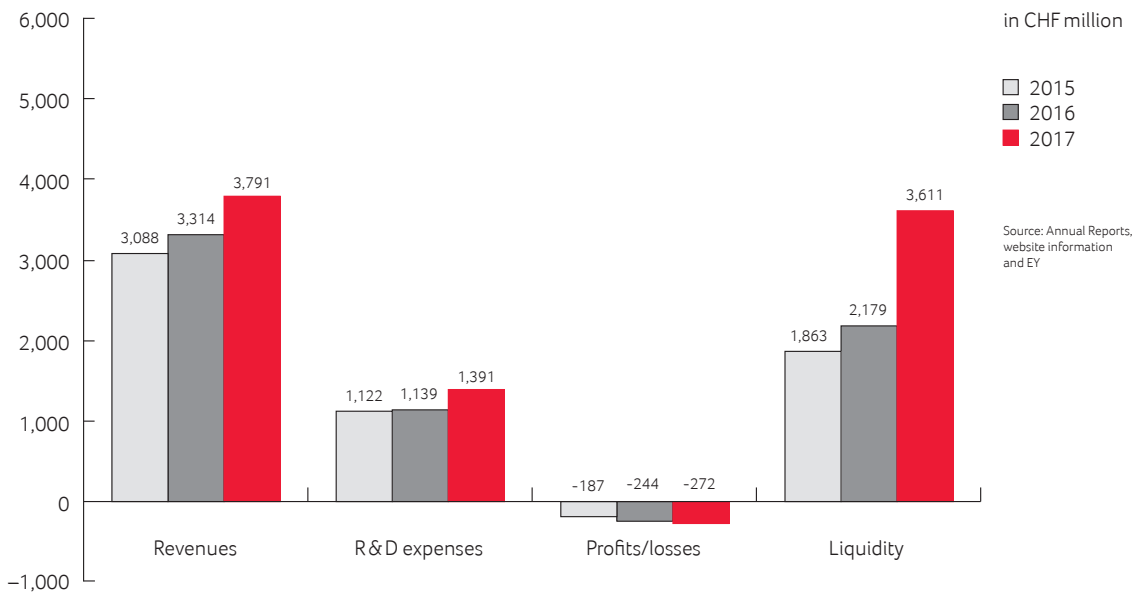
## Notes

- The 2017 data in this table is based on information that was available up until March 2018 when this report was compiled. At this time, some of the companies had not yet disclosed their final financial figures for 2017. Therefore, some figures were carefully extrapolated on the basis of the latest interim data publicly available (e.g. Q3 2017).
- 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 2017. 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 SXI LIFE SCIENCES® and SXI Bio+Medtech® indices at the SIX Swiss Exchange.

### Capital investment in Swiss biotech companies

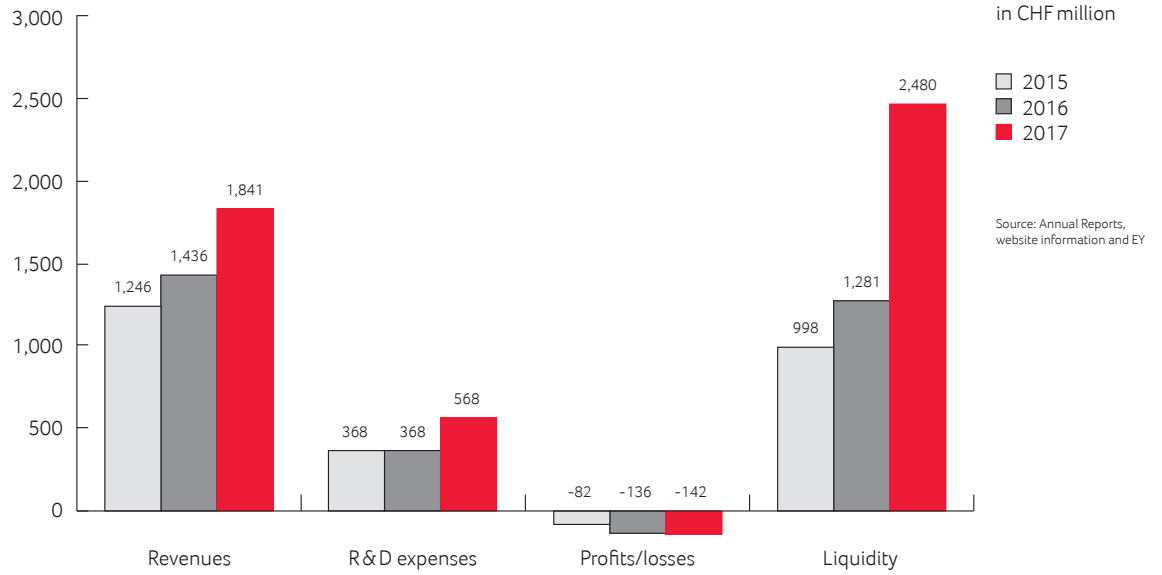


### Total Swiss biotech companies

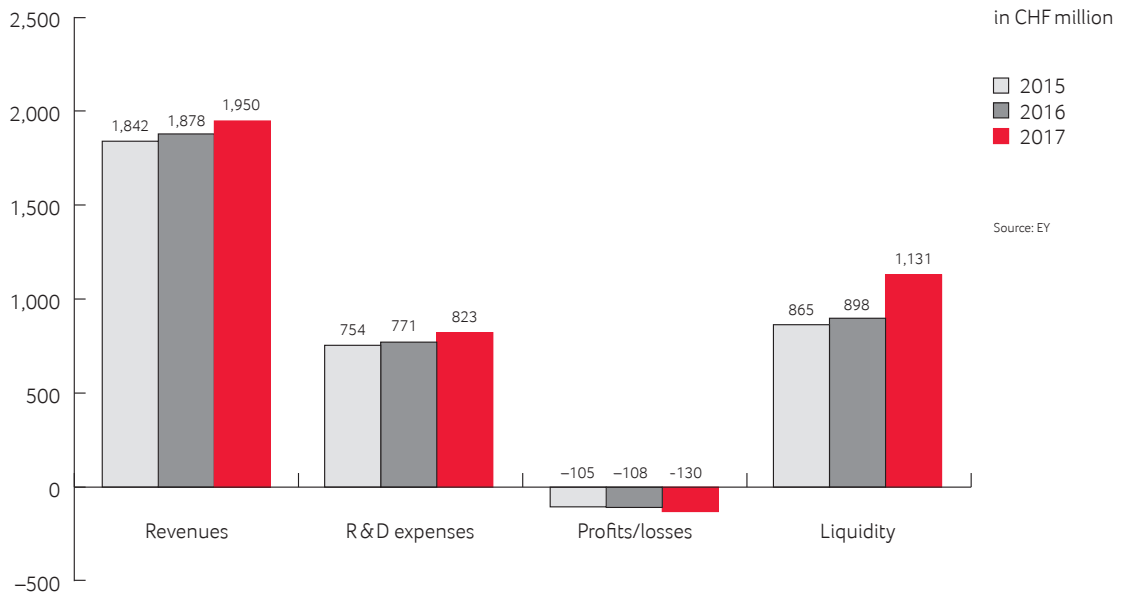


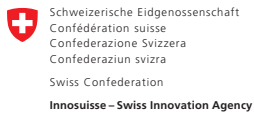
- As some privately held companies do not disclose financial figures, the figures above represent EY's best estimate.
- All figures are headquarter-counted and do not include data from pharma companies such as Novartis and Roche.

## Publicly traded Swiss biotech companies



## Privately held Swiss biotech companies





## Impressum

### Steering committee

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