

Swiss Biotech – An Overview of the Industry and the Key Stakeholders 2010

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This edition of CHIMIA is dedicated to Armin Fiechter (1924–2010) – a pioneer of biotechnology in Switzerland

Abstract: This article presents the stakeholders of the Swiss Biotechnology sector. From academia to industry, from TechTransfer initiatives to state impulse programs, the sector has developed rapidly in the last years. Public Private Partnerships such as Life Science Clusters and collaborations between industry associations have proven to be an essential part for sustainable success for our national GDP. The author has extensive experience in the various sub-sectors.

Keywords: Swiss Biotech Industry · Swiss Biotech Association · Swiss Society of Chemical Industries · Technology transfer

Introduction

Biotechnology is expected to continue to play a key role in the sustainable development of Switzerland. It is vital to economic growth, environmental efforts, commercialisation of new technologies and public health, to boost innovation in this industry. By further strengthening academic output, enablers and competitive clusters, the crucial management of the interfaces will be improved and make for a sound future of the sector.

The Swiss Biotech Industry has gained a lot of attention in recent years. Unlike many other industries, the sector has grown during the economic crisis, and Swiss Biotech has sustained itself remarkably well. The number of employees approached 20'000 (headquarter-based without big Pharma) and approximately 230–240 companies are based in Switzerland (Fig. 1 and 2).

This overview illustrates the structure of the biotechnology sector and puts emphasis on the various institutional play-

ers and enablers without whom the sector would not be as well interconnected as present. Included in the definition of 'Biotech' are Pharma and chemical companies, seeds manufacturers, producers of intermediates, reagents and diagnostics, service companies and to a certain extent also investors. This seems logical in the nature of a cross-sectional technology field such as biotechnology. However, the most important success factor is the research community in academia and companies. They stand for innovation and are hence at the beginning of the value chain.

The content of this CHIMIA publication is focused on latest developments in basic research and applied research

relevant to the chemical and manufacturing biotech industry. The article of the Swiss Industrial Biocatalysis Consortium (SIBC) by *Beat Wirz* and colleagues talks about the challenges in biocatalysis. 'Culture Collections and the Biotechnology Deal' by *Martin Sievers et al.* is a report of a national project between academia and industry. *Linda Thöny-Meyer* and coworkers present a novel process for isolation and purification (Application of Activated Charcoal in the Downstream Processing of Bacterial Olefinic Poly(3-hydroxyalkanoates)). 'IMAPlate Based Miniature, High Sensitive, Rapid Screening Method for Detecting Bioengineered, Secreted Lipase Activities in Yeast Ex-

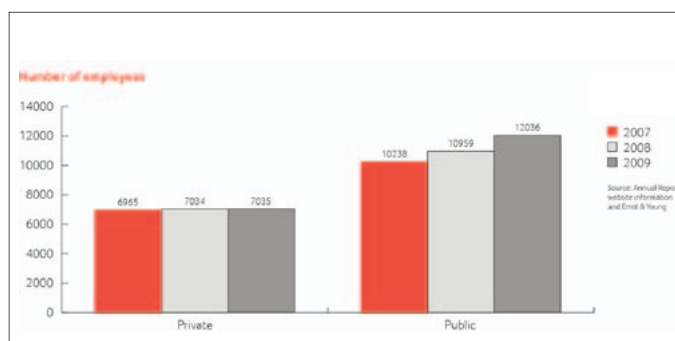


Fig. 1. Number of employees

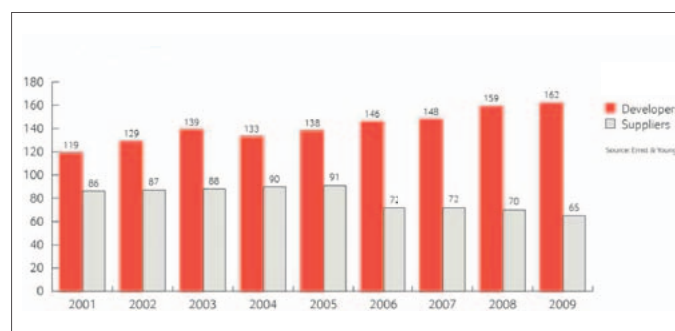


Fig. 2. Number of biotech companies in Switzerland

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pression Systems' from *Daniel Gygax* and coworkers describes a spectrophotometric assay based on miniaturisation. *Michel A. Sciotti et al.* present their article 'Development and Characterization of an Enzymatic Method for the Rapid Determination of Gamma Hydroxybutyric Acid' which focuses on a rapid assay based on GHB dehydrogenase. 'Continuous Micro-Production using Enzymatic Reaction and Online Monitoring' by *Olivier Naef* and his group explains the functioning of a micro-reactor coupled to a microfluidic system and a spectrometer. 'Process Monitoring with Disposable Chemical Sensors Fit in the Framework of Process Analysis Technology (PAT) for Innovative Pharmaceutical Development and Quality Assurance' from *Ursula Spichiger-Keller* and *Stefan Spichiger* reveals innovative principles in disposable bioreactors. The paper on tissue engineering as an emerging biotechnology sector from the research group of *Ursula Graf-Hausner* aims at the *in vitro* regeneration of diseased tissues and promises to profoundly change medical practice, offering the possibility of regenerating tissues and organs instead of simply repairing them (regenerative medicine), and highlights the potential of increased partnerships between industry and academia. *Karin Kovar* and coworkers' article 'Recombinant Yeast Technology at the Cutting Edge: Robust Tools for both Designed Catalysts and New Biologicals', and finally 'Innovative, Non-stirred Bioreactors in Scales from Milliliters up to 1000 Liters for Suspension Cultures of Cells Using Disposable Bags and Containers – A Swiss Contribution' from *Florian M. Wurm* and colleagues conclude the snapshots in research for this edition.

Academic Thrust – Public Funds

Swiss research enjoys a first-class international reputation, thanks primarily to the young scientists who are supported by the Swiss National Science Foundation (SNSF) and pursue their research interests predominantly in individual projects. With a view to further strengthening Swiss research in strategically important areas, the SNSF currently maintains 19 National Centres of Competence in Research (NCCRs), just under one third of which are devoted to topics related to biotechnology.

By guaranteeing top quality in Swiss research, the SNSF also plays an important role for the economy: in international competition, first-class research plus highly qualified and motivated young scientists are among the main locational advantages for innovative companies.

The academic structure of the country reflects the federal system of government.

There are two Federal Institutes of Technology, Zurich's ETH and Lausanne's EPFL plus several Research Institutions PSI, WSL, EMPA and EAWAG. As public sector services, they guarantee a base level of applied research, teaching and innovation. They also turn out world-class results in the promising, future-oriented disciplines of life sciences, communications and nanotechnology.

The universities are funded largely by the cantons. Only the larger cantons have their own universities and these vary in size and faculty emphasis. The Universities of Basel, Bern, Geneva, Fribourg Lausanne, Neuchâtel and Zurich and the University Hospitals offer extensive curricula in life sciences, medicine and biotechnology.

Today five Universities of Applied Sciences have stepped up their activities in the field of biotechnology and work closely with the Universities and Federal Institutes of Technology. This results in better vertical technology transfer and faster product innovation cycles. The Universities of Applied Sciences coordinate their industry efforts through a competence network called *biotechnet*, a resource that solves collectively industry and company problems by an interdisciplinary approach.

The Innovation Promotion Agency CTI specifically backs the transfer of knowledge and technology between universities and business. CTI supports application-oriented research and development. One of CTI's main missions is the promotion of start-ups, because many innovations are realised and put on the market by young entrepreneurs. Switzerland needs talents with exciting business ideas, who are willing to take on the competition and persistently implement their visions in the market. CTI's start-up promotion offers them a wide range of training and coaching opportunities. The promotion of entrepreneurship specifically targets growth-oriented

business projects with a technological focus.

Technology Transfer

SwiTT, the Swiss Association of Technology Transfer Professionals, is playing a growing role in successful TechTransfer. Operating at the interface between academia and industry, SwiTT has amassed years of knowledge and know-how that further understanding between academia and industry and accelerate the commercial implementation of scientific breakthroughs. Awareness has been boosted with the publication of its annual national report of results and achievements.

Lastly, it is one of the most important interfacing organisations that can be employed to extend the current success of the five KTT-consortia funded by the Federation and managed by various resources in the field of industry/TTOs and joint initiatives.

Industry

Companies are the biggest assets of any cluster. According to Porter, a true cluster requires companies with solid histories. Switzerland is known for having many innovative small and medium-sized companies with global reach. Often unknown to the public, these quiet champions are seasoned companies that have been seeking new solutions or applications. Having built their know-how over decades, they have become integral parts of the cluster and contribute to the respect commanded by products that are 'Swiss Made'.

At the networking level, the national industry association for biotechnology, the Swiss Biotech Association (SBA), is motivating selected stakeholders to trigger

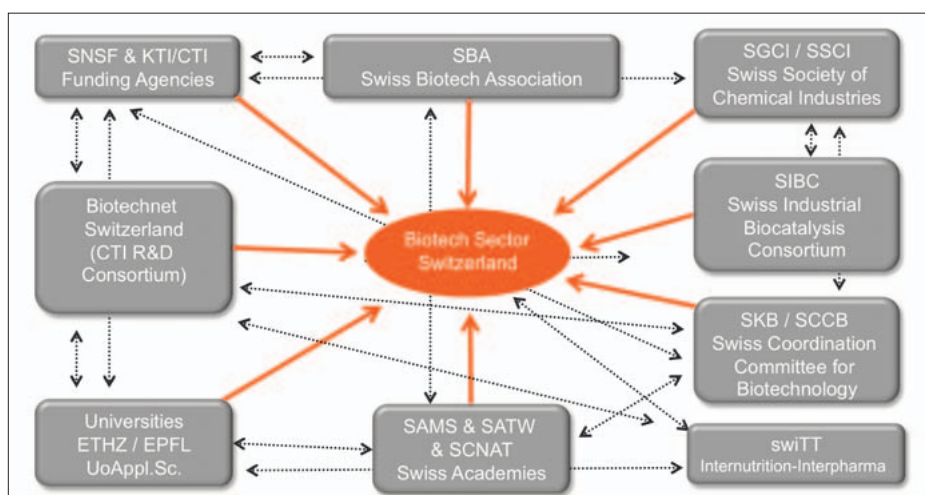


Fig. 3. Main Players in Swiss Biotech – Strategic Level and Structures

developments that will benefit the whole industry.

Because of the relative youthfulness and strong academic roots of many companies the culture among the actors is surprisingly open. Unlike older industries with a first class reputation Biotech sees itself as a community with different players. The SBA has initiated a platform for 'antibody companies' and an impulse program called 'Industrial Biotech'. It also organises networking opportunities for these segments.

Over the years, the SBA has invested a lot of resources to establish good working contacts with other industry associations and federal offices. Today, joint projects between the associations are more common and the whole community reaps the rewards.

The SBA works closely with the SGCI and Interpharma on the topics public affairs, industry development as a whole and support the education/research process.

Life Sciences and Biotech Clusters

One of the greatest assets for any country is the availability of regional clusters. Switzerland is well-served with five regional clusters. Berne Capital Area, BioAlps in the West, Biopolo Ticino in the South and in the North, the Greater Zurich Area and the BaselArea for Life Sciences (Fig 4).

Berne Capital Area is the global centre of the precision industry, and an extremely valuable strength for the life science industry. This international reputation nurtures the clusters. Local industry and academia have been working together for years in public-private cluster initiatives that consistently provide momentum to the sector.

BioAlps serves as a shining example of the importance of a match-making ability. Initiated by five cantons in Western Switzerland, the BioAlps association provides pragmatic and non-bureaucratic support of ideas from the laboratory through to international commercialisation. In partnership with local academic institutions and incubators, it connects investors with small companies or supports young companies in their first economic steps. The regional presence of a generous world leader such as Merck-Serono with a far-reaching vision for integration, rounds up the selling propositions for BioAlps.

With all these benefits it is no surprise to see a constant flow of suppliers and other Life Science companies establishing offices in Western Switzerland.

Biopolo Ticino is smaller but similar in approach. The cluster covers the Italian-speaking part of Switzerland and also cooperates with the Italian Biotech commu-

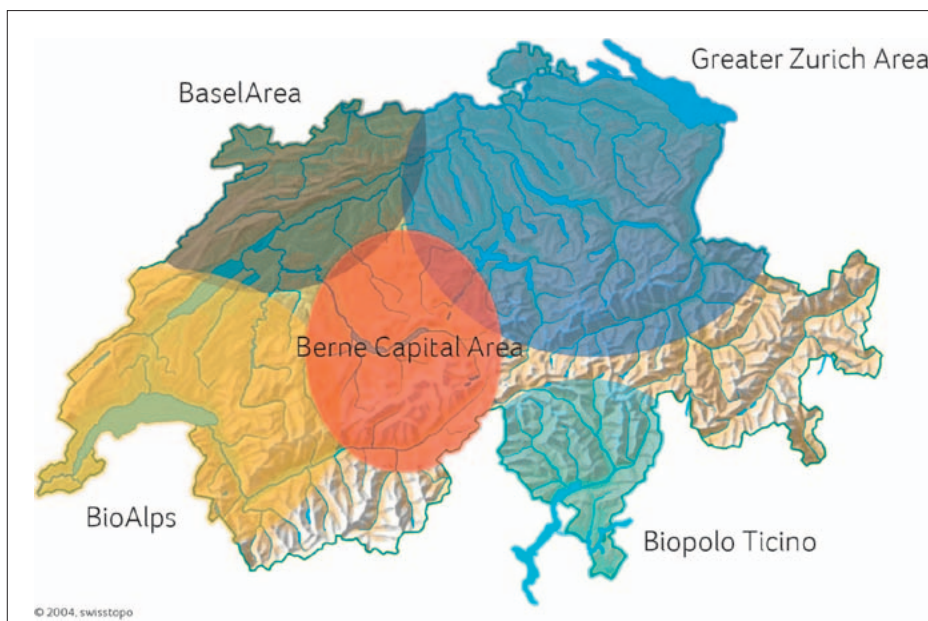


Fig. 4. One Nation – One Biotech Cluster

nity, which in turn, looks to Switzerland for further growth opportunities.

A recent excellent example of collaborating on know-how is 'Toolpoint for Life Sciences', an organisation at home in the *Greater Zurich Area*. This bottom-up vertical set-up connects more than 25 leading companies of the liquid handling automation industries. They cooperate in non-competitive or non-critical areas and excel in partnership projects ranging from Human Resources to Regulatory Affairs and many more. The activities of Universities and ETH Zürich lead to further successes, which created many companies and employment at the BIO-TECHNOPARK® Schlieren-Zurich.

In the *BaselArea for Life Sciences*, big Pharma and the chemical industry are strong magnets for other successful ventures. Thanks to the presence of the international blue chips such as Roche, DSM, Novartis, Lonza, Clariant and Syngenta, small businesses develop rapidly and profit from the attention given to their big neighbours. The short distances enable better know-how exchange which in turn brings about more value for the participants in the value chain. Basel is, not surprisingly, an international hot-spot for Life Science conferences. Global partnering conferences with scientific presentations and panels are proof of Basel's attractiveness and global importance.

Private Finance Sector

The biotech industry in Switzerland has developed over the past years into an internationally-recognised focal point and is supported by an active public and private

investor base. In terms of market capitalisation, the life science companies listed on the Swiss Stock Exchange (SIX) together represent the largest peer group of its kind in Europe. Through the association SECA (Swiss Equity Capital Association), many of the active investor groups meet and raise the benchmark of knowledge in this field.

More information: www.swissbiotech.org.

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