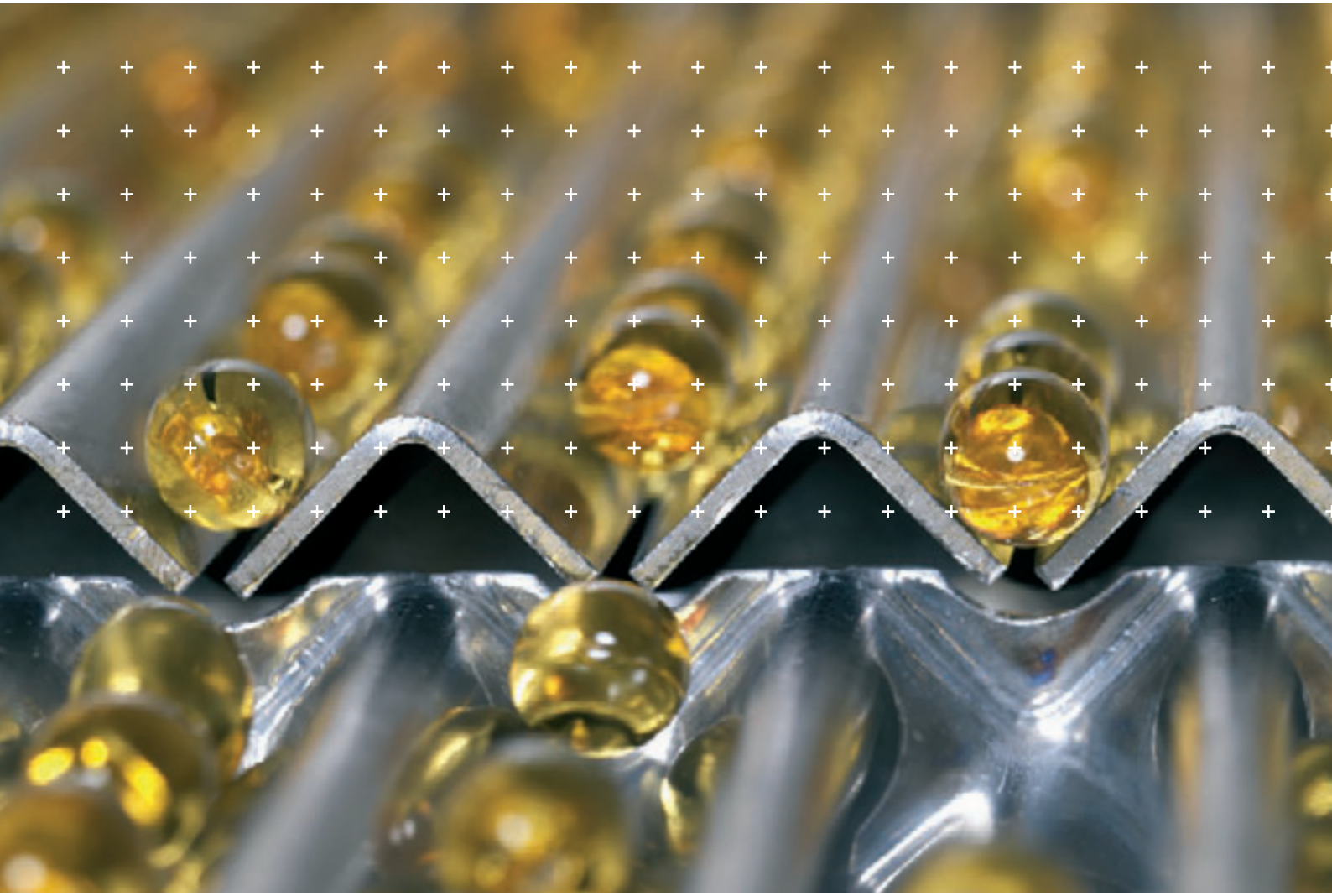
The Swiss Biotech Sector 2013

Swiss Biotech Association



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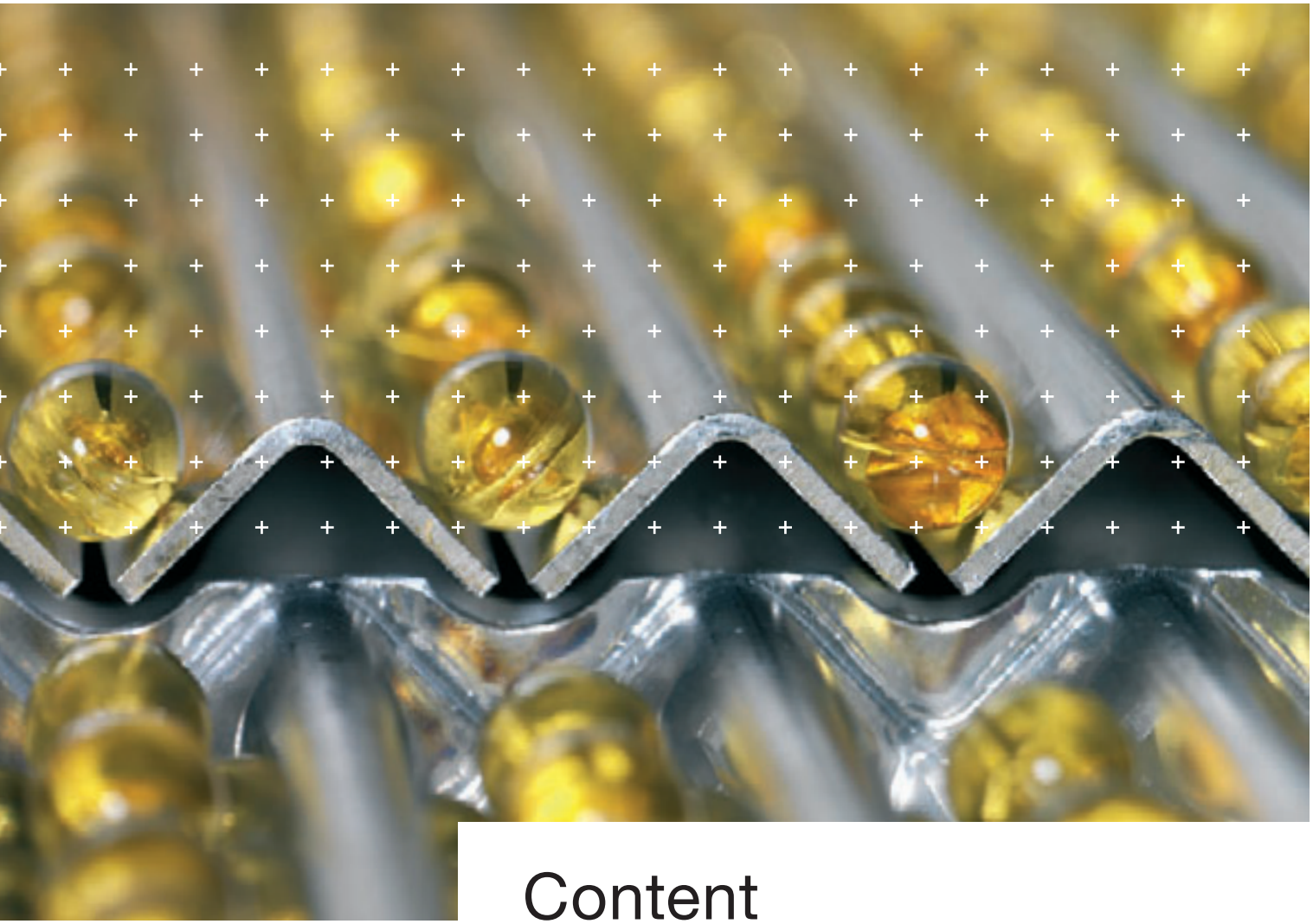
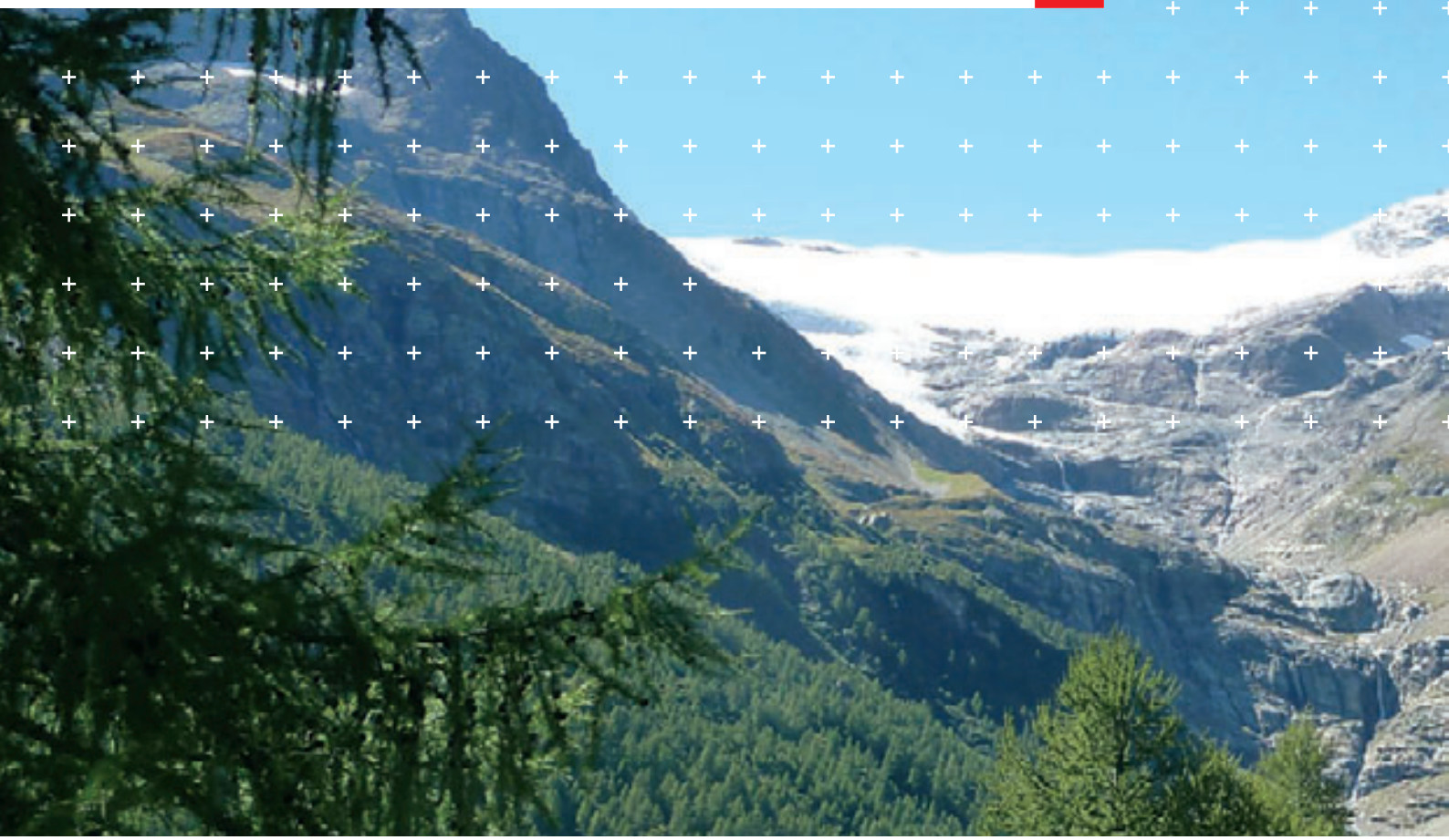


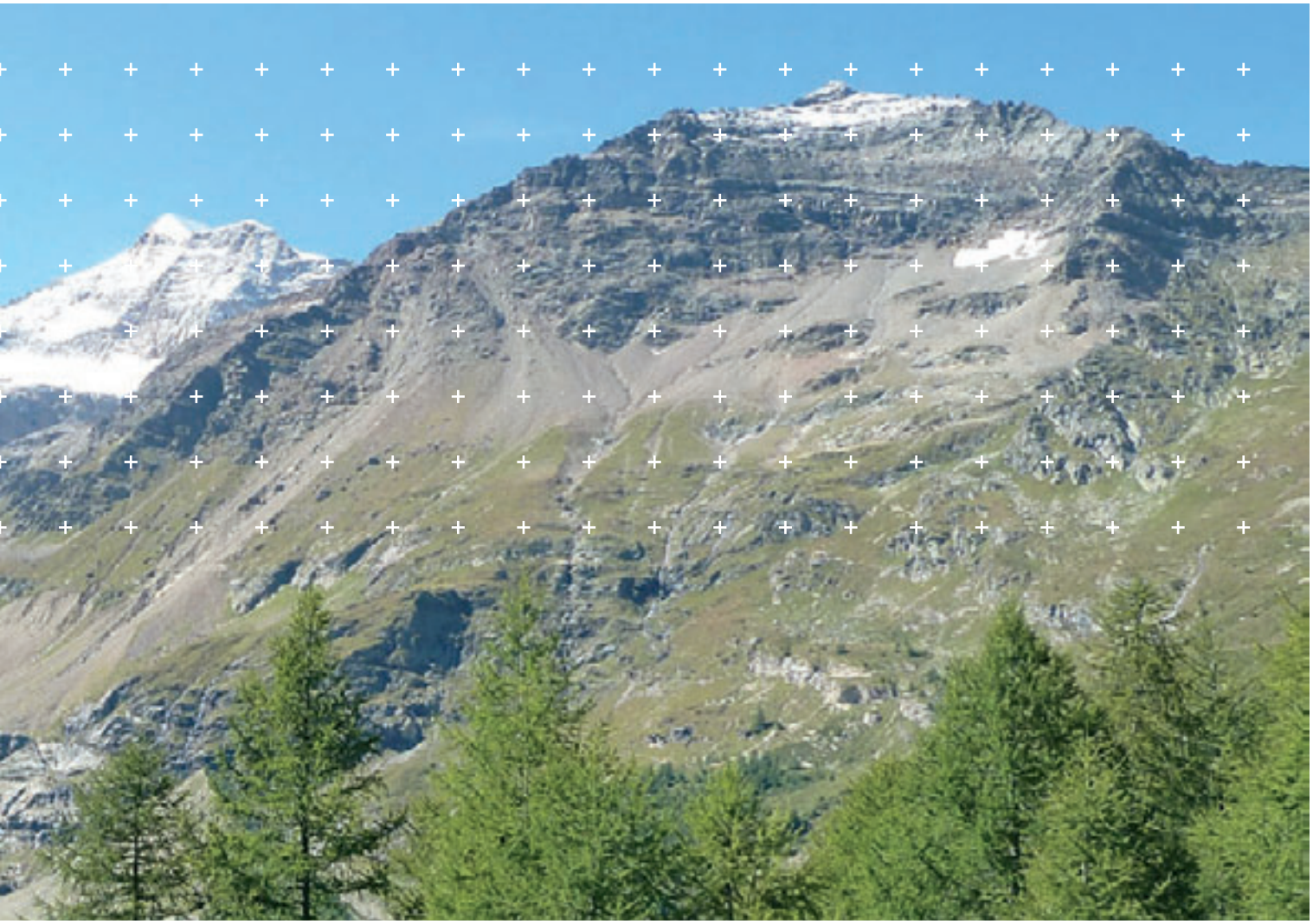
Content

The Swiss Biotech Sector 2013

Excellence & Strength



Biotechnology has become a key driver for innovation and success in a variety of industries. Its impact is to date mostly visible in healthcare.



Switzerland's health industry has an excellent long-standing reputation throughout the world. As a result, chemicals, pharmaceuticals and biotechnology have been among Switzerland's largest export industries for many years. The biotech industry in Switzerland benefits simultaneously from the inputs of Swiss world leading pharma enterprises and cutting-edge public research institutions. Hence, the sector is in a unique position to become a trailblazer for promising new drug candidates, sensitive diagnostics and smart new therapies.

According to definitions of the Organisation for Economic Cooperation and Development (OECD) – which are the basis of this report – there were 197 Swiss companies which used biotechnological methods in at least some of their business units in 2012. A subset of 51 firms had non-core business operations in the field of biotechnology, they are called "biotechnology-active companies". Another 146 firms were occupied wholly or for the most part with modern biotechnology methods. They are called "dedicated biotechnology companies" by the OECD. Unless otherwise indicated, the following data refer to these dedicated companies. Companies which are also related to the Life Sciences and play a big role for the Swiss biotechnology sector – such as plant engineering and construction companies – are not represented in this report as they are not defined as biotech companies by the OECD.

In 2012, the Swiss biotech sector showed a good perfomance. The industry counted 4,300 employees and generated a turnover of almost five billion Swiss francs. A total of 337 million Swiss francs in external financing flowed into the biotechnology sector over the last year. The most impact is visible in the healthcare sector in Switzerland. Two thirds of all biotech companies (99) and 84% of all employees (3,630) are active in this field. At well above 4.8 billion Swiss francs, medical biotechnology is responsible for more than 98% of all revenues. Due to the well-stocked clinical pipeline, it is likely that investors' attention will not slacken off in the future.

These are the key findings of the company survey carried out by BIOCOM AG on behalf of the Swiss Biotech Association. Data were collected from April to June 2013, following the OECD guidelines and definitions of biotechnology (see page 30 for methodology).

Structure of the Biotech Sector

Strengthen the Process

Biotechnology has garnered a lot of attention in Switzerland in the past. The sector has shown growth during the economic crisis and sustained itself remarkably well. There are 197 companies distributed all around the country which are fully committed to biotechnology methods or are working with biotechnological methods in some of their business units. A subset of 51 firms had non-core business operations in the field of biotechnology. These include, among others, chemical companies, foodstuff manufacturers and energy companies. These firms are considered to be “biotechnology-active companies” according to the definitions set out by the Organisation for Economic Cooperation and Development (OECD).

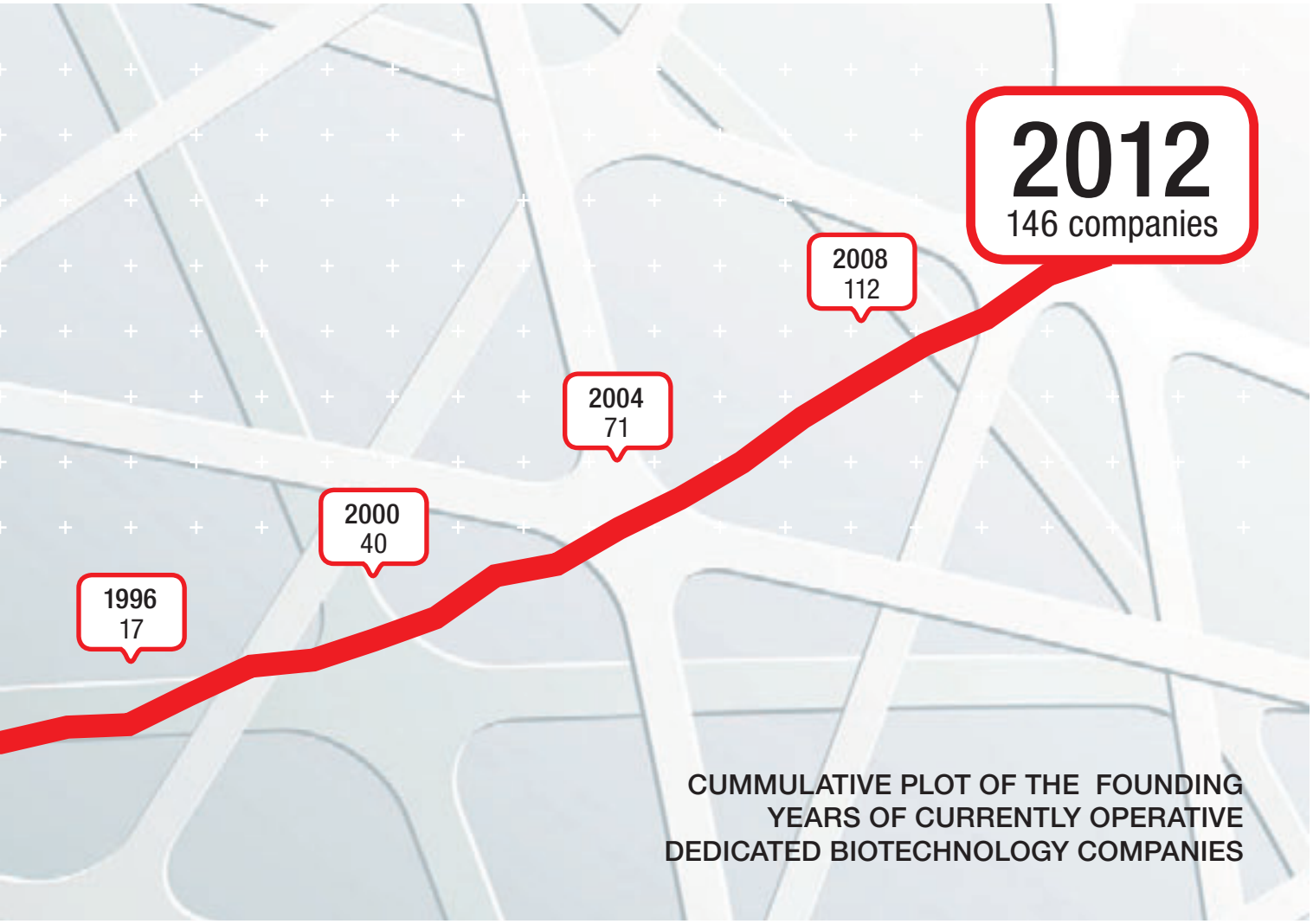
For many pharmaceutical companies, it was a logical step in the past to expand their own business model, the chemical synthesis of small molecules, to the biotechnological production of biopharmaceuticals. Swiss pharma giants Novartis and Roche took this step years ago. Both biotechnology-active companies are among some of the world’s largest pharma companies – not least due to their successful development of biopharmaceuticals in recent years.

Three geographical hot spots for Swiss biotech companies

More than 80% of all companies are located in one of three geographical hot spots. Western Switzerland, with the area around Lake Geneva, is home to 64 companies (32.5%). 53 biotechnology companies (26.9%) have their headquarters in the Greater Basel Area. 46 firms (23.4%) have registered their office in the Greater Zurich Area.

A majority of 146 companies were occupied wholly or for the most part with modern biotechnology methods. They were counted as “dedicated biotechnology companies”. Unless indicated otherwise, only dedicated biotechnology companies are considered in the following.

The Swiss biotechnology sector has weathered the economic challenges in other parts of the world well: according to research conducted in the course of this survey no biotechnology company was forced to declare bankruptcy in 2012.



CUMMULATIVE PLOT OF THE FOUNDING YEARS OF CURRENTLY OPERATIVE DEDICATED BIOTECHNOLOGY COMPANIES

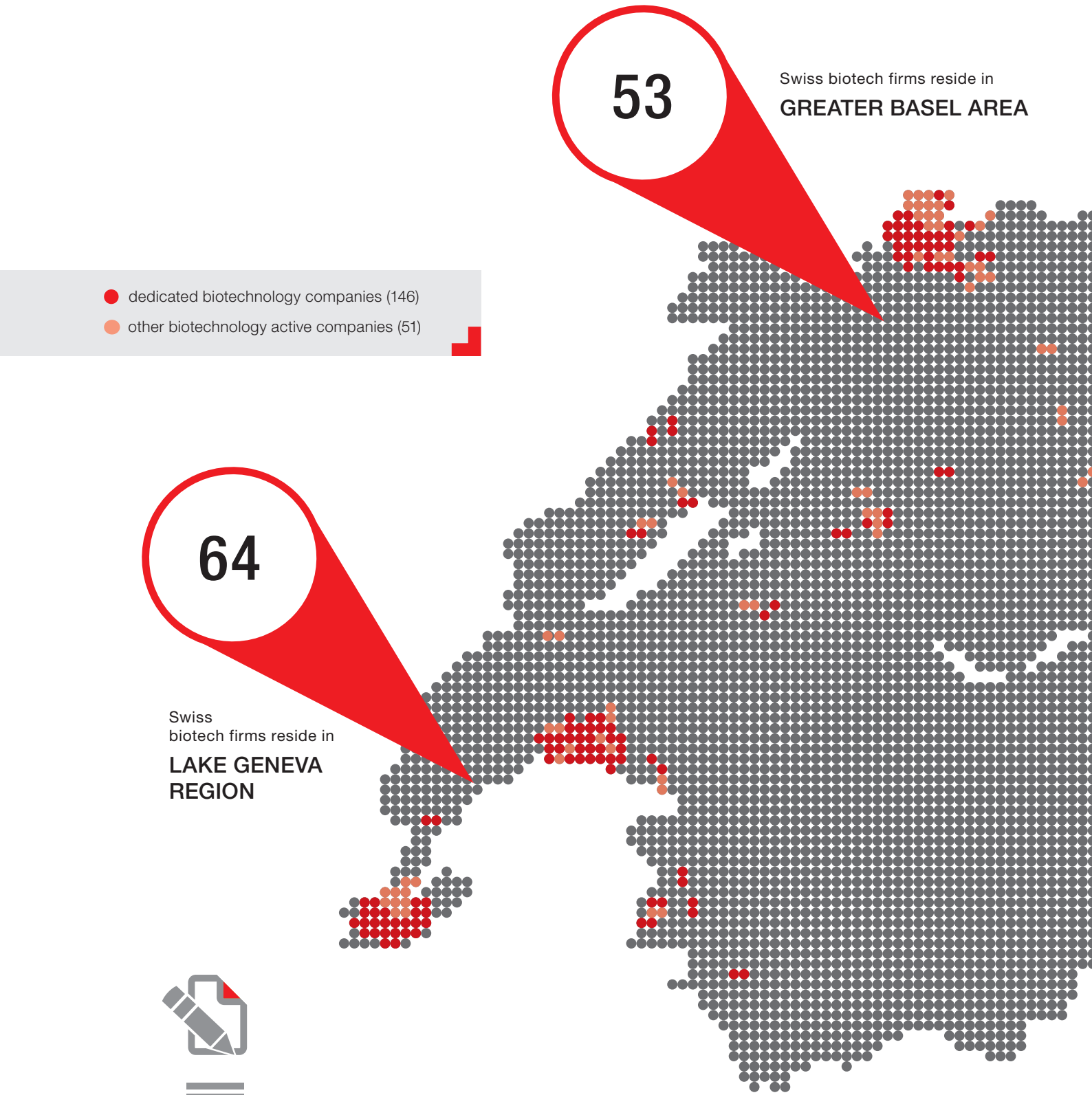
The Swiss biotechnology industry is still young. Although the first three dedicated biotechnology companies were created back in the seventies (Bühlmann Laboratories AG, Cerbios Pharma S.A. and Debiopharm S.A.), the average age of biotechnology companies is only 9 years. A total of 36 companies – almost a quarter of all Swiss dedicated biotechnology companies (24.6%) – were created before the year 2000. In recent years especially, the sector has seen a lot of new firms entering the market: five new companies were created in 2012. The year before, twelve new companies were formed and in 2010 entrepreneurs created seven new businesses.

20 of these 24 new ventures became active in the field of medical biotechnology (83%), three new companies (13%) committed to bioinformatics, the remaining one (4%) concentrates its business on offering non-specific biotechnology applications.

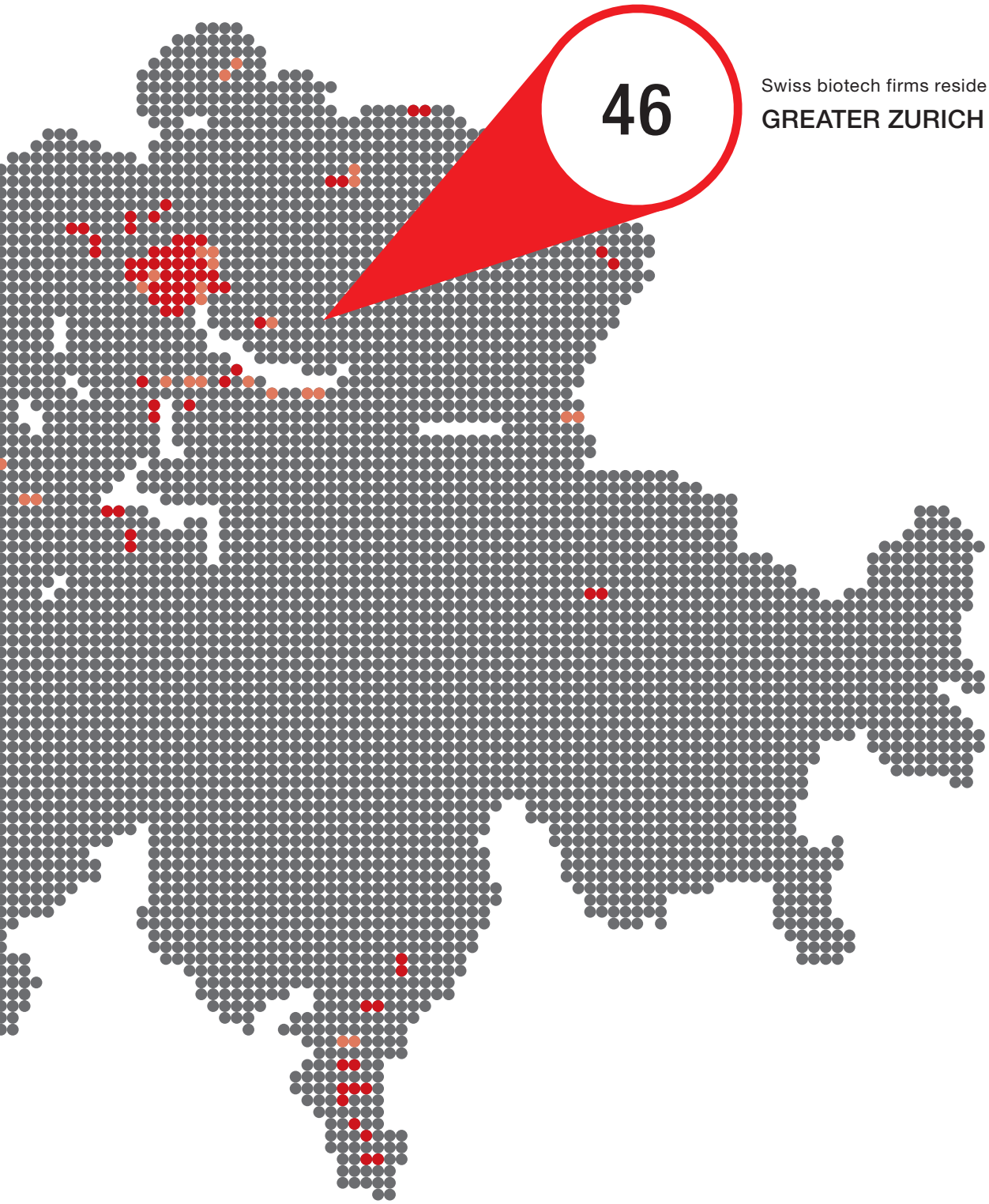
All of the 24 new companies were founded in one of the three geographical hot spots for biotechnology. Nine (38%) were created in Western Switzerland, eight (33%) have registered their offices in the Greater Basel Area. Seven entrepreneurs (29%) have chosen the Greater Zurich Area as home for their startup business.

The high number of start-ups in the Lake Geneva region in Western Switzerland is at least partially attributable to a specific event. In spring 2012, the German pharma company Merck KGaA announced its decision to close down the Geneva headquarters of Merck-Serono, its biopharmaceuticals division. The site became part of Merck with the acquisition of Swiss biotechnology company Serono in 2007. Merck set up the Entrepreneur Partnership Program (EPP), a fund worth 30 million Swiss francs, to facilitate spin-offs and start-ups whose work focuses on business activities launched at Merck Serono in Geneva. Within the first year of its creation, the EPP supported a total of six new companies, four of them are defined as dedicated biotech companies along OECD criteria. But only two of them (Geneva based Quartz Bio and Prexton Therapeutics) have started their business already in 2012. For this reason, only the both companies are integrated in this 2012 biotech report.

Geographical Distribution



New dedicated biotechnology start up companies created in the last few years.



Swiss biotech firms reside in
GREATER ZURICH AREA

9 years

is the average age of the dedicated biotech companies

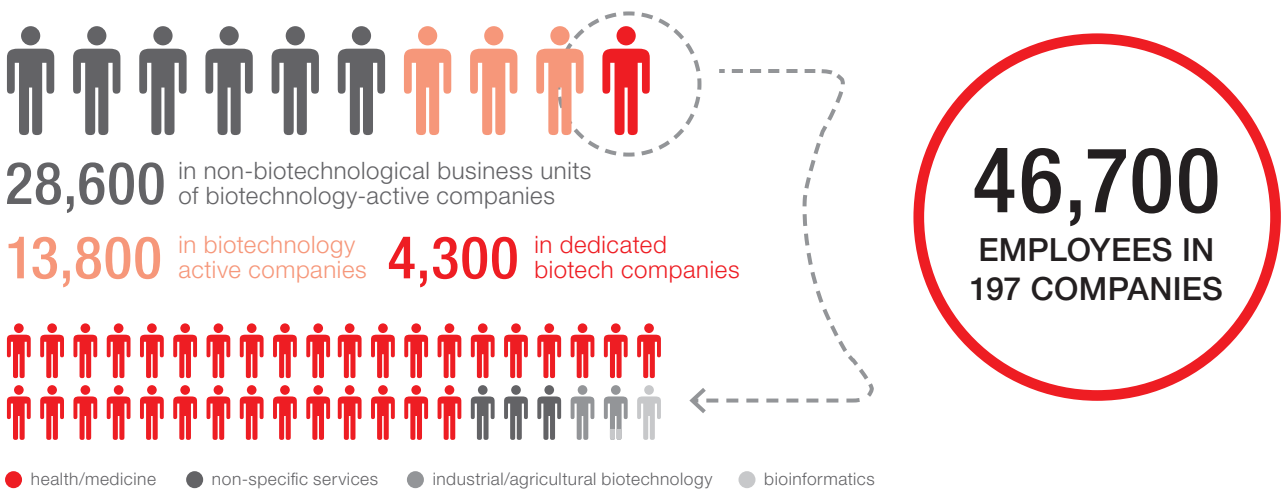
Employee Structure

Spotlight on People

The Swiss biotechnology sector is dominated by small and medium-sized enterprises (SMEs). All in all, 46,700 employees earn a living by working for one of the 197 biotechnology companies. Food manufacturers like Nestlé and global pharma companies like Novartis or Roche in particular employ a huge staff. 42,400 people worked for these biotechnology-active companies. Although biotechnology is only one among several lines of busines for these companies, it retains a reasonable workforce: 13,800 staff were directly involved in biotechnology projects.

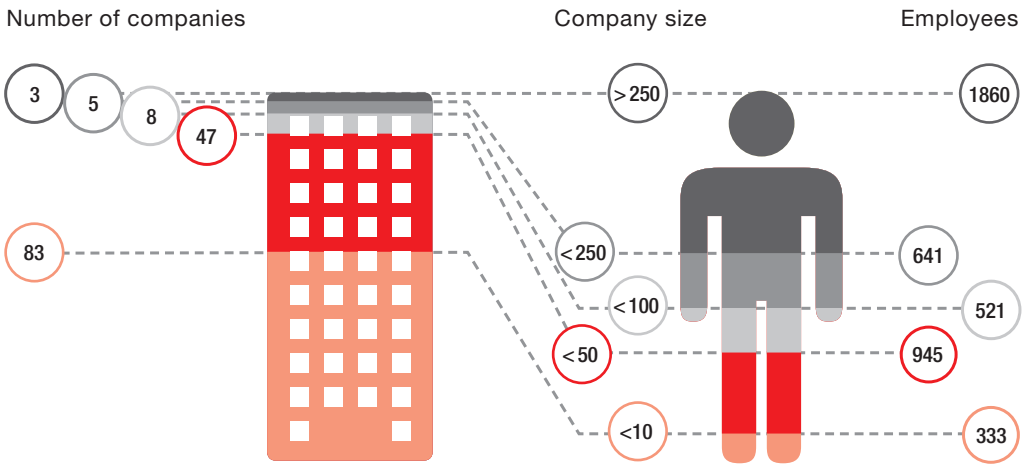
Medical biotechnology is the most important employer

The 146 Swiss dedicated biotechnology companies had about 4,300 employees on their payroll in 2012. Medical biotechnology companies were the most important employer. 3,630 people (84.4% of all employees in biotechnology) earned a living working for these firms. Industrial and agricultural biotechnology and companies employed 196 staff (4.6%). The headcount of companies offering non-specific applications and services totaled 306 staff (7.1%). A further 168 employees (3.9%)



worked for bioinformatics firms. Mirroring the industry as a whole, most Swiss dedicated biotechnology companies are rather small in size. In fact, the majority of businesses employ less than ten staff: 83 of the Swiss dedicated biotechnology companies (56.8% of all dedicated biotechnology companies) employ no more than nine people. A further 47 companies, almost a third of all Swiss biotechnology firms (32.2%), have between ten and 49 staff. Larger enterprises are rare in Switzerland: eight companies (5.5%) employ more than 50 but less than 100 staff. Five companies (3.4%) employ at least 100 but no more than 249 people.

Three dedicated biotechnology companies (2.1%) have at least 250 employees on their payroll. Thus, exceeding the threshold at which they are considered to be SMEs as defined by the European Commission, they are counted as large-scale enterprises. It comes as no surprise that these three companies all have their origins in the field of healthcare: the drugmaker Debiopharm Group, the vaccine developer Crucell – an affiliate of Johnson & Johnson – and the orphan disease specialist Actelion are the three largest Swiss biotechnology companies in terms of headcount.



Number of companies of a specific size and the number of staff employed by these companies.

Fields of Activity

Business for Biotechnology

health/medicine (incl. animal health)

agricultural biotechnology

industrial biotechnology

non-specific biotechnology

bioinformatics

Main areas of activity in dedicated biotechnology companies (only one classification per company)

Switzerland has been a stronghold for the pharma and medtech business for decades. Thus, it is not surprising that it is the healthcare sector where biotechnology's impact on society and the economy becomes most apparent. The search for new therapies, vaccines or biomarkers represents one of the most important applications of biotechnology. 99 Swiss dedicated biotech companies were active in the 'red' or healthcare sector in 2012 (67.8% of all dedicated biotech companies).

Biotechnological methods, however, are used further afield than just healthcare and medicine. Nine dedicated companies (6.2%) concentrate their business on industrial or 'white' biotechnology. These companies develop new production processes or bioproducts. The 'green' or plant biotechnology sector seems to play only a minor role in Switzerland: Bioreba AG, a company focused on diagnostic testing for plant diseases, is the only Swiss biotech company (0.7%) active in this field. However, the low figures for white and green biotechnology companies do not reflect the true significance of these sectors. Industrial biotechnology processes are primarily of interest to the chemical industry. The same holds true for plant biotechnology: modern biotechnological breeding techniques are regularly used to complement classic approaches. This is why a large number of activities do not take place in the dedicated biotechnology companies themselves but directly within biotechnology-active

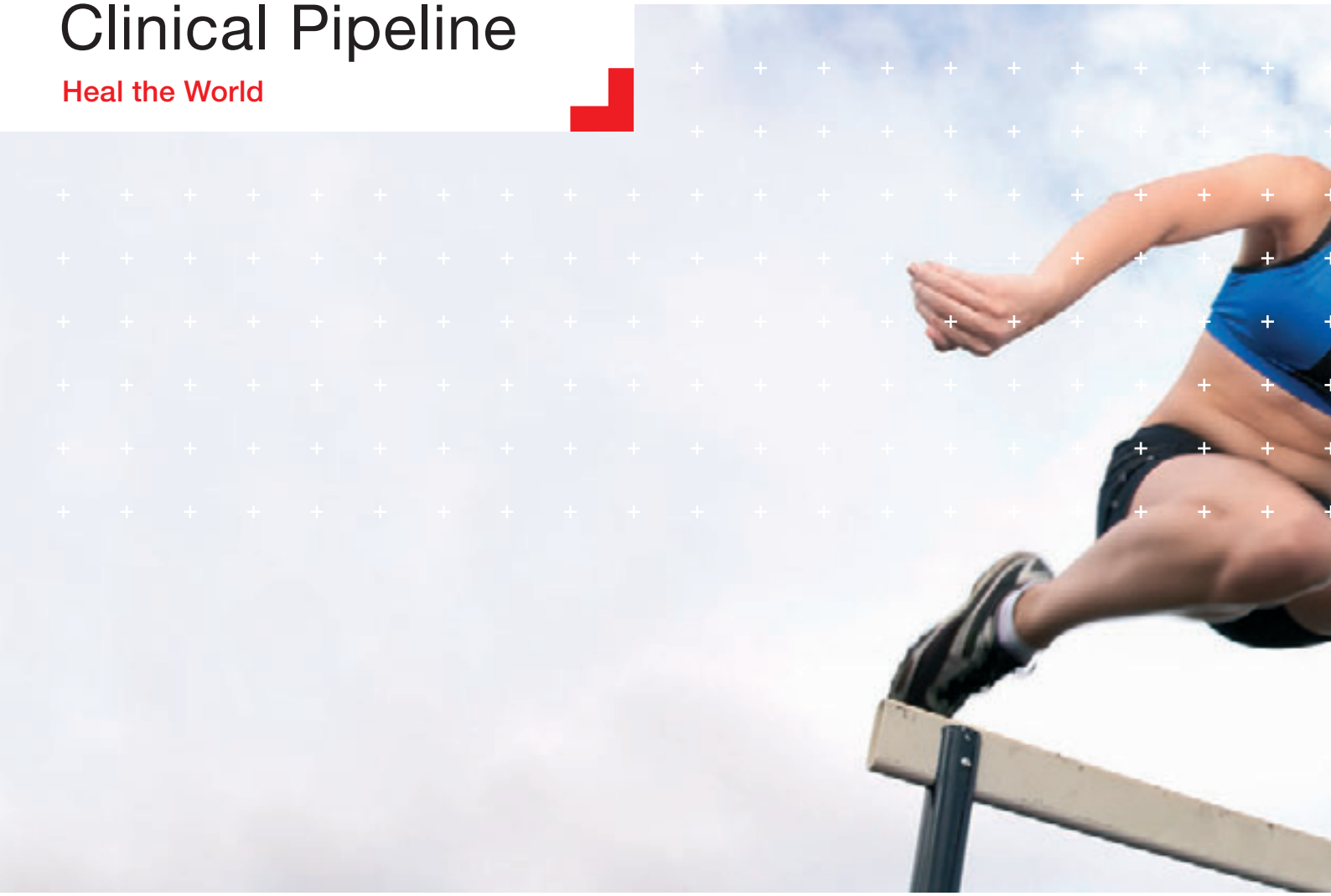
large-scale enterprises. Sigma-Aldrich and DSM are two examples of companies that are active in industrial biotechnology besides several other lines of business. Syngenta – one of the world's leading seed manufacturers – is another one. As it uses traditional techniques as well as genetic engineering to produce seeds and develop new varieties, it is considered to be a 'green' biotechnology-active company.

In addition to these companies, whose line of business addresses a single market segment of the biotechnology sector, there are also many companies which offer 'non-specific' applications and services. With 31 companies (21.2%), this is indeed the second largest sector in Swiss biotechnology. This includes all companies that work mainly for other biotechnology companies or that are active as a supplier. This category also includes contract manufacturers of biological molecules such as the Lonza Group. A group of six companies (4.1%) is dedicated to bioinformatics. These firms develop software tools for generating useful biological knowledge.

Furthermore, there exist a wide range of plant engineering companies situated in Switzerland which play a big role for the biotech industry. According to OECD criteria these services are not included in the biotechnology definition. For this reason, these companies are not represented with facts and figures in this report.

Clinical Pipeline

Heal the World



The Swiss life science landscape prides itself not only on top-notch basic research but also on a commendable hustle in clinical research that puts Switzerland ahead of most European life science hubs. Small and medium-sized biotech companies also make their contributions to the country's clinical pipeline in the slipstream of the big pharma companies.

Swiss biotech companies: 8 drugs already approved and on the market

Including the year 2012, eight marketed drugs have been successfully developed by Swiss dedicated biotechnology companies so far. New to this ivy league is Esmya from PregLem SA (now Gedeon Richter) as a pre-operative treatment for uterine fibroids. The progesterone receptor modulator is the most advanced product manufactured by the company from Plan-les-Ouates.

In 2012, three more candidates were in the process of being approved. All of them – approved and yet-to-be-approved molecules – are considered to be small molecules. Swiss biotech SMEs are therefore still waiting for their first marketed biological. When it comes to the 65 drug candidates being developed in Phase I to III clinical trials, the number of biologicals and small molecules is almost similar. In 2012, five small molecules and three biologicals were in Phase III testing. In phase II, there are ten and sixteen, respectively, and in Phase I, there are sixteen small molecules and fifteen biologicals right at the beginning of development. These numbers do not represent all R&D projects dedicated biotech companies had in their portoflio in 2012. Only the number of active ingredients was counted (see page 30 for methodology).

Actelion and Debiopharm leading the pack

Actelion was one of the most active biotech companies in 2012. The firm from Allschwil near Basel focuses on endothelial-related compounds. Indication-wise, Actelion has concentrated on rare diseases. So far it has brought three small molecules to the market. Tracleer is an endothelin receptor antagonist used in the treatment of pulmonary artery hypertension (PAH), Veletri a prostaglandin-derivative is also used in PAH and Zavesca is a synthetic analogue of D-glucose for treating Niemann-Pick disease type C and Morbus Gaucher type 1. Actelion's pipeline boasted nine candidates in 2012, with PAH drugs Macitentan and Selexipag being the two most advanced ones. Drug candidate Macitentan, for example, met the primary endpoint in a Phase III study in patients with PAH. Based on this, the company applied to both the US-American FDA and Europe's

EMA for a marketing authorization. In December 2012, the FDA announced acceptance of the application. But there's more to come: last year, the two Phase II molecules, Ponesimod (against chronic plaque psoriasis) and Cadalozid (against C. difficile-associated diarrhea) performed well and tests are being continued in Phase III.

Debiopharm Group from Lausanne has in the past evolved into a biopharmaceutical company with a global reach. The drugmaker was established already in 1979. It has developed two molecules present in five products which are commercialized in three product categories worldwide. Oxaliplatin as Eloxatin to treat colorectal cancer and the decapeptide triptorelin – as Decapeptyl in three formulations and a broad range of indications – and as Salvacyl to treat severe sexual deviations. The new formulation Debio 8206 CPP is tested in a Phase III study in the rare disease of central precocious puberty. Another phase III study is ongoing with the cyclophilin inhibitor Alisporivir (Debio 025) as treatment for hepatitis C. The Lausanne-based company is also managing a drug candidate in a Phase I/II trial: Debio 0932 is a small molecule inhibitor of heat shock protein 90 licensed-in from Curis Inc. (US). It is tested in patients with advanced cell lung cancer.

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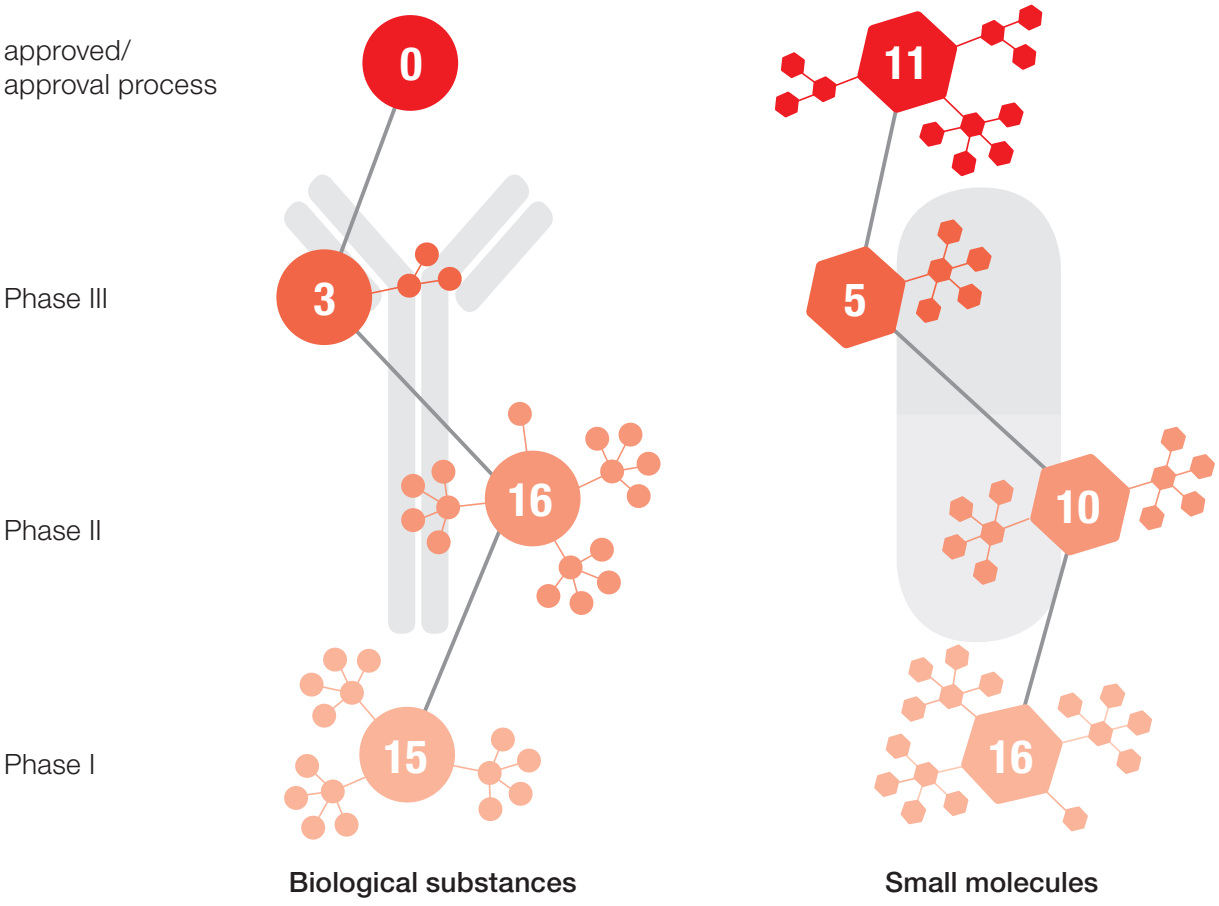
DRUG CANDIDATES IN CLINICAL DEVELOPMENT BY SWISS BIOTECH COMPANIES IN 2012

DRUG CANDIDATES OF CURRENTLY OPERATIVE DEDICATED BIOTECH COMPANIES



Small and medium-sized companies are the backbone of clinical research

Good news also from Basel where, in October 2012, Basilea Pharmaceutica Ltd. received the go-ahead to apply for a European marketing authorization for Ceftobiprole, a cephalosporin antibiotic. One step behind is Isavuconazole. The antifungal is tested in various Phase III trials as a therapy against yeasts (such as Candida species) and molds (such as Aspergillus species). Basilea's most important drug Toctino was at the centre of a distribution agreement with GSK company Stiefel. The GSK subsidiary agreed to pay 216 million Swiss francs upfront and possible milestone payments up to 74 million Swiss francs for the exclusive worldwide rights. The intravenously administered formulation is used to treat adults with severe chronic hand eczema. However, Basilea kept an orally administered formulation of the drug candidate in-house. In March 2012, the company said that a Phase III study in the same indication had met the endpoints.

Three more companies have candidates that overcame all hurdles and went into Phase III testing. AmVac AG from Zug has its candidate vaccine AMV100 in a Phase III trial in the indication gynecological inflammations caused by bacteria and trichomonads. Finox Biotech from Burgdorf also pushed the development of its biosimilar Bemfola into Phase III as did Lausanne-based Gene Signal International SA with its lead drug candidate GS-101. Finox's product is a recombinant-human Follicle-Stimulating Hormone (r-FSH) used to stimulate the ovaries in the context of treatment for infertility; Gene Signal's product is a topically applied antisense oligonucleotide to help patients with a corneal graft.

APPROVED THERAPEUTICS OF DEDICATED BIOTECHNOLOGY COMPANIES

Company	Drug	Indication
Small molecules		
Actelion Pharmaceuticals Ltd.	Tracleer®	Pulmonary arterial hypertension (PAH)
	Veletri®	Pulmonary arterial hypertension (PAH)
	Zavesca®	Mild to moderate type 1 Gaucher disease, treatment of progressive neurological manifestations in adult patients and pediatric patients with Niemann-Pick type C disease (NP-C)
Basilea Pharmaceutica AG	Toctino®	Chronic hand eczema
Debio Recherche Pharmaceutique S.A. (DRP)	Eloxatin®	Early and advanced stages of metastatic colorectal cancer
	Decapeptyl®	Advanced prostate cancer, endometriosis, precocious puberty, in-vitro fertilisation programs, uterine fibroids
	Salvacyl®	Prostate cancer
Preglem	Esmya®	Uterine fibroids

DRUG CANDIDATES OF DEDICATED BIOTECHNOLOGY COMPANIES IN CLINICAL PHASE III

Company	Drug candidate	Indication
Biologicals		
AmVac AG	AMV100	Acute, subacute and chronic gynecological inflammations
FINOX Biotech	Bemfola	Treatment for infertility
Gene Signal International SA	GS-101	Progressive Corneal Neovascularisation
Small molecules		
Actelion Pharmaceuticals Ltd.	Macitentan	Pulmonary arterial hypertension, Digital ulcers associated with systemic sclerosis
	Selexipag	Pulmonary arterial hypertension
Basilea Pharmaceutica AG	Isavuconazole	Severe invasive fungal infections
Debio Recherche Pharmaceutique S.A. (DRP)	Debio 8206 CPP	Central precocious puberty (CPP)
	Debio 025/Alisporivir	Hepatitis C

Collaboration

Achieve More Together

In a cross-sectional technology like biotechnology, collaborations are especially important for successful research into new scientific ideas and the development of new biotechnological products, processes and services. Collaborations along the entire value chain have now become a way of life for most biotechnology companies. Companies tend to choose different partners depending on a product's development stage.

The 56 companies that took part in this section of the study participated in about 930 collaborations in 2012. These companies rely on a strong network of collaboration partners particularly in early research and development (699 collaborations). It is easier to collaborate in precompetitive issues of basic research which do not directly affect business secrets. Basic research is the natural domain of universities (156 collaborations), but other biotech companies itself (206) and the industry (76) are also important partners in this early stage.

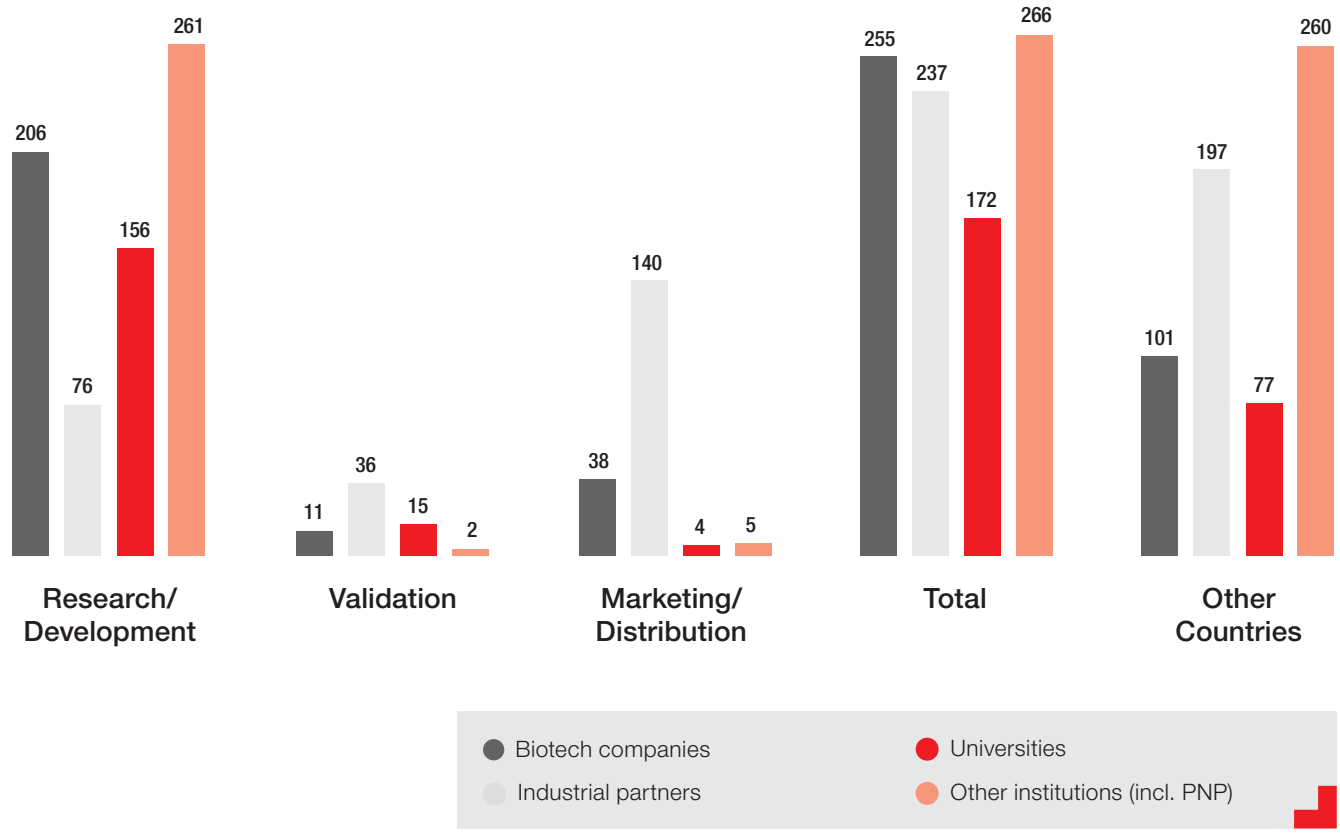
In the validation phase, many companies try to protect their intellectual property and trade secrets. Collaborations in this stage are rather uncommon (64 collaborations). If at all, they take place between different biotechnology companies (11 collaborations) or other industry partners (36 collaborations).

Many dedicated biotechnology companies rely on a strong partner for marketing and distribution. In most cases, large-scale enterprises have a sufficient sales force to distribute a product across all of Europe or even globally. It is therefore not surprising that biotechnology companies (38 collaborations) and other industry enterprises (140 collaborations) are the preferred collaboration partners.

Biotech made in Switzerland: Global outreach

Relationships within the biotechnology sector are not confined by national borders. This holds especially true for an export-oriented country like Switzerland. Approximately two out of three alliances in the biotechnology sector (635 collaborations) boast at least one international partner.

COOPERATIONS OF DEDICATED BIOTECHNOLOGY COMPANIES ALONG THE VALUE CHAIN



Turnover and R&D Expenditure

Innovation Drives Revenues

With respect to turnover, Swiss dedicated biotechnology companies have demonstrated impressive resilience to the economic crisis. Revenues in the biotechnology sector amounted to almost five billion Swiss francs in 2012. This sum includes revenues from the sales of products and services as well as upfront and milestone payments from licensing agreements.

It goes without saying that the 99 medical biotechnology companies contribute the lion's share of revenues. Indeed, at well above 4.8 billion Swiss francs, about 98.2% of all revenues originate in this field. The still small but growing number of approved biotech drugs or companion diagnostics are possible sources for these revenues. This is also the reason why the state of a few companies has a significant effect on the sector's overall performance. Actelion Pharmaceuticals Ltd. and Debiopharm Group deserve a special mention in this context. These two drug developers alone are responsible for the bulk of sales.

Allschwil-based Actelion has specialized in developing drugs for orphan diseases. It brought to the market the first oral treatment approved for pulmonary arterial hypertension, a rare but life-threatening disorder that severely compromises the functions of the lungs and heart. The endothelin receptor antagonist reached blockbuster status within a couple of years, with annual revenues exceeding one billion Swiss francs. While all Actelion's approved drugs were in-licensed from other companies, the Allschwil-based drugmaker has focused its current clinical pipeline on in-house developments.

Different roads to success

The drugmaker Debiopharm follows a different business model. The Lausanne-based biopharmaceutical company relies on in-licensed pharmaceuticals, presenting potentially superior therapeutic proteins. Established in 1979, the company has developed two molecules present in five products that are commercialized worldwide. Debiopharm invests in the molecules that it in-licenses while bearing the entire financial risk. Debiopharm's main source of income consists of royalty payments, a portion of which is shared with the originators of the molecules.

Lab reagents: Less visible but as important

Many less visible products are also an important source of revenue. Trade with laboratory reagents and services which cannot be allocated to health, industrial biotech or agribusiness was the second largest source of

income. These businesses generated a turnover of 38.3 million Swiss francs in 2012, about 0.8% of the overall revenue in the sector.

The industrial biotech sector accrued revenues of 25.6 million Swiss francs in 2012. This corresponds to 0.5% of the total revenue in biotechnology. It is important to note, however, that because white biotechnology is primarily of interest to chemical and other industries, a large number of activities in this field do not take place in the dedicated biotech companies themselves but in biotechnology-active large-scale enterprises such as Sigma-Aldrich or DSM.

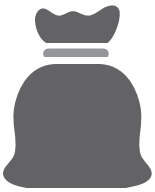
Bioinformatics has become an important part of many areas of biotechnology. Six Swiss companies are committed to developing software tools for generating useful biological knowledge and for improving upon methods for storing, retrieving, organizing and analyzing biological data. These companies accrued 23.5 million Swiss francs in turnover, about 0.5% of all revenues generated in 2012.

Compared to the sector as a whole, the income generated by dedicated plant biotechnology companies is negligible.

Exceptional high research intensity

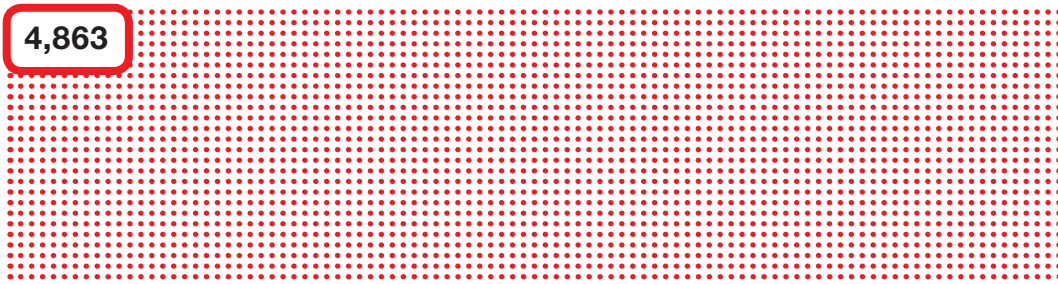
Cross-sectional technologies are usually exceptionally research-intensive. This holds true for the biotechnology industry as well. Companies often have to spend millions of euros in research and development (R&D) before they can bring a product to the market. This is highlighted by the 1.7 billion Swiss francs invested in R&D by dedicated companies in 2012. On average, Swiss dedicated biotechnology companies spent more than 34% of their turnover on R&D. This makes the sector one of the powerhouses for innovation in the confederation. The research intensity in Switzerland (nationwide R&D expenditures as a percentage of the gross domestic product) was at 3% in 2009 (latest year data available). This value is one of the highest in Europe and the world: Switzerland clearly outperforms the EU and the United States.

The development of strong competences in environmental and life sciences is favored by the strong links between a scientific system that performs well and a powerful pharmaceutical and life science industry that picks up this knowledge, develops new technologies and in turn invests in the production of greater knowledge thus generating a virtuous circle.



4,952 Mio. CHF

Revenue (in Mio. CHF)



1,686 Mio. CHF

Investment in R&D (in Mio. CHF)

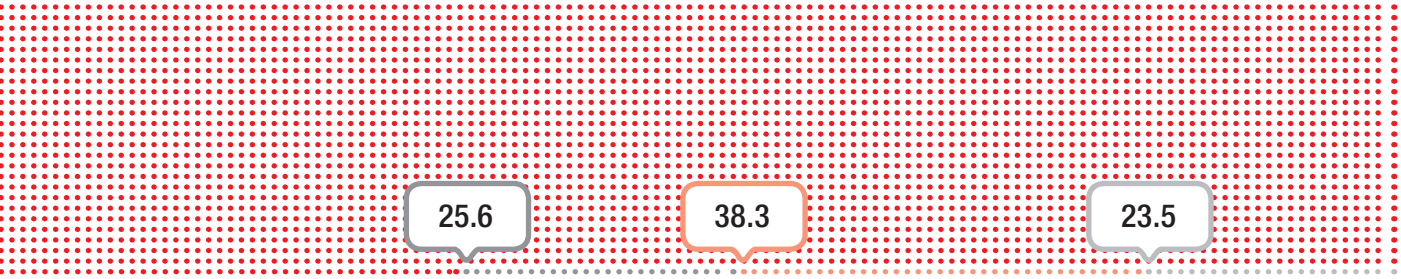
Indeed, most R&D investments are made in the healthcare sector. 99 dedicated red biotechnology companies spent 1.67 billion Swiss francs in 2012 (98.8% of all R&D expenditure in biotechnology). Given the paramount influence of this segment on the entire sector, it is hardly surprising that the research intensity in the red biotechnology sector (34.3%) is comparable with the average research intensity across all fields. There are other reasons, however, as to why the development of new drugs and diagnostic tools is so expensive. The company's clinical research forms the basis for approval decisions by the regulatory authorities. There are strict standards concerning, for example, the quality of the product and documentation of the production process. It is only possible to meet these requirements with high financial expenditure. Late stage clinical studies needed for approval of new drugs are regularely done with hundreds of patients distributed across several centers. These large-scale studies can easily cost tens or even hundreds of millions of Swiss francs.

Industrial biotechnology is a trending topic

Industrial biotechnology has experienced a growth in significance in recent years. More and more industries recognize the economic impact of biotechnological applications. The "biologization of the industry" has become a well-known saying. This is reflected in the exceptionally high research spending in the sector as percentage of turnover: 48.2% of turnover is spent on R&D. The nine industrial biotechnology companies invested 12.3 million Swiss francs in R&D projects in 2012 (0.7%).

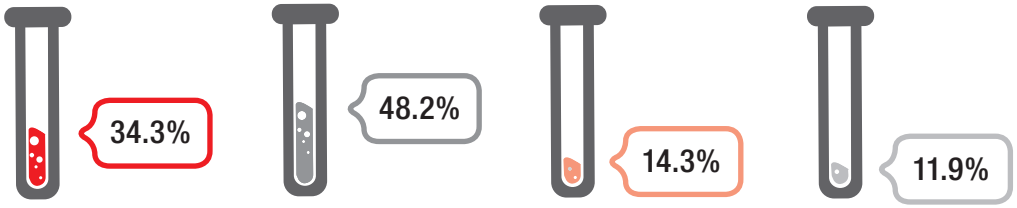
The 31 Swiss dedicated biotechnology companies offering non-specific services spent 14.3% of their turnover on R&D. Their investments totaled 5.5 million Swiss francs in 2012 (0.3%).

Bioinformatics uses many areas of computer science, mathematics and engineering to process biological data. However, in order to analyze and store the biological data in a meaningful way, ongoing investments are mandatory. R&D spending totaled 2.8 million Swiss francs in 2012 (0.2%) which correlates with a research intensity of 11.9%.



Ø 34.1%

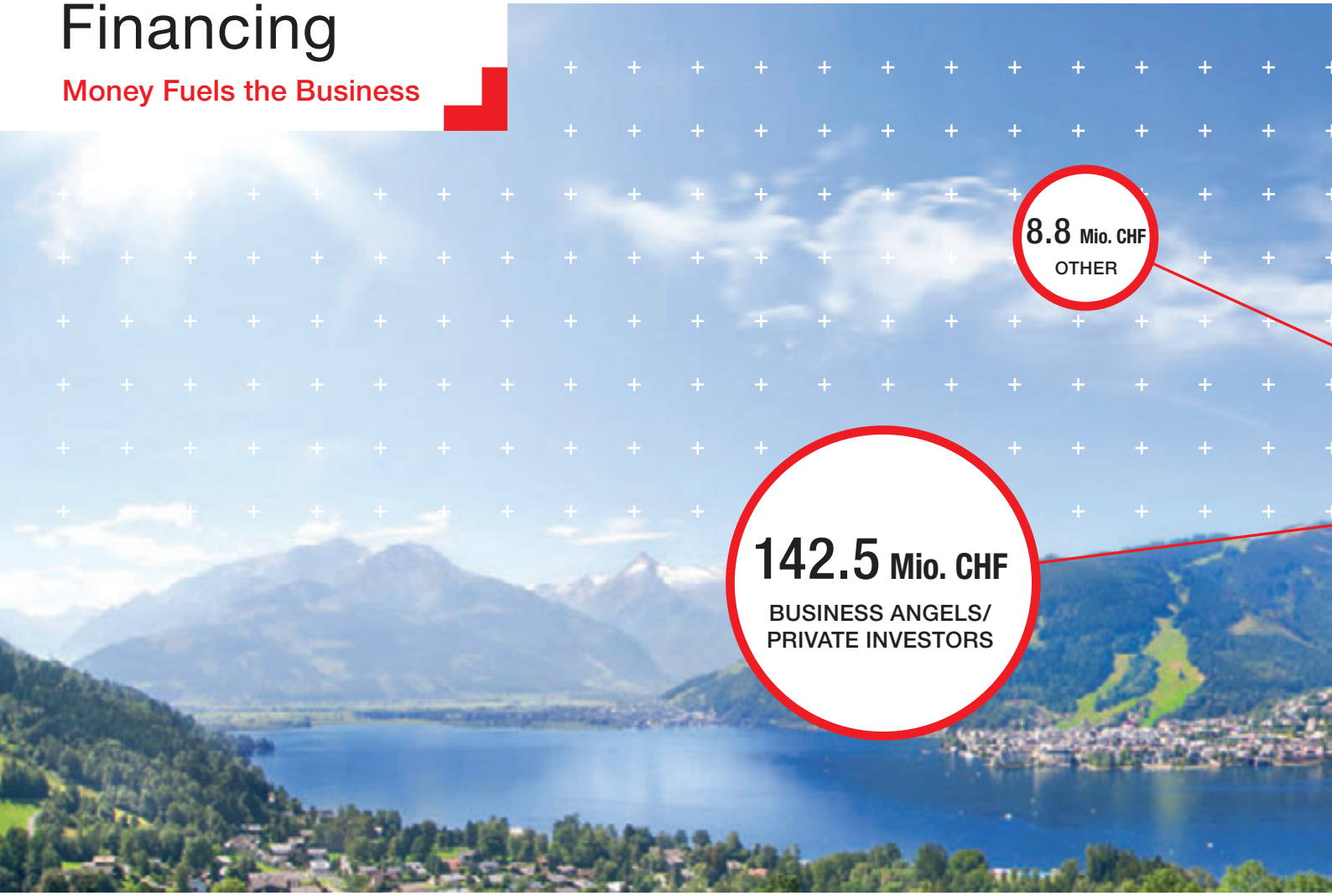
Research intensity (R&D-spendings as percentage of turnover)



- health/medicine
- industrial/agricultural biotechnology
- non-specific services
- bioinformatics

Financing

Money Fuels the Business

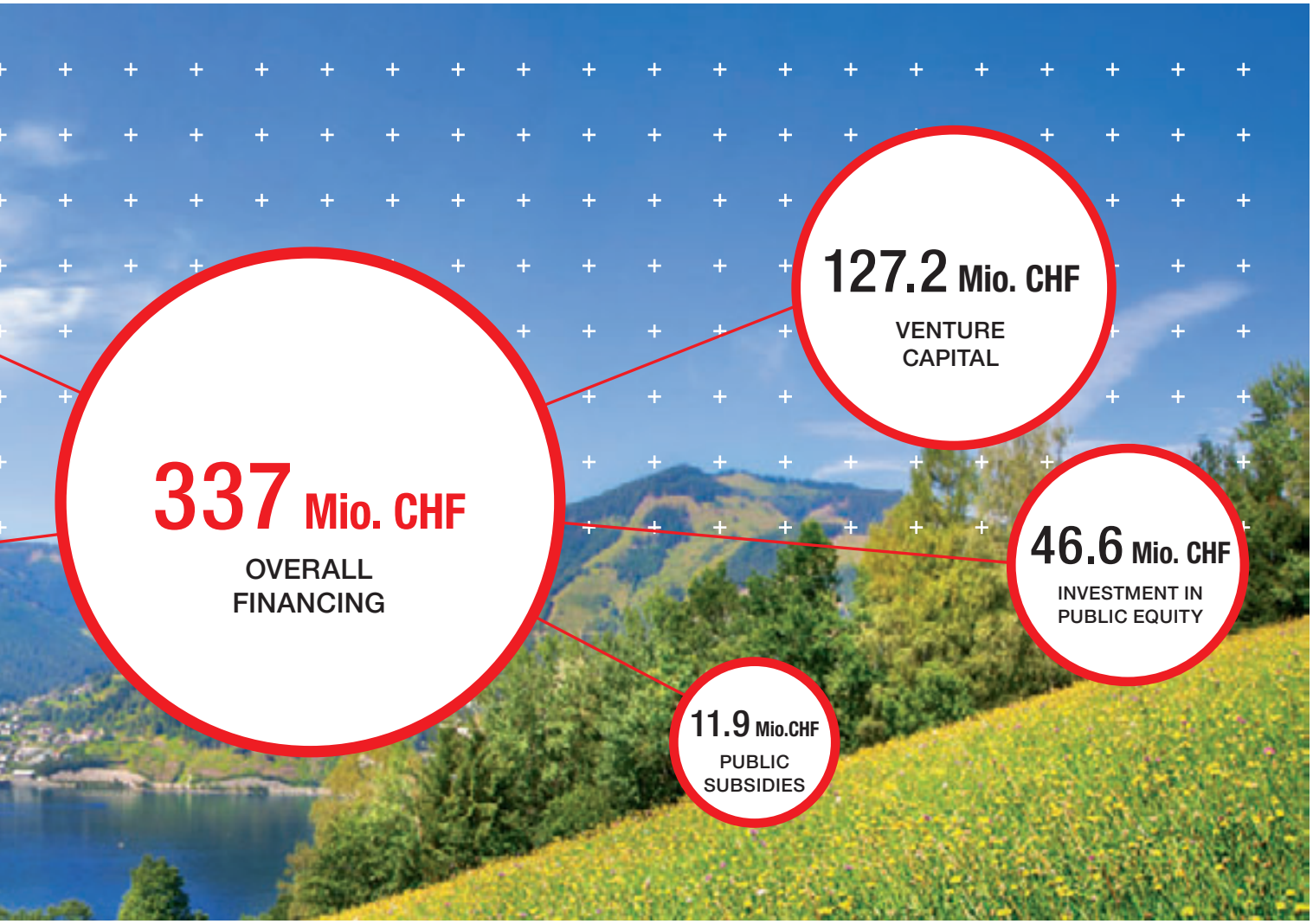


The euro crisis and the strong Swiss franc challenged the Swiss economy as a whole. The biotech and pharma companies coped with the situation remarkably well. They showed a strong performance in financing their business. All in all, 337 million Swiss francs in external financing flowed into the sector in 2012. This figure includes funds from venture capitalists, institutional and private investors, grants and other contributions.

Private investors back entrepreneurial spirit

Venture capitalists and investors in public equities play a pivotal role in financing the biotechnology industry. At more than 173 million Swiss francs, more than one in two francs invested in biotech came from this source (51.6% of the total financing volume). The lion's share of this sum was invested as venture capital. Privately held companies disclosed that they had attracted an aggregated sum of at least 127 million Swiss francs (37.7%). Publicly traded enterprises pulled in a total of 47 million Swiss francs (13.8%). As in many other European countries, there was no IPO of a dedicated biotechnology company on the stock exchange in 2012. The second major source of funding came from business angels and private investors. They fueled the industry with another 142 million Swiss francs (42.3%). Public subsidies and grants, which are especially important to many start-up companies and small businesses, totaled about 12 million Swiss francs in 2012 (3.5%). Nine rounds of financing of privately-held dedicated biotechnology companies were made public in 2012. ADC Therapeutics Sàrl managed to attract the largest single private equity investment in a Swiss dedicated biotechnology company in 2012 – about 47 million Swiss franc. The Lausanne-based company is developing a pipeline of proprietary Antibody Drug Conjugates (ADCs) for the treatment of cancers. A group of international investors centered around the British venture capitalist Celtic Therapeutics Management L.L.L.P formed the company in March 2012.

In December 2012, Biocartis S.A. secured an almost equally large amount of money. A series D financing worth 42 million Swiss francs was entirely backed by existing investors. The Lausanne-based molecular diagnostics company announced will use the proceeds to commercialize its own technology platforms. Genkyotex of Geneva was the third Swiss biotech company which nailed down financing that ran into tens of millions of Swiss francs. In July 2012, the company rallied its existing backers to extend its Series C round by 26 million Swiss francs. The fresh money will be used to advance clinical development of Genkyotex's lead compound, the NOX1/4 inhibitor GKT137831, through Phase II development for the treatment of diabetic nephropathy. Telormedix is a



clinical stage biopharmaceutical company focused on targeted immunity therapies in the treatment of cancer and other diseases. In mid-January, the company raised 7.5 million Swiss francs from Aravis Venture and Proquest Investments. The money will enable Ticinese Telormedix to further advance its product candidates through preclinical and clinical trials.

A new dawn for Lake Geneva region

The German pharma company Merck was involved in at least two rounds of financing for dedicated biotechnology companies in 2012. In the spring of that year the company announced its decision to close down the Geneva headquarters of its biopharmaceuticals division Merck-Serono. It initiated the Entrepreneur Partnership Program (EPP), a fund worth 30 million Swiss francs, to facilitate spin-offs whose work focused on business activities launched at Merck Serono in Geneva. Within the first year of its creation, the EPP supported a total of six new companies, four of them are defined as dedicated biotech companies along OECD criteria. But only two of them started their operative business in 2012. Quartz Bio, based in Plan-les-Ouates, Geneva, offers biomarker data management and exploratory biomarker analysis services. Prexton Therapeutics has been the first spin-off company to secure funding through the EPP. The company will use the 2.1 million CHF seed investment to develop a metabotropic glutamate receptors program for Parkinson's disease. ProteoMediX AG, Sophia Genetics SA and PIQUR Therapeutics Ltd. completed smaller financing rounds.

Cytos Biotechnologie AG and Addex Therapeutics AG, two publicly traded companies, found access to fresh capital through the stock exchange. Cytos Biotechnology, based in Schlieren, closed a combined equity and debt financing round of 37 million Swiss francs. The immunodrug specialist issued new shares worth 23.75 million Swiss francs in total and raised an additional 13.25 million Swiss francs in secured convertible loan notes. Cytos intends to use the proceeds primarily to conduct a phase IIb study in allergic asthma with its lead compound CYT003-QbG10. The Toll-like receptor 9 agonist inhibits the immune response that causes asthma. Geneva-based drug developer Addex Therapeutics has nailed down 9.6 million Swiss francs of financing through a private placement in October 2012. Two of the company's lead products are being tested in clinical phase II: dipraglurant (ADX48621), an mGluR5 negative allosteric modulator for treating Parkinson's disease levodopa-induced dyskinesia (PD-LID). Adex's partner Janssen is developing ADX71149, an mGluR2 positive allosteric modulator for treating schizophrenia and anxiety seen in patients suffering from major depressive disorder.

International Comparison

Switzerland Leading the Pack

In an international comparison, the Swiss biotech industry occupies a good position. At 146 companies, the number of dedicated biotech companies is fairly high for this relatively small country. On a global scale, the US remains the leading country for biotech. Some 2,300 companies are based in the US; many of these are of global significance. Significant biotech locations have also emerged outside the US; a number of Asian Countries, South Korea or Japan for example, are now playing an increasingly important role.

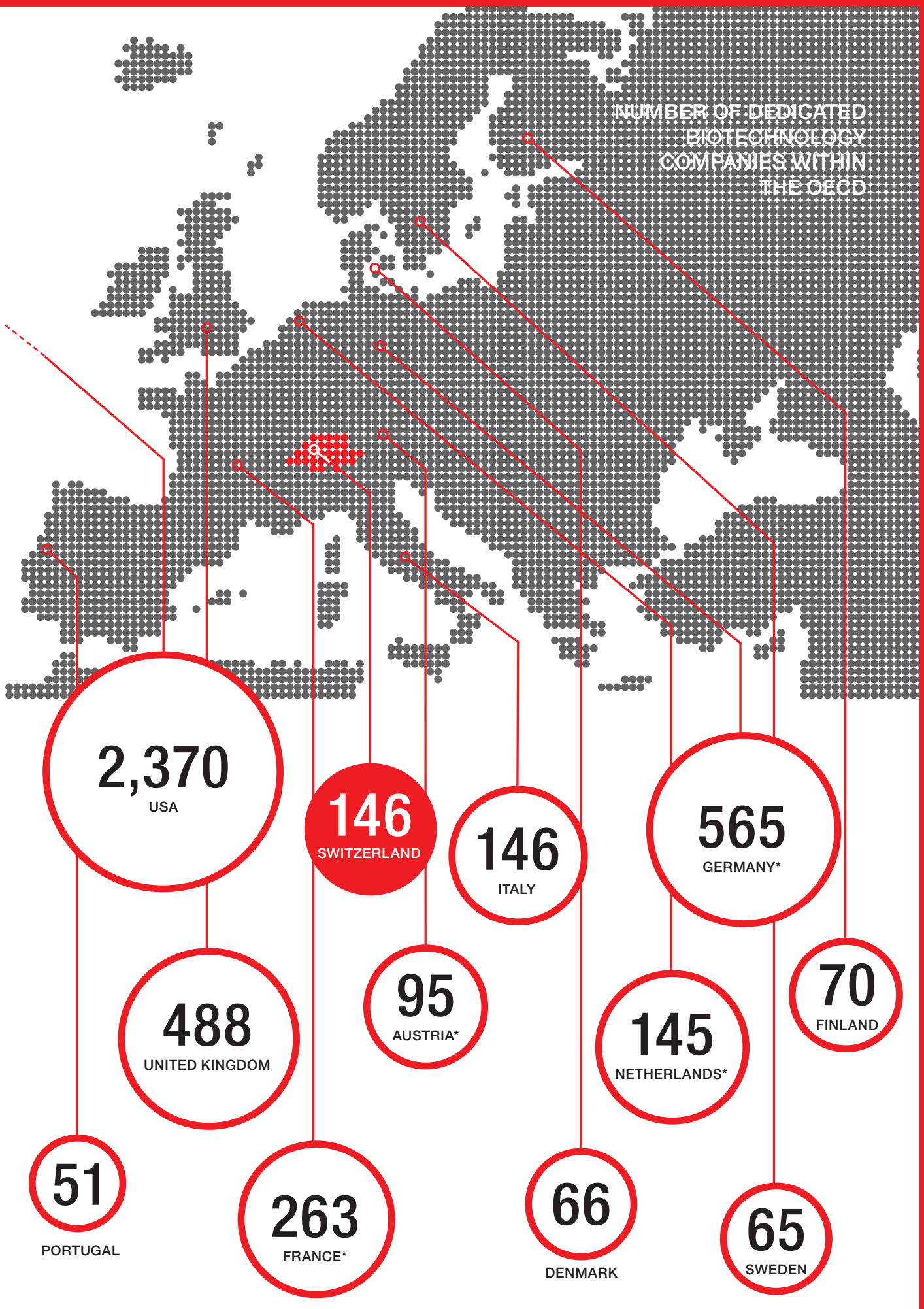
Switzerland as a trailblazer for medical biotechnology

Nevertheless, European biotechnology counts among the heavyweights. Without doubt Switzerland is one of the forerunners in biotechnology – even though some larger European economies, such as Germany, have more biotechnology companies (565) than Switzerland. However, Switzerland's neighboring country Austria, with a population comparable to Switzerland, has about a third fewer firms (95).

The success and competitiveness of the Swiss biotech industry becomes even clearer if other indicators are analyzed. Swiss dedicated biotech companies have succeeded in bringing blockbuster drugs to the market in the past. This is why the turnover in the sector, more than 4 billion euros in 2012, exceeds the revenues of many other European countries, including Germany (2.9 billion euros) and Austria (188 million euros).

Swiss biotech companies have recognized that continuous investments are needed in research and development (R&D), in order to catapult themselves to the top position and to settle there. R&D expenditures far in excess of 1.3 billion euros are a clear indicator of this. With a research intensity of 34%, the Swiss biotech industry is spending as much money on R&D in relative terms as Germany (934 million euros, 32%).

Despite economic crises in other parts of the world and in spite of the relative strength of the Swiss franc, Switzerland's biotechnology industry has proven that it can withstand world turmoil. Thus the sector is ideally positioned to defend its already leading role in many healthcare-related fields and to extend its business into adjacent niches.



Source: OECD Biotechnology Statistics 2012 | *updated from other sources

Prospects

A Bright Future

Biotechnology is a major driver of innovation in many industries. Nowadays, the most visible benefit of this cross-sectional technology is in healthcare.

Medical biotechnology: Innovation made in Switzerland

The healthcare industry is one of Switzerland's powerhouses for innovation. The ageing of society, the emergence of new diseases and increasing cost pressures in healthcare systems are just three of the many challenges in medicine. The Swiss biotechnology industry benefits simultaneously from the inputs of several world-leading pharmaceutical groups and globally recognized public institutions. This is why the sector is in a unique position to become a trailblazer for promising new drug candidates, sensitive diagnostics and smart new therapies.

Biotechnological methods, however, are used further afield than just medicine. Food manufacturers, consumer goods producers, energy and chemical companies are looking to biotechnological techniques for the development of novel products or to establish more sustainable production processes. Demand for biobased innovations is growing throughout Europe and the world. Industrial nations in particular are on their way to establishing truly sustainable bioeconomies.

Paving the way to a sustainable bioeconomy

The ever-increasing world population pushes the demand for healthy food and feed. At the same time the market demand for non-food fibres and other renewable ressources is increasing from year to year. This clearly indicates that their is a demand for new seed varie-

ties, which are especially drought resistant and can be cultivated on yet too arid land. Some of Switzerland's companies have chosen to build their businesses in the field of green and white biotechnology. As early adopters, these companies have a huge opportunity to play a leading role in this emerging industry segment.

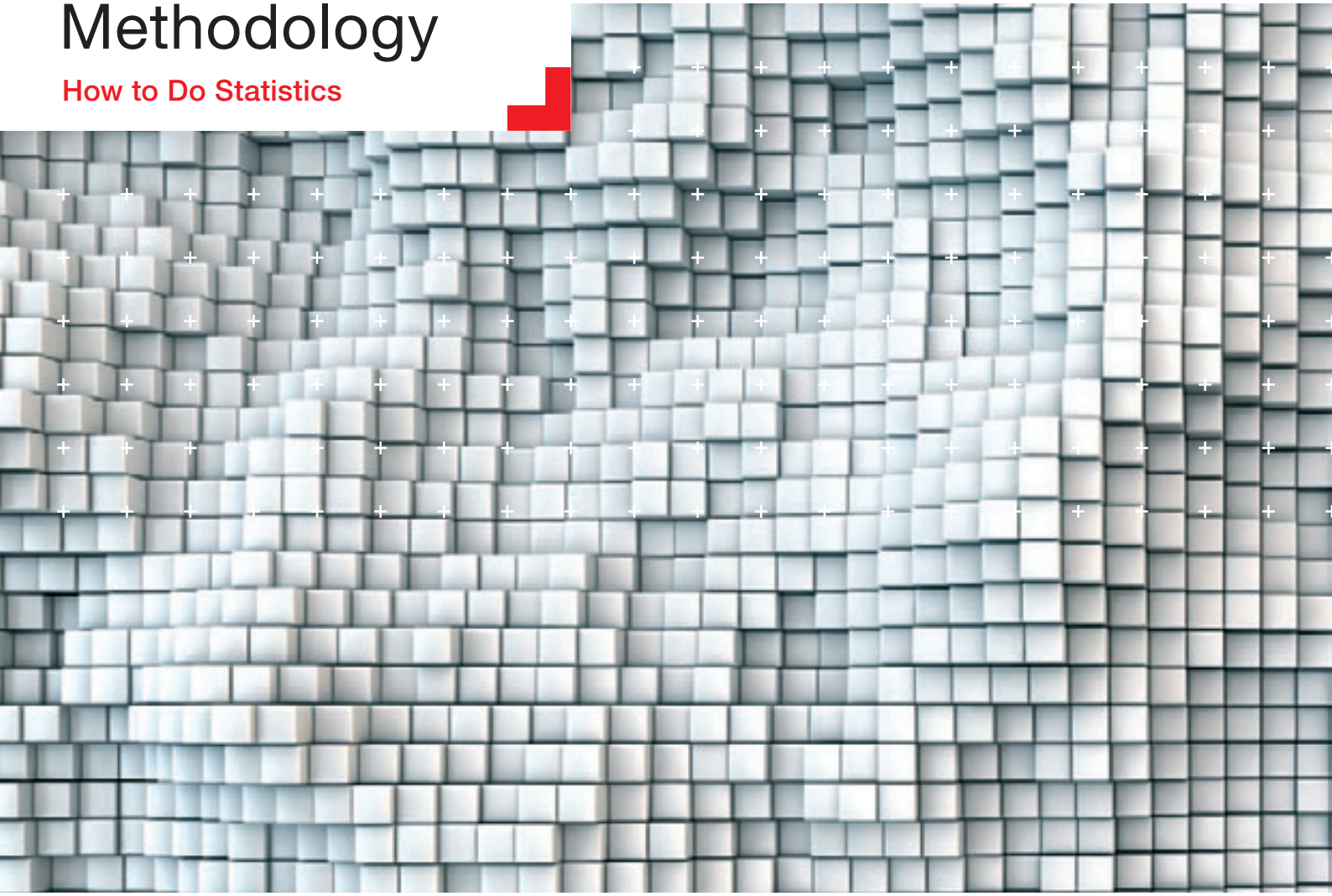
Swiss desire for consent: United we stand!

It is not only Switzerland's excellent research facilities, along with some of the world's leading life science companies and continuous political support, that provide the Swiss biotech sector with a unique opportunity to position itself as a leader in this process. Swiss biotechnology's current success is due principally to the fact that, almost two decades ago, it was agreed to focus on pharmaceutical biotechnology and to give research institutions and companies intensified public support through the Swiss Priority Programme Biotech. It may be Switzerland's centuries-old tradition of direct democracy and the pursuit of consensus which has made it possible to take advantage of this public support, to put aside one's own interest, to develop long term strategies and to create products out of ideas.

Today, the Commission for Technology and Innovation (CTI) is a major funding agency to support R&D projects of biotechnology companies. Further more, CTI helps to optimise knowledge and technology transfer through the use of national thematic networks. Together with high standards of living, the imposition of moderate taxes and a highly skilled workforce in all industries relevant to biotechnology, Switzerland clearly intends to remain one of the leading biotechnology hot spots in Europe and the world.

Methodology

How to Do Statistics



In December 2004, the OECD standardised the huge range of existing definitions of the term biotechnology. Since then, all OECD countries have been called upon to carry out surveys on biotechnology, following the so-called Framework for Biotechnology Statistics (www.oecd.org). The OECD recognises two different categories of companies within the biotech industry: dedicated biotechnology company and other biotechnologically active companies. The first of these definitions, according to the OECD, applies to biotechnologically active enterprises, whose core company goals are the application of biotechnological procedures in the manufacturing of products, the supply of services or in the execution of biotechnological research and development.

Unlike the dedicated biotech companies, the central aims of other biotechnologically active companies do not exclusively lie in the application of biotechnological procedures. The OECD thereby also includes in this category companies where biotechnology makes up only one part of the business activity. Companies are defined as biotechnologically active companies if they use biotechnological procedures for recently developed or significantly improved products or production processes. The central company aims must not be solely in the use of biotechnological procedures for the production of products, the supply of services or in the execution of biotechnological research and development. Examples of such companies are pharma firms, chemical companies or seed manufacturers. Other companies related to the biotechnology business – such as plant engineering and construction companies – are not included in this survey as their activities are not defined as biotechnology business activities by the OECD.

Concerning the clinical pipeline of the dedicated biotech companies special care was undertaken to represent the core development activities in this survey– especially

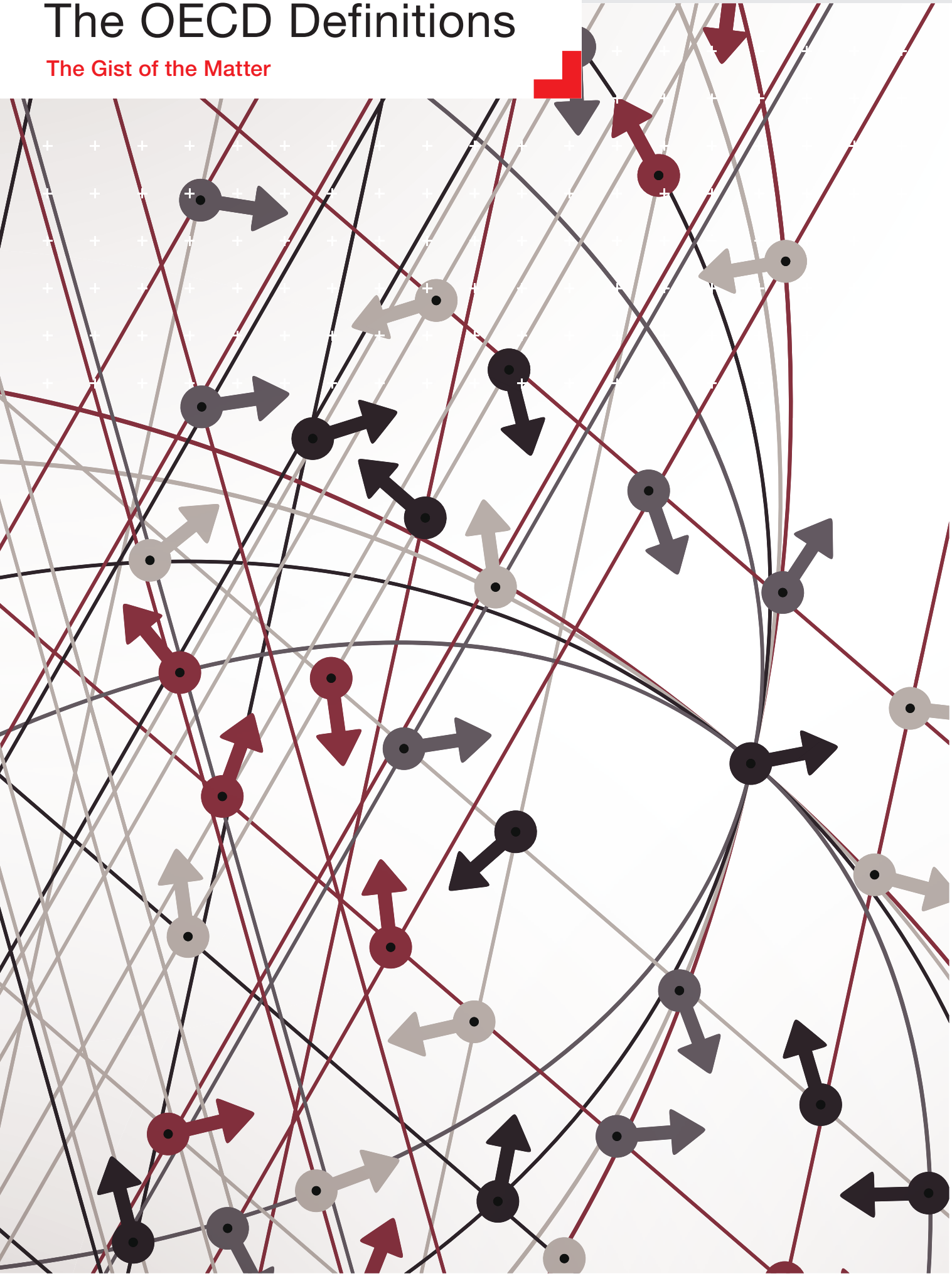
in the early clincal development, when a wide range of drug candidates are tested in different indications and formulations. For this reason the report does not include all R&D projects, but focuses on the number of active compounds the company work with in phase I and II tests.

For the purposes of this survey, BIOCOM AG has compiled a questionnaire, which is based on the OECD definition as described above. Between April and June 2013, a total of 197 companies were contacted and requested to complete the survey.

When deciding on the company selection, the OECD definition was used alongside an adjustment with the company database at BIOCOM AG. 132 of the companies answered either by questionnaire or by telephone, corresponding to a response rate of 67%. Unless otherwise indicated, based on these data facts and figures for the whole sector were carefully extrapolated. In accordance with the OECD guidelines, while selecting companies to participate, extreme care was taken to include all enterprises which are resident in Switzerland and which are active in biotechnology. Therefore, companies that are majority owned from outside Switzerland but have a company office with R&D activities in Switzerland were also considered. In surveying the employee figures, number of companies and fields of activity, the survey included only the Swiss locations of a company. If an enterprise had more than one location in Switzerland, only cumulated figures and data for the company as a whole were considered. The reference date of the survey was 31.12.2012.

The OECD Definitions

The Gist of the Matter



OECD Definitions

Biotechnology

… is defined as the application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services.

A dedicated biotechnology firm

... is defined as a biotechnology active firm whose predominant activity involves the application of biotechnology techniques to produce goods or services and/or the performance of biotechnology R&D.

An other biotechnologically active firm

... is defined as a biotechnologically active firm that applies biotechnology techniques for the purpose of implementing new or significantly improved products or processes (per the Oslo Manual (OECD, 1997) for the measurement of innovation). It excludes end users which innovate simply by using biotechnology products as intermediate inputs (for instance, detergent manufacturers which change their formulation to include enzymes produced by other firms via biotechnology techniques).

Definition areas of activity

Health/Medicine

Development of therapeutics and/or diagnostics for the field of human medicine, drug delivery, human tissue replacement

Animal health

As above, for veterinary application

Agrobiotechnology

Genetically modified plants, animals or microorganisms, as well as non-genetically modified plants grown using biotechnological procedures, for use in agriculture or forestry

Industrial Biotechnology

Biotechnological products and processes for the handling of waste or sewage, for chemical synthesis, for the extraction of raw materials and energy etc.

Bioinformatics

Construction of databases on genomes, protein sequences; modelling complex biological processes, including systems biology.

Non-specific services

Equipment or reagents based on biotechnological principles, for research or provision of services in this field (“ancillary industry”)

Further relevant terms

Biotechnology product

… is defined as a good or service, the development of which requires the use of one or more biotechnology techniques basend on the list and single definitions above. It includes knowledge products (technical know-how) generated from biotechnology R&D.

Biotechnology process

… is defined as a production or other (e.g. environmental) process using one or more biotechnology techniques or products.

Biotechnology research and experimental development (R&D)

… are defined as R&D into biotechnology techniques, biotechnology products or biotechnology prorecces, in accordance with both the biotechnology definitions presented above and the Frascati Manuel for the Measurement of R&D (OECD, 2002).

Biotechnology employment

… is defined as the employment involved in the generation of biotechnology products as defined above. For ease of collection, it is suggested that employment be measure in terms of staff numbers rather than hours worked. However, where countries prefer, they an collect this information in terms of full-time equivalents, consistent with an R&D survey approach (as outlined in the Frascati Manual).

About the SBA

1Nation – 1Cluster

The Swiss Biotech Association (SBA) is the national industry association representing Switzerland's companies working with biotechnological tools. The association was established in March 1998 and today represents more than 220 companies and institutions. Members apply biotechnological techniques to the research, development and production of therapeutics, diagnostics, agricultural and nutritional products and specialty chemicals. Member companies represent all aspects of business along the entire value chain, including supply, services, finance and consulting.

The SBA is the leading industry association active in all areas of biotechnology and the networking platform for multinational enterprises active in the field. Its members recognize the significant economic potential of modern biotechnology.

The association aims at identifying, communicating and utilizing the advantages of modern biotechnological methods and their impact on society.

The SBA supports member interests by lobbying the government and parliament in Switzerland and, where feasible, in Brussels, providing high quality information and business services and attracting investment from both private and government sources.

The SBA strives to influence and enhance greater understanding of the industry's comprehensive needs and to this end conducts extensive dialogues with organizations like seca, osec, SIX Swiss Exchange, universities and science centers, clusters in life sciences and the Financial Services Authority.

The SBA's stakeholder engagement extends beyond Swiss geography through partnerships with global biotechnology associations like BIO, Europa Bio and other national, regional and international bodies.

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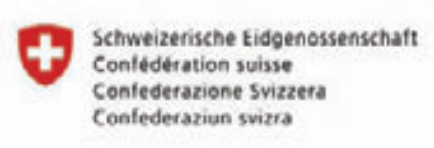

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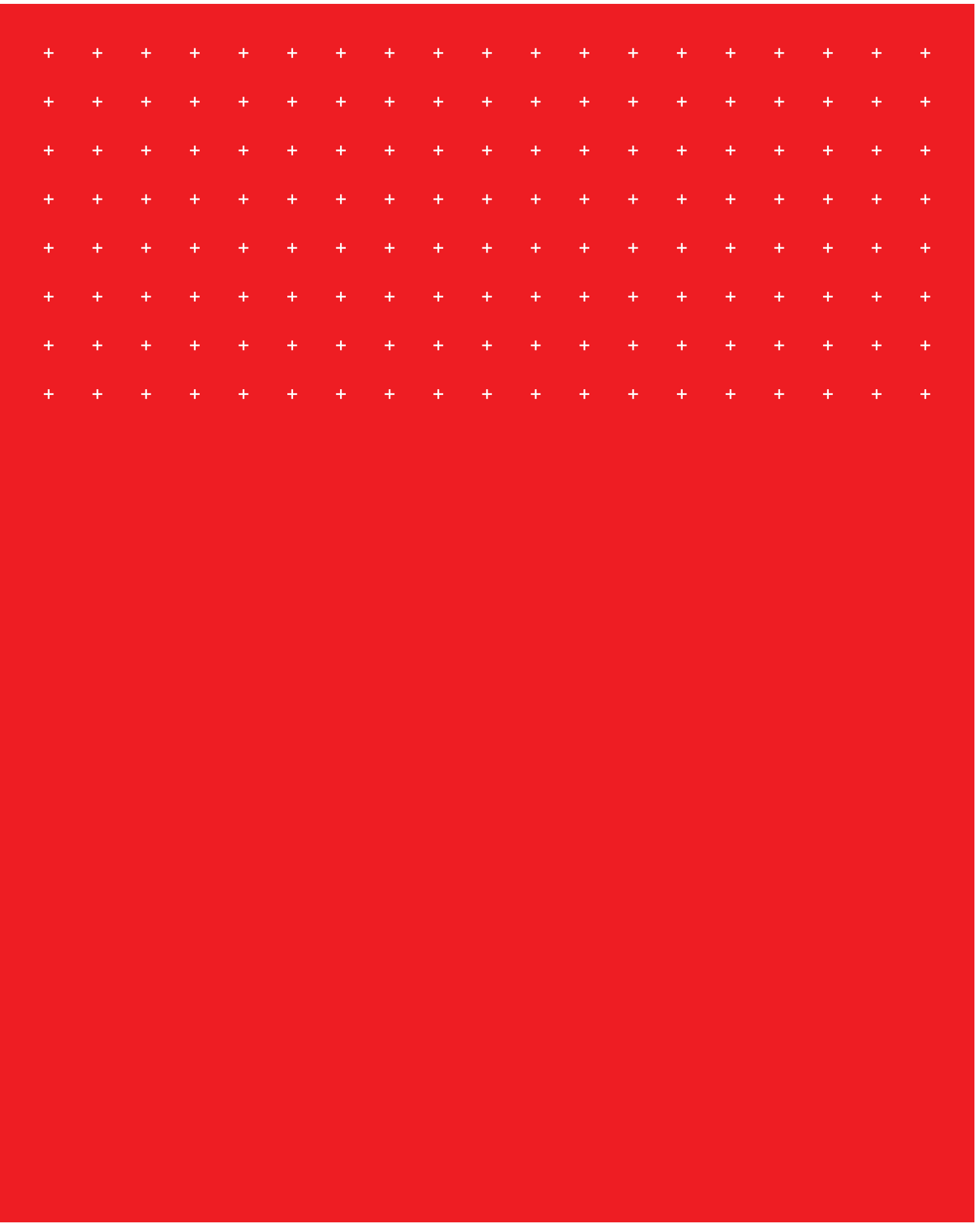

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