



# SWISS MEDTECH REPORT

**Michael DeMane, President, Medtronic Europe, Canada, Latin America and Emerging Markets**

«We have established our international headquarters, manufacturing operations and training centre in Switzerland for several reasons, not least because of its location in the heart of Europe, but also because of its reputation for quality and precision technology and a humanitarian tradition consistent with Medtronic's mission. With the proximity of advanced centres of scientific research, Medtronic actively wants to contribute to establishing the Arc Lémanique as a pool of technological excellence.»

**Ray Elliott, Chairman, President and CEO, Zimmer Holdings, Inc.**

«When we acquired Centerpulse in 2003, it was natural for us to continue to build upon the tremendous heritage for quality and innovation in orthopaedics that has existed for decades in Winterthur and throughout Switzerland. Since that time, we've received tremendous cooperation from all levels of government. Clearly, Switzerland is committed to retaining and expanding its reputation as one of the great world capitals of the medical device industry.»

### USEFUL ADDRESSES ON MEDICAL TECHNOLOGY IN SWITZERLAND

Central database of the Swiss medtech sector	<a href="http://www.swiss-medtech.org">www.swiss-medtech.org</a>
Swiss investment promotion agency	<a href="http://www.locationswitzerland.ch">www.locationswitzerland.ch</a>
Swiss export promotion agency	<a href="http://www.osec.ch">www.osec.ch</a>
Swiss innovation promotion agency	<a href="http://www.kti-cti.ch">www.kti-cti.ch</a>

#### Investors & finance

Swiss private equity & corporate finance association	<a href="http://www.seca.ch">www.seca.ch</a>
Investor database	<a href="http://www.swisslifescience.com">www.swisslifescience.com</a>
The Swiss stock exchange	<a href="http://www.swx.com">www.swx.com</a>

#### Trade associations & support

<a href="http://www.economiesuisse.ch">www.economiesuisse.ch</a>
<a href="http://www.interpharma.ch">www.interpharma.ch</a>
<a href="http://www.zurichmednet.org">www.zurichmednet.org</a>

#### Regulatory environment

<a href="http://www.swissmedic.ch/md.asp">www.swissmedic.ch/md.asp</a>
<a href="http://www.bag.admin.ch">www.bag.admin.ch</a>
<a href="http://www.swissreg.ch">www.swissreg.ch</a>



...a successful medtech location.

Dear Reader

Switzerland is a prime location for medtech companies. The new Swiss Medtech Report gives a good outline of the possibilities and serves as an information gateway to the Swiss medtech community.

What makes Switzerland a successful medtech location? In a technology-friendly environment, Switzerland offers a qualified and highly motivated workforce. Stable political and social conditions, a flexible job market as well as an effective infrastructure and the

attractive tax framework make Switzerland a rewarding choice for any innovative company.

In addition, even more specific factors define Switzerland as a medtech location: the country's strong tradition in high-precision manufacturing and machining, Switzerland's large experience in both the medical and clinical field, and excellent higher education institutions with international top rankings in research as well as teaching. Switzerland is also a small but interesting and demanding test market.

Today, every relevant skill for medtech is present and, indeed, every kind of medtech activity is performed in Switzerland. In fact, the entire value and supply chains from basic research to financing and market implementation are present here, making the cluster both horizontally and vertically effective.

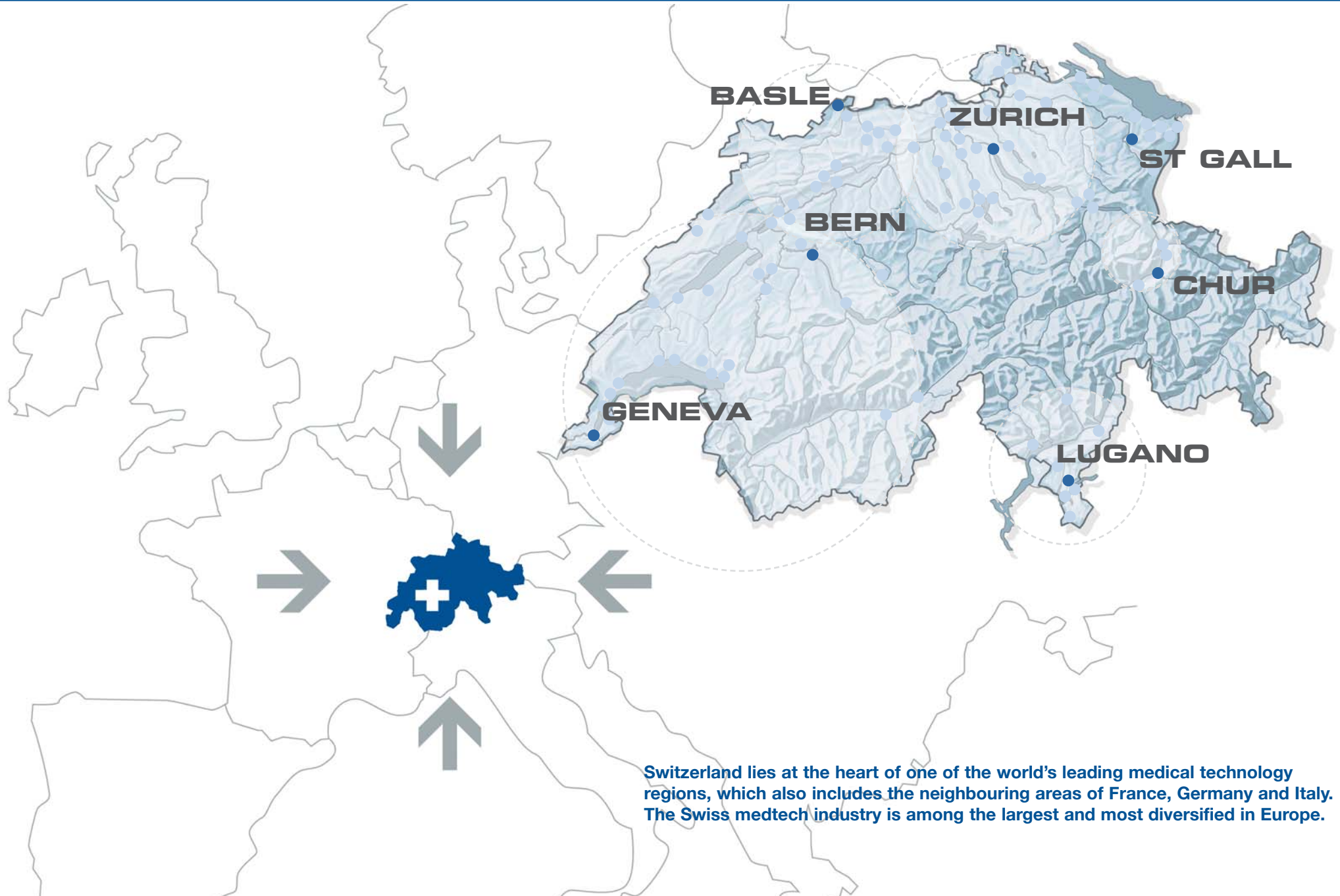
The unique combination of advantages described here and innovative and vibrant medtech research and business communities make Switzerland a true medtech gem in the heart of Europe.

Joseph Deiss  
Minister for Economic Affairs



# 04

# MEDTECH COUNTRY SWITZERLAND



Switzerland lies at the heart of one of the world's leading medical technology regions, which also includes the neighbouring areas of France, Germany and Italy. The Swiss medtech industry is among the largest and most diversified in Europe.

<b>USEFUL ADDRESSES ON MEDICAL TECHNOLOGY IN SWITZERLAND</b> .....	<b>02</b>
<b>PREFACE</b> / by Joseph Deiss, Minister for Economic Affairs .....	<b>03</b>
<b>A PRIME BUSINESS LOCATION FOR MEDICAL TECHNOLOGY COMPANIES</b> / by Location Switzerland .....	<b>06</b>
<b>INDUSTRY STATEMENTS</b>	
Interviews with Gilbert Achermann (CEO Straumann), Valentin Chapero (CEO Phonak), Willy Michel (President of the board Ypsomed) .....	<b>08</b>
<b>IMPROVEMENT IN THE ART OF LOCOMOTION THERAPY</b> / Company portrait: Hocoma, Zurich .....	<b>11</b>
<b>SCIENCE TO MARKET, MOTOR FOR SWISS MEDICAL TECHNOLOGY</b> / by CTI, the Swiss Innovation Promotion Agency .....	<b>12</b>
<b>INCREASING AWARENESS OF PATENT PROTECTION</b> / by Peter Frei, Swiss Federal Institute of Intellectual Property .....	<b>14</b>
<b>«SWITZERLAND IS A PILOT MARKET»</b> / Interview with Jürg Schnetzer, Federation of Swiss medical devices' trade and industry associations .....	<b>16</b>
<b>MARKET-ORIENTED TEAMWORK</b> / Success story of a new cyclor for automated peritoneal dialysis .....	<b>18</b>
<b>HETEROGENETY OF THE MEDTECH SECTOR</b> / by Ernst & Young .....	<b>20</b>
<b>COMBINATION OF PROFIT AND SUSTAINABILITY</b> / Company portrait: Robert Mathys Foundation, Bettlach .....	<b>22</b>
<b>SWX - THE LIFE SCIENCE STOCK EXCHANGE</b> / by SWX Swiss Exchange .....	<b>23</b>
<b>THE MEDTECH INDUSTRY ENJOYS HIGH VISIBILITY</b> / Round-table discussion with financial experts .....	<b>24</b>
<b>FROM AUTOMOTIVE TO MEDICAL TECHNOLOGY</b> / Company portrait: Weidmann Plastics Technology, Rapperswil .....	<b>26</b>
<b>COMPETENT PARTNER FOR INTERNATIONAL BUSINESS</b> / by Osec Business Network Switzerland .....	<b>27</b>
<b>SPEEDING UP BIOANALYTICS</b> / Company portrait: DiagnoSwiss, Monthey .....	<b>29</b>
<b>MILESTONES IN MODERN MEDICAL DEVICE TECHNOLOGY</b> / Timeline .....	<b>30</b>
<b>APPENDIX</b> / Swiss Medtech Survey by Ernst & Young .....	<b>32</b>



**LOCATION SWITZERLAND** Switzerland is home of more than 500 medical technology companies that value a business environment supporting rapid, solid growth in Europe. In many instances, these firms are world leaders in their respective markets. Together, they employ a full-time workforce of 40'000 in Switzerland, according to Eucomed, and this amount is constantly increasing. They also spend close to USD 500 million annually for research and development and export goods worth close to USD 5 billion per year.

Switzerland lies in the heart of one of the world's leading high-tech manufacturing and life sciences centres, it includes the cross-border regions with France, Germany and Italy. The Swiss medtech industry is among the largest and most diversified in Europe.

- Access to the European market with more than 450 million consumers of products and services from Switzerland

With Europe's highest per capita income, Switzerland is an attractive, demanding market boasting one of the best health care systems in the world.

Good contractual relations with the EU and the central geographical position provide Switzerland-based companies with virtually unrestricted access to the fast-growing USD 70 billion pan-European market for medical devices.

#### **Switzerland – one medical technology cluster**

Switzerland provides a paradise-like environment for

medical technology: All medical technology skills are represented at R&D as well as at industrial level by specialised suppliers and producers. Swiss cultural and technological peculiarities have combined in a unique vertical medical technology cluster:

- A long medical and particularly clinical tradition
- An industrial tradition in macro- and micromechanics associated with the culture of high precision/high quality. Nanotechnology is being intensively developed.
- The pragmatism in the Swiss culture with its tradition of practice-related education
- Excellent quality of Swiss R&D, as documented by top ranking of Swiss universities and high numbers of publications and of patent registrations:
  - Universities of Basle, Bern, Zurich
  - Swiss Federal Institutes of Zurich and Lausanne
  - several Universities of Applied Sciences
  - Research Institutes (e.g. EMPA, PSI, Maurice E. Mueller Institute)

#### **CTI Medtech Initiative – stimulating innovative medtech projects**

As an investment in market-oriented innovation of the Swiss medical technology, the Swiss government specifically supports product- and market-oriented medical technology projects with the CTI Medtech Initiative ([www.kti-cti.ch](http://www.kti-cti.ch)).

In private-public partnerships this programme

- increases the number of qualified jobs in the sector

- specially considers projects of start-up companies and SMEs
- stimulates know-how transfer between R&D institutions and companies

Read more about CTI Medtech on pages 12 and 13.

### Further aspects of the Swiss economic reality

- A sophisticated scientific environment with leading-edge competence in life sciences, micro technology, precision instruments and medicals

With an annual total expenditure of CHF 8 billion (USD 6.3 billion) in 2004, Switzerland has one of the world's highest levels of research expenditure relative to gross domestic product (GDP) (2.6%). Over two thirds of the Swiss research is financed by the private sector.

- A highly skilled and quality-conscious workforce, experienced in precision operations – a world leader in terms of productivity

Up to 44% of the Swiss working population or 1.7 million persons are active in the science and technology sectors. With an annual average of 1,856 working hours, the labour force in Switzerland works more hours per year than in any other European country. The English language is to be considered as the official language of the medical technology community.

- Short product registration cycles and easy access to markets for medical devices and innovative drugs



Companies obtain all authorisations and licenses for manufacturing, wholesale and retail operations of pharmaceuticals from the Swiss Agency for Therapeutic Products Swissmedic ([www.swissmedic.ch](http://www.swissmedic.ch)).

- Well-developed network linking public administration, support instruments, research and industry

The Swiss high-tech community is marked by an exemplary and effective cooperation between the Swiss government, research institutes, finance and industry.

On the Internet portal [www.swiss-medtech.org](http://www.swiss-medtech.org), a database of over 500 Swiss medical technology and life sciences companies provides free and direct access to these knowledge networks.

- Attractive fiscal system

The very favourable tax environment with moderate overall taxation is a key advantage of a business location in Switzerland. The maximum corporate

tax rate on profit was 16-28 % in 2004, which is one of the lowest rates in Europe.

- Wide choice of venture capital and private equity funds

Switzerland is a world leading financial centre. With more than 40 venture capital firms and sector-specific investment funds, Switzerland offers an excellent climate for medical technology companies. In 2003 and 2004, Switzerland ranked third in Europe regarding venture capital influx.

For further information please visit  
[www.locationswitzerland.ch](http://www.locationswitzerland.ch)



**GILBERT ACHERMANN,  
CEO STRAUMANN**

The international Straumann group is a leading provider in the fields of implant dentistry and dental tissue regeneration. Since its establishment 50 years ago, Straumann has brought forth groundbreaking solutions that have shaped today's industry standards.

Straumann has branches in 60 countries around the world. The headquarters and the biggest factory are still located in Switzerland. What are the advantages to have the headquarters and the production in Switzerland?

**Gilbert Achermann:** Switzerland provides an excellent central location in Europe, which is our largest market region and generates almost two thirds of our global business. Implant dentistry was pioneered here, with the result that Switzerland has a higher concentration of specialists and university faculties than anywhere else. This is important for research and development, as well as for training and education, which are fundamental to our business model.

With regard to production, Switzerland offers an unparalleled level of expertise in high-precision engineering, quality manufacturing and medical technology. The «made in Switzerland» distinction provides additional leverage to our global brand. Our location in Basle puts us in one of Europe's leading pharmaceutical, medical and medtech clusters with a culture of scientific research and innovation. It has a unique talent pool and increases our attractiveness as an employer.



**Gilbert Achermann, CEO Straumann:** «The 'made in Switzerland' distinction provides additional leverage to our global brand.»

**How is Straumann reacting to the consolidation process that is taking place in the worldwide medtech industry?**

**Gilbert Achermann:** Our strategy is to continue our strong organic growth with the vision of becoming the global market leader. This means that we have to continue to outpace our competitors in terms of innovation, quality, and customer service. At Straumann we have summed it up in our guiding principle: «Simply doing more».

**Since 50 years innovation is your main goal. How does Straumann guard against getting lazy?**

**Gilbert Achermann:** Firstly we rank among the leading contributors to R&D in our industry and secondly we have an exclusive partnership with a unique inde-





**Valentin Chapero, CEO Phonak:** «Today we generate nearly 70% of our turnover with products launched in the last two years.»

pendent scientific network, the International Team for Implantology (ITI). But it is important to realise that innovation just for the sake of novelty is neither in the interest of patients nor customers. Straumann firmly believes in purposeful innovation that delivers lasting benefit, which is why we lay considerable importance on thorough clinical testing and development.

**How do you rate the Swiss medtech industry in a European and a worldwide context?**

**Gilbert Achermann:** Switzerland is a world leader in the medtech field and I am convinced that this is related to the combination of our tradition of expertise in precision mechanics and our strengths in medicine and research. While we are strong in product innovation and in quality, I have no doubt that some countries will catch up in certain areas, making it all



**Willy Michel, President of the board Ypsomed:** «In the medtech sector there is certainly room for innovative start-ups and well-positioned niche players.»

the more important to compete on the service and marketing levels. More specifically in the field of implant dentistry, we believe that the global market will continue to grow in the region of 15% annually for the next three years as dental professionals and patients become increasingly aware of the considerable advantages that implants offer over conventional treatment with crowns and bridges.

**VALENTIN CHAPERO,  
CEO PHONAK**

**Based in Stäfa, near Zurich, Phonak is the third largest hearing system company worldwide. The company is famous for its innovation power. It generates nearly 70% of the turnover with products launched in the last two years.**

**What are the advantages for a global medtech company such as Phonak to have its headquarters in Switzerland?**

**Valentin Chapero:** Phonak develops miniaturised high-tech communication devices for hard of hearing people. Hence, Switzerland with its long tradition of electromechanical excellence and manufacturing engineering know-how is the ideal place to develop and manufacture highly miniaturised and ultra-low-power hearing systems. In addition, the high education level and the open culture and internationality of the Swiss, support to excel in a such an innovation-driven industry.

**How is Phonak reacting to the consolidation process that is taking place in the medtech industry?**

**Valentin Chapero:** Within the hearing industry, consolidation has taken place some years ago. Today, only 6 players share around 90% of the global hearing aid market. Phonak actively drove consolidation with the acquisition of Unitron Hearing and is today the number 3 hearing system company worldwide.

**The medtech sector is highly dynamic. Flexibility and innovation are some of the most important factors in competition. How does Phonak guard against getting lazy?**

**Valentin Chapero:** Phonak knows from experience that the competitive environment leaves no room to become complacent. Even enjoying a huge success with our latest hearing system Savia we are working full-steam to keep the product pipeline full. Today we generate nearly 70% of our turnover with products launched in the last two years.

How would you rate the Swiss medtech industry in the European and the worldwide context?

**Valentin Chapero:** Compared to the size of the country the Swiss medtech industry is remarkably successful, which is also true for the whole life sciences sector. The strong combination of highly qualified and motivated employees, the high-class education system and a very stable political and economical environment make Switzerland one of the most attractive countries for high-tech industries with a strong need for continuous innovation.

**WILLY MICHEL,  
PRESIDENT OF THE BOARD  
YPSOMED**

**Headquartered in Burgdorf, Ypsomed was created in 2003 from one of the two divisions formerly owned by the well-known Disetronic Group. Ypsomed is the world's leading independent medical technology company in the field of self-injection solutions, and is a sought-after partner to the pharmaceutical and biotech industries.**

In the last two years, Ypsomed has invested over CHF 120 million in buildings, infrastructure and production facilities at their three Swiss locations in Burgdorf, Grenchen and Solothurn. What advantages does Switzerland offer as a location for production and as an operational headquarters?

**Willy Michel:** Switzerland is well known for outstanding research and development, and for innovative products. As well, Switzerland is an ideal place for



production of high-value and complex products, like the self-injection pen, the injection system and pen needles produced by Ypsomed. These products are produced in large volumes, which would not be possible without high-volume capital-intensive automation. Switzerland has many success factors, like the low cost of capital, a highly trained work force, as well as a flexible labour market.

How is Ypsomed reacting to the consolidation process that is taking place in the medtech industry?

**Willy Michel:** One has to differentiate that the consolidation process does not apply to all medtech areas equally. The factors that certainly contribute to consolidation are the long and cost-intensive development phases, the demanding regulatory standards, as well as the necessity to have access to a worldwide sales and distribution organisation. However, in the medtech sector there is certainly room for innovative start-ups and well positioned niche players.

With Ypsomed's easy-to-use injection pens, you have developed into a rapidly growing niche player. How do you guard against getting lazy?

**Willy Michel:** Ypsomed is a worldwide leader in the fields of injection systems and self-injection solutions. Currently Ypsomed employs over 70 engineers

involved in research and development, and has over 150 patent groups. In the last years we have significantly increased our investment in R&D, and we have an aggressive patent strategy, so as to assure that we maintain our technological edge.

How would you rate the Swiss medtech industry in the European and the worldwide context?

**Willy Michel:** Switzerland certainly has a recognised worldwide technology know-how, especially in micro-technology and in processes using combinations of complex electronic and mechanical processes necessitating very demanding safety standards. At the same time, Switzerland is known for high-precision, quality and reliability. These qualities are requirements worldwide by customers and commercial partners. These competitive advantages are being recognised by many foreign medtech companies, which is demonstrated by their establishment of subsidiaries here in Switzerland.

For further information please visit  
[www.straumann.com](http://www.straumann.com)  
[www.phonac.com](http://www.phonac.com)  
[www.ypsomed.com](http://www.ypsomed.com)

# IMPROVEMENT IN THE ART OF LOCOMOTION THERAPY

# 11

**HOCOMA** The young Zurich-based medical engineering company has developed a revolutionary system for locomotion therapy of people with neurological impairments, like for example stroke or traumatic brain injuries, and became world's number one in the market of rehabilitation robotics.

Founded in 1996 as a limited liability company by the economist Peter Hostettler (HO) and the electrical and biomedical engineers Gery Colombo (CO) and Matthias Jörg (MA) to develop the Lokomat System, Hocoma was converted into a stock corporation with support by CTI and private investors in 2000. In 2002 the company was awarded the «CTI Start-up Label.» «In 2001, we started with sales activities in Switzerland, Germany and the USA», says CEO Gery Colombo. Nowadays, the company sells the Lokomat Systems in all major markets all over the world. «Because we are operating in a niche market, with 60 pieces the absolute number of sold systems does not seem very high.» Nevertheless, Hocoma is the world market leader in the young market of rehabilitation robotics, and in 2005 the management plans to sell around 40 Lokomat Systems. «This means that we will increase our sales from 5.7 CHF million up to CHF 10.5 million CHF.» Today, around 35 employees work for Hocoma in Switzerland and in the USA.

## FULL-SERVICE STRATEGY

Hocoma's development of the Lokomat System after years of research and engineering has produced a crucial improvement in the art and science of locomotion therapy. Systems are already in use in presti-



Dr Gery Colombo, CEO (left),  
Dr Peter Hostettler,  
CFO and President  
of the board

gious clinics worldwide and enjoy increasing popularity with patients and therapists alike. But what is so special about the Lokomat System? «Through numerous intensive training sessions, patients begin the process of relearning to walk upright until partial or even complete functional mobility is restored», explains Colombo.

The system convinces by a convenient handling with user focus. The simple user interface allows the therapist to easily operate the Lokomat and adjust training parameters to suit the individual patient needs.

## HIGH TECH AND HIGH QUALITY

A Lokomat System costs between CHF 250'000 and CHF 350'000 and offers high tech as well as high quality. «The system is constructed with custom-made components. For this we work together with more than 80 suppliers, many of them produce the

components especially for us.» Almost all suppliers are located in Switzerland. «Made in Switzerland is one of our most precious assets», emphasises Gery Colombo. Referring to its long-term strategy, the company has been financed by private investors since its beginning. Because of the continuous growth, the company plans another round of financing in 2006. Either by private investors or by venture capitalists, even an IPO is possible. «We have already developed a new system called Erigo, a tilt table with an integrated robotic stepping system.» It has been designed to support and facilitate the early mobilisation of neurological patients. And Colombo and his team still have many ideas for new products. To stay innovative Hocoma always has several research projects with universities or clinics going on.

For further information please visit  
[www.hocoma.ch](http://www.hocoma.ch)





**THE INNOVATION AND PROMOTION AGENCY CTI  
What role does CTI, the national Innovation  
Promotion Agency, play within Switzerland's efforts  
to promote research and technology?**

Next to the Swiss National Science Foundation (SNF), CTI is Switzerland's most important national organization for the promotion of research. The SNF focuses mainly on basic research conducted at universities and Swiss Federal Institutes of Technology, whereas CTI concentrates on promoting applied research and development and entrepreneurship in the support of innovation. In addition to its role as a promoter of innovation, CTI also has the goal of assuring an efficient and results-oriented transfer of knowledge and technology.

Swiss companies aiming to be at the cutting edge of the promising global medical technology market need to apply the latest scientific knowledge. But the path from laboratory to patient is strewn with obstacles. Small companies with limited resources can find it difficult to cope.

This is where CTI offers a helping hand by encouraging medical technology through its life sciences application and transfer-oriented projects. The CTI Medtech Initiative was set up in 2000 to support the Swiss medtech scene across projects in a better structured and more targeted manner. It sees itself as an important platform hub that links interested economic and scientific partners through working groups and joint projects.

The short-term goal is to improve products and production processes. The longer-term objective is to

integrate new technologies with the products, thus obtaining the optimal advantage in the global competitive market. CTI Medtech promotes communication and exchange between academia and companies, inviting the latter to combine their specialist internal expertise with outside know-how in an attempt to generate original product ideas.

A market study carried out by the Karlsruhe-based Fraunhofer Institute for Systems and Innovation Research (ISI) in 1998 showed potential in Switzerland in the following areas: Orthopaedic and micro-electronic implants («implantable devices»), surgical systems and procedures, and microsystems for biochemical diagnosis. In addition, the CTI Medtech specialists opted for other «future-oriented and innovative areas of medical technology» to ensure that all creative ideas are included.

Since launching the CTI Medtech Initiative in 1997, CTI has promoted more than 170 medtech projects with federal funding of over CHF 50 million. With its economic partner's additional CHF 1.50 for every Swiss franc invested by the government, a research volume of over CHF 120 million has been achieved. An external evaluation in 2004 gave CTI Medtech a very good report.

The results clearly show the effect of the initiative and would not have been achieved without it. Although the economic effects of CTI Medtech are difficult to separate from other influences, a positive effect on R&D expenditure and possibly on the job situation is assumed.

## REFINED SENSOR TECHNOLOGY FOR HYDROCEPHALUS PATIENTS

Hydrocephalus is one of the most frequent birth deformities. Although the illness has many facets, the cause is always that there is too much cerebrospinal fluid pressing against the brain matter and thus damaging it.

An important treatment method is the valve – the shunt – which is introduced into the body and draws off the excess cerebrospinal fluid by means of an outlet valve in the stomach. Johnson & Johnson is the global technological leader in this area since taking over Medos SA, a specialist in implantable tube valves for hydrocephalus based in Le Locle, in 1991. But the shunt is a tricky device as the slightest malfunction can have serious consequences – especially for small children – and cause permanent damage for patients.

## INTERDISCIPLINARY TEAMWORK

As part of a CTI Medtech-supported partnership between various universities of applied sciences, the Swiss Federal Institute of Technology Zurich, the EPFL and Medos SA, the microcircuitry experts at EPFL developed implantable flow sensors in such a way that now malfunctions can be detected and remedied.

The new design now permits a flow of up to 300 ml/h. Low-noise HF compatible sensor circuitry provides the innovative content and passive remote measurement at 27 MHz provides the power and data transfer. The device produces a heat output of

only 10 mW in order to prevent overheating of the cerebrospinal fluid.

Dynamic FEM simulations were carried out to check correct temperature distribution. The project partners used thermomechanic sandwich structure simulations that provided evidence that the mechanical demand posed by fusion bonding during manufacture does not lead to a higher device failure risk in production or during long-term use.



Prof. Dr. Gilberto Bestetti, Head of CTI Medtech

## The Innovation Promotion Agency CTI brings «science to market»

CTI promotes projects in applied research and development (R&D) carried out jointly by private-sector businesses and academia. The organisation provides financing exclusively for technical universities.

With CTI Start-up it also supports the establishment and development of internationally focused companies with high growth potential. By building a bridge between the laboratory and the market, CTI furthers the innovation process driving the economy.

In 2004, CTI also launched a Swiss-wide entrepreneurial education and training programme called «venturelab». Bringing together the most important players in this sector, the annual CTI Medtech event offers a good platform specially conceived for the Swiss medtech scene.



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[www.ktistartup.ch](http://www.ktistartup.ch)  
[www.venturelab.ch](http://www.venturelab.ch)



**MEDICAL DEVICE PATENTS** Patent protection gives companies the competitive edge necessary to survive in today's fast-developing and continually changing marketplace.

There is increasing concern, that the fast-growing number of patents (ever more patents per innovation) and the broad patent protection on basic discoveries may result in a severe limitation of the intellectual property protection of findings from lengthy and costly research and developments in medical device technology. Furthermore, the danger of a possible infringement of protective rights of a third party has risen dramatically during the last few years.

#### **VALUABLE COMMODITY**

Nonetheless, a growing number of medical device companies are being established every day around the world and successful organisations are able to protect their investments with intellectual property rights. Moreover, intellectual property rights rarely seem to preclude the development of innovative and worthwhile projects, while projects involving work protected by older patent rights of a third party are seldom innovative. Intellectual property rights not only protect innovations but are a valuable commodity as well; they can be sold or licensed. In fact, a start-up company may have nothing more than its patent portfolio to attract investors – no track record, no approved products and no revenue. The exclusive right to use an innovation is granted only if the innovation is disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person

specialising in the art. The published patent documents are therefore a valuable source for all kinds of information.

Furthermore, reading patents often imparts knowledge not otherwise available such as developments in a particular field or data on specific competitors, and helps monitoring the specific technical area and market developments involved. Intellectual property rights are also a measure for the innovative power of a company.

#### **THE BENEFIT OF PATENT INFORMATION IS GROWING**

In the medical device industry, an ever increasing awareness of patent protection can be observed. The reasons for this are manifold. On the one hand, the time to market for a new product has increased heavily and, accordingly, the time allocated for return on investment has shrunk as no supplementary protection certificate, such as that known for pharmaceutical compounds, exists for medical devices. The

#### **EFFECTIVE PROTECTION**

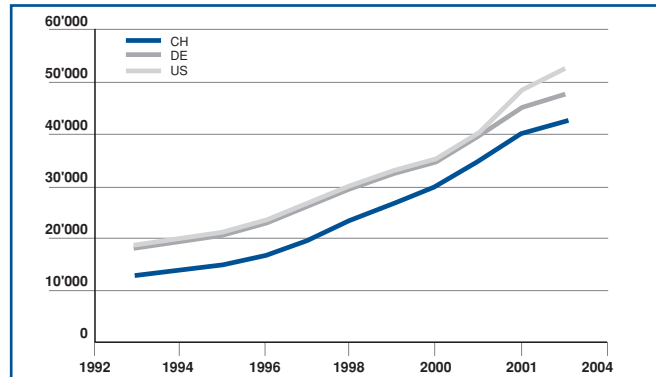
A patent is a legal right granted by a government for a limited period of time to prevent others from making, using or selling an invention. Patents are both an incentive and a source of revenue for research and development, in particular for those areas involving high-cost, high-risk inventions such as for medical devices. Furthermore, patent protection gives companies the competitive edge necessary to survive in today's fast-developing and continually changing marketplace.

extended time to market is due to increased regulatory and technical requirements and standards. On the other hand, a systematic covering of a technology area with patent rights may considerably strengthen and enlarge the competitiveness of a company.

As a result, the investments in costly R&D can be spread over a larger period of time and, last but not least, small companies such as start-ups will gain a strong position when negotiating with the global players in their field. Consequently, the benefit of patent information is growing:

- Start-ups or well-established companies can use patent information to obtain an overview of newly developing market segments.
- Investors may find valuable information on existing know-how in targeted companies and on the internal structures of these companies.
- Systematical monitoring of certain areas of patent information will facilitate the prognostication of future trends. This will allow a company to act proactively.
- An estimation of the patent strategy of competitors is possible through checking their patent applications in different countries around the world.
- The internationally standardised layout of patent documents obliges the patent assignee to comment on the state of the art and its drawbacks. This information can be used for the risk analysis mandatory for the development of a medical device.

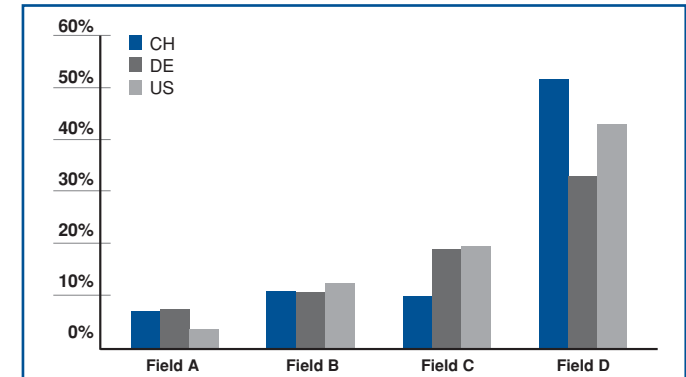
Even though all desired information is generally accessible to the public through the Internet or for a fee through professional databanks, it needs to be filtered out of an information jungle containing more



**Number of published patent documents per year published in Switzerland, Germany, and the USA by the medical device industries.**

than 50 million patents. The Swiss Federal Institute of Intellectual Property (IPI) in Bern provides various services for individuals and businesses in this area:

- The Institute is the federal office for patents, trademarks, designs and copyrights and an important platform for intellectual property at the international level ([www.ige.ch](http://www.ige.ch)).
- ip-search is a service of the Federal Institute of Intellectual Property acting as your partner for worldwide database research on patents, technology and businesses and for professional trademark searches ([www.ip-search.ch](http://www.ip-search.ch)).
- The IPI as a competence centre in patents, trademarks, design and copyrights offers a series of courses on both the protection rights and the information included in patent documents. We also offer in-house training and assistance to companies with a view to meeting the specific needs of a customer ([info: training@ipi.ch](mailto:training@ipi.ch)).



**The chart shows the medical device patent documents distribution in selected technology areas. Field A: Dentistry; oral or dental hygiene (A61C) Field B: Filters implantable into blood vessels; prostheses, orthopaedic, nursing or contraceptive devices; fomentation, treatment or protection of eyes or ears; bandages, dressings or absorbent pads, first-aid kits (A61F) Field C: Diagnosis, surgery, identification (A61B) Field D: Preparations for medical, dental purposes (A61K)**



**Peter Frei,  
Swiss Federal Institute of  
Intellectual Property**

**For further information  
please visit [www.ige.ch](http://www.ige.ch)**



**REGULATION** The Executive Director of the Federation of Swiss medical devices' trade and industry associations (FASMED) explains why Switzerland is an interesting market for products of the medtech industry.

**Why is the Swiss market so interesting for international manufacturers of medtech products?**

**Jürg Schnetzer:** Because the medical and nursing professionals in Switzerland are so demanding! The professional ethics of this group are very exacting and manufacturers know that if they are successful in Switzerland, they will be successful in many other countries too.

**So basically Switzerland is a test market for new products?**

**Jürg Schnetzer:** Test market sounds too disparaging. Switzerland is a pilot market in which only products that are demonstrably effective, useful and cost-effective will succeed. Manufacturers analyse the way the market responds to a product, how professionals react, and how the product fares in terms of reimbursement. That's what makes the market interesting. Other advantages are the leading edge that Switzerland has established over the years in osteosynthesis and prosthetics, and the research being done there. The importance of this aspect should not be underestimated, particularly for borderline products like coated stents or substances that are activated inside the body by medical technology.

**You mentioned borderline products. How would you describe the interplay between biotechnology, the engineering sciences and medical technology?**

**Jürg  
Schnetzer,  
Executive  
Director  
FASMED**



**Jürg Schnetzer:** Medical technology developed in a classic business environment and draws primarily on engineering sciences such as micromechanics, plastics technology, metallurgy and optics. Biotechnology, on the other hand, is a research-driven industry. The two disciplines have already merged to some extent in the university landscape, but this development is still at a very early stage in industry. I would like to emphasise that training is very good in all areas, not only at tertiary level but also, and more particularly, at vocational level. The standard to which our mechanical engineering technicians and engineering operatives are trained is unsurpassed.

**How long does it take on average for a medtech product to be given marketing authorisation in Switzerland?**

**Jürg Schnetzer:** I can't really answer that question because medtech products don't require marketing authorisation in Switzerland. If a product carries the European CE mark or the Swiss MD mark, then it



can be marketed in Switzerland. This is a «new and global approach» that is being adopted in Europe. The reimbursement situation, however, is different. If a product has reimbursable status, this means that the health insurance funds will reimburse the cost of the product to the patient. Some very clearly defined hurdles have been incorporated into the legislation to make sure that the social system doesn't end up paying for absolutely everything that patients use.

#### How does a product get reimbursable status?

**Jürg Schnetzer:** The reimbursement system is regulated on a national level and, naturally, is an extremely political subject. Every patient wants to get the best level of health care provision, and that means modern, efficient care. However, it is the social system that pays for this through the people who pay insurance premiums and taxes. There are Swiss committees that evaluate methods and medical technologies to determine whether they should be given reimbursable status or not.

#### Can you say how long it takes for a reimbursable product to reach the market?

**Jürg Schnetzer:** It's difficult to say because the process is so complex. First of all, the manufacturer

has to produce a health technology assessment (HTA) showing that his product fulfils the three criteria of cost-effectiveness, usefulness and effectiveness. This process ensures that only products suitable for the system are accepted. Completely new processes and products have to be evaluated by a committee that deals with fundamental questions, others have to be reviewed by a benefits committee, and products which are purchased directly by the patient are examined by a committee that determines whether the products should be included in the list of pharmaceutical specialities and devices. It is generally acknowledged that these procedures need to be streamlined and accelerated.

#### What about regulation in general – is Switzerland more tightly regulated than other countries?

**Jürg Schnetzer:** No, because the new and global approach being applied throughout Europe is based on the manufacturer's own responsibility for his products. The system in the USA, for example, is completely different. There, products require premarket approval, which is much the same as the situation for pharmaceutical products in Switzerland. It's a very expensive process and involves a lot of manpower. In a world dominated by the Internet, lifestyle

## SAFE PRODUCTS

Medical technology products must be safe. But the term «safe» takes on a number of dimensions in the health care market:

**Safeguarding supply:** means that services and products must be physically available to customers. This is important for service providers, patients and insurance companies.

**Product safety:** means ensuring the quality of a product and hence eliminating risks from the process of supplying health care to the individual. This is important for patients, service providers and insurance companies.

**Reliable planning criteria:** means that the parameters and data used to predict the level of need/costs/prices have to be as reliable as possible. This is important for insurance companies, service providers and patients in their capacity as payers of insurance premiums and taxes.

trends and e-health it is impossible to legislate to protect patients and consumers from the consequences of their actions; national restrictions on advertising and the imposition of penalties of the kind being discussed in Switzerland and elsewhere are unlikely to have much impact. At the same time, this type of discussion engenders the risk of deregulated areas being regulated again.

For further information please visit  
[www.fasmed.ch](http://www.fasmed.ch)





**WORKING IN NETWORKS** Thanks to the interplay of engineers, clinicians, mathematicians and the Swiss Innovation Promotion Agency CTI a new cyclor for automated peritoneal dialysis was developed in fast time.

For patients with end-stage renal failure, peritoneal dialysis is a well-established therapeutic option. Until nowadays, the cyclors for automated peritoneal dialysis were heavy and not very user friendly. «It was our aim to improve those machines to give back quality of life to the patients», explains Frédéric Neftel, president and CEO of Debiotech.

For the company, based on the lake of Geneva, the best choice was to work together with the Ecole Polytechnique Fédérale de Lausanne (EPFL), the University Hospital Bern and with CTI, the national Innovation Promotion Agency. «The project is innovative and very market oriented», explains Gilberto Bestetti, Head of CTI Medtech. On the one hand, CTI Medtech supported the project with a lot of coaching, and on the other hand, it supported the EPFL significantly in all the phases of the project.

### **MATHEMATICAL IMPACT ON LIFE SCIENCES**

The researchers are members of the research group of Professor Alfio Quarteroni, Chair of Modelling and Scientific Computing at EPFL. «We elaborated a new mathematical model and computer simulation environment to investigate and predict the kinetics of individual injection-extraction patterns, hence providing an optimisation tool for the different peritoneal

dialysis techniques and facilitating the use of more elaborated therapeutic options», explains Quarteroni the work of his group.

The software called ChronoDialManager includes a new definition of the injection-extraction pattern that represents a specific peritoneal dialysis therapy. Injections and extraction of fluid into the peritoneal cavity are scheduled according to parameters like variable frequency, variable injected volume or rate of frequency variation and rate of volume variation.

«This project provides a remarkable example of the impact that mathematics can have in life sciences in our days. The model that we have developed moves from a brilliant intuition of Debiotech and associated clinicians about the possibility of improving radically the efficacy of peritoneal dialysis therapy by the help of a rigorous mathematical approach.»

The scientists have devised a flexible adaptive optimisation environment that not only can implement state-of-the-art clinical knowledge on peritoneal dialysis, but is ready to incorporate in a straightforward manner novel scientific achievements. For Quarteroni the interplay with the clinicians of Bern, Gent and Turin, and the team of engineers from Debiotech «has been of paramount importance for the development and improvement of our model».

### **TAILORED THERAPY**

At the moment, the new cyclor is in clinical trials. The clinical coordination is headed by Professor Jean-Pierre Wauters from the University Hospital Bern, with the active expertise and support of Professor Norbert Lameire and Professor Wim Van Biesen, University Hospital Gent, Belgium, and the contribu-





tion of Professor Alfonso Pacciti, Molinette Hospital Torino, Italy.

«For patients suffering from advanced kidney failure, peritoneal dialysis performed at home provides a form of therapy that, in most instances, interferes less with daily activities than centre hemodialysis», says Wauters. «With the new mathematical model conceived by Professor Quarteroni's team and the associated software progress, peritoneal dialysis could become more practical and hopefully more efficient at long term. It should allow a tailoring of the therapy to the individual patient and his medical needs even on a daily basis, and should therefore become more appealing to both patients and nephrologists. The present development is an illustration of the great achievements that can be reached by transdisciplinary teams.»

Debiotech's CEO Frédéric Neftel is convinced that the cyclor will be on market in very few years. He has already signed a marketing and sales contract with Baxter Healthcare in the USA, a leader in the renal care universe and particularly in the peritoneal dialysis market. «This agreement and its long-term potential represent a significant recognition for all Debiotech engineers and partners who contribute to

the company's development of novel concepts and ideas becoming breakthrough products.»

Under the agreement, Debiotech and Baxter will initially seek to develop a new dialysis product based on proprietary Debiotech platforms and technologies. Baxter will manufacture, sell and distribute the product under an exclusive worldwide license from Debiotech with the exception of Japan where an alternative arrangement with Terumo has already been established. The first agreement will include up to USD 18 million in payments to Debiotech (contingent upon achievement of development, launch and sales milestones), in addition to royalties of an undisclosed amount.

#### About ESRD (end-stage renal disease) and treatments

ESRD is an advanced stage of chronic kidney disease that requires some form of therapy to replace lost renal function. The incidence and prevalence of ESRD have doubled in the past ten years and are expected to continue to grow. Worldwide, approximately 1.5 million patients are being treated for ESRD. Two forms of dialysis are most commonly available to ESRD patients: peritoneal dialysis (PD) and hemodialysis (HD).

In PD, extra fluids and waste are removed from the blood inside the body, using the body's own peritoneal membrane, or abdominal lining, as a natural filter. In this form of dialysis, blood never leaves the body. Dialysis fluid enters the peritoneal cavity through a flexible catheter surgically inserted in the abdomen. Extra fluid and waste travel across the peritoneal membrane into the dialysis fluid, which is then drained from the abdomen through the catheter after a predetermined dwell period. Present exchange profiles are usually constant and independent of patient characteristics. Most of the exchanges are done overnight to improve patient comfort.

For further information please visit  
[www.debiotech.com](http://www.debiotech.com)  
[www.acs.epfl.ch](http://www.acs.epfl.ch)  
[www.cti.ch](http://www.cti.ch)

**INDUSTRY INSIGHT** The Swiss medtech sector consists of several sub-segments and can be considered as very complex. Nevertheless, there is a bright future for a heterogeneous and not often very visible industry because of the wealth of labour skills, especially in precision manufacturing and material technology, a vast venture capital industry and a huge intellectual potential.

More than 500 firms in Switzerland operate in the fields of biomaterials, cardiovascular, dental implants and devices, diabetes devices, electro-medical and imaging equipment, orthopaedics, respiratory equipments, surgical instruments and wound & care management. The sub-segments differ in terms of market penetration, reimbursement policies, R&D, regulatory affairs and distribution. The whole sector benefits from the growing wealth in most parts of the world, the increasing number of elderly people, the continuous progress in medical science and – sadly enough – the global growth of «civilisation diseases» like obesity, diabetes, degenerative joint disease (DJD) and high blood pressure.

According to official statistics, approximately 40,000 people work in this sector. The majority of the 500 firms are small and mid-sized companies generating revenues of less than CHF 5 million a year. Their annual sales are estimated at CHF 9 billion with a growth rate of 7% p.a. Switzerland can be counted among the leading countries in medical technology. Even though labour costs are rather high, this is less and less relevant in a highly automated and capital-intensive industry. Furthermore, the label «swiss made» is important in the global medtech sector. No sign of a countertrend exists. We will focus in our

overview on dentals and orthopaedics, which have a major impact on the sector.

## DENTAL IMPLANTS AND DEVICES

One of the most attractive sub-segments of medical technology is the area of dental implants. The world market is estimated to rise by 15%, embodying a market potential of more than USD 1 billion. In the developed world, people want to have good-looking teeth. Nowadays, only 2% of the world population is treated with dental implants. The Swiss-based Nobel Biocare and Straumann are leading companies in the global market. Both companies provide the specific abutments to their implants, which are the base for the dental technician to build the crowns and bridges.

The global market is dominated by five companies which control 85% of the market. From an investor perspective, dental implants are believed to be low-risk investments (due also to the absence of significant product liability issues) with high growth rates. However, product demand depends on the individual financial situation of a patient, because in nearly all countries worldwide, dental treatments are paid by the patient directly and are not reimbursed by the public insurance system. Contrastingly, this makes dental implant manufacturers less vulnerable to the often dramatic changes in public health policies.

## ORTHOPAEDICS

Growth within the orthopaedic sub-segment is between 10 and 20%. Whereas sales of artificial joints for knees, shoulders and hips as well as

arthroscopy are expected to increase by 10%, products for spine stabilisation and bone stimulation could increase by up to 20%. The main players in this market are Johnson & Johnson, Stryker, Zimmer, Biomet as well as Synthes. Synthes is expected to enjoy outstanding growth in the field of discs, especially through its US business. Due to the Mathys spin-off of the osteosynthesis unit (injured bones) to Synthes, Synthes is now in a leading position in the osteosynthesis business. On the other hand, Mathys specialises in joints and biomaterials.

Joints made of ceramic, but also wear-reducing materials (ceramic and metal), minimal-invasive surgery, operative techniques (navigation) and tissue engineering are considered as future growth drivers.

In terms of reimbursement, nearly all the products are paid by the medicare system. This makes the sub-segment relatively resistant to unfavourable business cycles because product demand does not depend on a patient's financial situation. However, we expect the pressure from the medicare system on the product prices to increase in the near future.

Merger and acquisition transactions have also taken place in the Swiss medtech environment. Since the medtech sector is considered to be a global business, the consolidation process is likely to continue. Foreign companies, in particular, are on the lookout for interesting acquisition targets in the Swiss sector. One of the most important reasons is the wide range of human resources available in Switzerland. Key executives mention that companies need to be where the intellectual potential is. That is why Switzerland, with its universities and schools of applied sciences, but also its dense network of top

hospitals (within a radius of 300 km, you find six large and highly reputed hospitals and university clinics) is a top location for the medtech industry. Furthermore, the industry benefits from the wealth of labour skills in Switzerland, especially in precision manufacturing and material technology. It also profits from a vast venture capital industry that has discovered the prospects of the medtech industry in the last few years.

Investors tend to like this cash-flow-rich sector, where time to market for new products is significantly lower, and product liability issues are less dramatic than in the pharmaceutical or biotech industries.



**Heinrich Christen,**  
Partner, Industry Leader  
Medtech Ernst & Young  
Switzerland

For further information please visit  
[www.ey.com/ch](http://www.ey.com/ch)





Robert Mathys Jr, Executive Director

**ROBERT MATHYS FOUNDATION (RMS)** The non-profit organisation is a research institute and service laboratory with the objective to support and promote research and testing of medical products regarding different applications in traumatology and orthopaedics as well as materials technology and testing including the evaluation of innovative manufacturing and machining processes.

The Mathys family has 50 years of experience in medical technology. The success story started very

unspectacular in 1946 when Robert Mathys Senior founded an industrial factory. But at the end of the 1950s, the factory underwent its own «economic miracle», when the founder was contacted by surgeons to use his know-how to develop and produce stainless steel implants and instruments for bone surgery and orthopaedics.

Operation mobility was set in motion to convert Mathys, over several years, into Mathys AG Bettlach specialised in medical technology, with branches throughout the world.

In 1985, Dr Robert Mathys Sen. decided to establish a non-profit organisation for the promotion of medical and clinical research as well as of technical development and further training in their fields of application of the industrial part. In 1992 RMS-foundation was set up as an independent R&D institution in its own premises.

#### COMPETENT PROMOTING AND RESEARCH PARTNER

As an independent non-profit organisation RMS is setting on teamwork partnership with interested research groups not only from companies but also from institutes or clinics. «It is our aim to be a competent promoting and research partner of medical and clinical implants, instruments and devices. Most of our partners are from Switzerland but we also work together with German, American and Asian partners», says Robert Mathys Jr, Executive Director of RMS. «And we also want to be a partner for our employees. We especially want to give young and motivated workforces the possibility to start working in an innovative and highly developed industry.»

Nowadays, RMS has 30 employees. Technicians as well as biochemists, material scientists and mechanical engineers. «The recognition of problems, problem solving, and the breaking of new ground require not only constant research, but also a clear concentration on one's own strengths», explains Mathys. This is how the foundation's multidisciplinary team applies all its specific experience to the development of new materials, to the verification of research results obtained by its own teams and others, and to the testing of new ideas.

According to the statutes the activities of the foundation are supervised by a scientific committee, consisting of highly qualified medical, engineering and material science specialists.

The close collaboration with companies in the vicinity as Mathys Ltd. Bettlach and Synthes Bettlach GmbH, the major partners of the RMS, is an ideal base to understand the problems of the industry in the field of medical technology.

On the other hand the industrial partners can profit from a certified and accredited institution for their R&D activities.

In addition, the foundation nowadays offers advisory and test services to outside customers on an order basis and in line with its general business conditions. Nevertheless, the foundation's steady growth into a competent research institute and service laboratory is based on wide experience and know-how in medical and material technology.

For further information please visit  
[www.rms-foundation.ch](http://www.rms-foundation.ch)



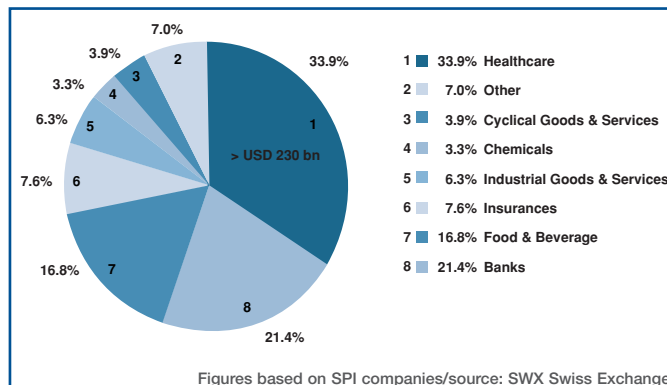


**SWX SWISS EXCHANGE** Among European countries, Switzerland has been able to position itself especially well as the home base for various foreign life science and medtech companies by creating an advantageous business environment.

Switzerland is a global leader in cross-border private banking and is one of Europe's leading financial centres for equity-investing institutions. In terms of investor relations, companies can only gain from Switzerland's geographical location and size. In particular, it is important to be able to reach investors quickly and efficiently. The close attention given by the media, analysts and investors to each company makes it easy for market participants to form an opinion on a one-to-one basis and guarantees the necessary flow of information. Switzerland is a centre for sector-oriented institutional investors with a special focus in medtech and other life science sectors. These investors draw on many years of international experience in sector-oriented investing, which makes them particularly stimulating contacts. With more than one third of its total market capitalisation stemming from listed life science companies, the SWX Swiss Exchange is a highly attractive listing platform for foreign companies in this sector (see pie chart). A public placement of shares affords companies a high degree of global visibility among investors.

#### Key figures financial centre Switzerland:

- Population 7.4 million
- Approx. 340 banks / 185,000 employees in the financial sector
- Assets managed in Switzerland: CHF 3,459 billion
- Proportion owned by foreign clients: 57%
- Worldwide share of total assets managed abroad: 27%

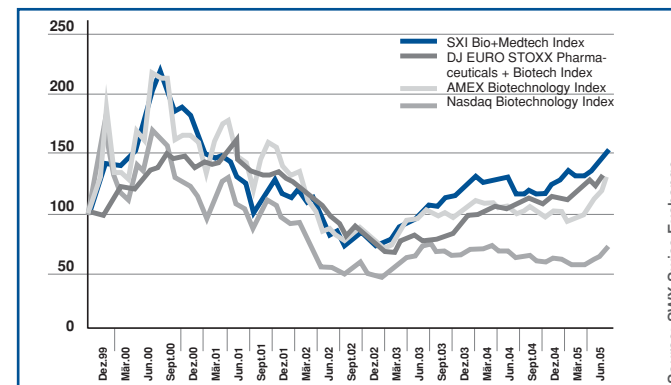


**SWX industry breakdown as per 31 Dec. 2005**

### A STRONG PEER GROUP IN MEDTECH

Resounding names like Synthes, Straumann, Phonak and Ypsomed form part of the strong peer group in medtech. Ypsomed successfully floated its shares on SWX in 2004 and is showing a launch-to-date performance of +103% (as of 30 June, 2005). With the intended purpose to even increase the already high visibility and liquidity in the life science sector, the SWX Swiss Exchange launched two industry-specific indices (SXI LIFE SCIENCES® & SXI Bio+Medtech®) in mid-2004 that reflect not only the Swiss but also the primary listed foreign companies. The tremendous interest in the Swiss Bio+Medtech® sector is best illustrated by a performance comparison (see graph). The companies in the Swiss life science sector are being tracked by about 60 banks and various brokerage houses worldwide (source: Thomson Financial). As a result, medtech companies listed on SWX show surpassing market multiples.

For further information please visit [www.swx.com](http://www.swx.com)



**Performance comparison SXI Bio+Medtech®**

### An IPO at SWX enables life science companies to benefit from:

- continental Europe's most international marketplace
- leading financial centre for equity-investing institutions with high expertise in life sciences
- strong private banking investor base
- high placing power
- high attention for IPOs (and beyond)
- a lively derivative and bond market
- the focus on small and mid caps
- numerous banks with strong research activities
- the multilingual and multicultural Swiss investors
- an attractive and balanced regulatory environment due to self-regulation
- the uncomplicated listing procedure
- approval of several accounting standards (US GAAP, IFRS, Swiss GAAP FER, etc.)
- short communication paths – high concentration of investors in few locations
- low currency risk (listing in various currencies possible)



**ROUND TABLE: Yvonne Wegmann (Vice President, SWX Swiss Exchange), Marc Klingelfuss (Head Capital Markets, Lombard Odier Darier Hentsch), Christoph Gretler (Director, Credit Suisse First Boston), Diego Braguglia (Partner, VI Partners), and Stephan Meier (CEO, Bellevue Asset Management) discuss the potential of the medtech sector.**

**Why do leading banks recommend an SWX listing?**

**Marc Klingelfuss:** Behind the USA, Switzerland is the number two listing location for medtech companies. This is mainly due to the large number of global leaders in the sector in Switzerland: They represent a highly visible and relevant peer group. The sector capitalisation and concentration in Switzerland is unparalleled in Europe. Companies such as Synthes, Nobel Biocare, Straumann, Phonak, Ypsomed and Zimmer are an attractive peer group and reflect a large variety of products and services in the sector.

**Stephan Meier:** Another reason is the wide investor base, which is very interested in the sector and very familiar with its internal workings. For this reason, Nobel Biocare was also listed in Switzerland after having been traded only on the Stockholm stock exchange before. Nowadays, approximately 90% of the trading of Nobel shares is taking place at SWX.

**Christoph Gretler:** Added to this is the fact that Swiss medtech companies enjoy relatively healthy valuation levels. This is very attractive to companies aiming to issue shares in Switzerland as it gives them hope that their shares will receive an attractive valuation level.

**Diego Braguglia:** Switzerland's attractiveness has fairly deep historical roots. Due to extensive experience in the area of micromechanics and engineering, Switzerland also has access to a very good network of universities, medical schools and industries, and, as the country is located at the heart of Europe, we are regarded by global companies as an interesting location.

**Yvonne Wegmann:** This is absolutely right! International companies see Switzerland as a very attractive location. Studies have shown that around 60% of companies that move their head offices relocate them to Switzerland. The reasons behind such a move are the qualified workforce, a favourable tax and labour law, the high quality of life, close proximity to universities and access to the peer group, as already mentioned.

**One year ago – for reasons that also included boosting its image – the SWX launched the SXI LIFE SCIENCES<sup>®</sup> and SXI Bio+Medtech<sup>®</sup> indices. Is it possible to draw any conclusions yet?**

**Yvonne Wegmann:** Both were very well received by the market. The indices have given both Swiss and foreign life science companies that are listed at SWX Swiss Exchange greater visibility. Furthermore, various products have already been launched on the SXI indices and this has a positive influence on liquidity. Since the companies in the baskets are capped at a maximum weight of 10%, smaller companies benefit above average from the increased demand.

**Stephan Meier:** And, the broader an index gets, the more interesting it becomes, particularly for investors who want to make a broad-based investment within a single sector.

**Diego Braguglia:** The variety of the companies in the baskets is important since medical technology is becoming more and more integrated with the areas of bio- and nanotechnology, having therefore a greater upside but potentially increasing the investment risk. This risk is counterbalanced by companies having a more classical business model.

**Christoph Gretler, you mentioned the healthy share prices of listed companies. Can you tell us a bit more about this?**

**Christoph Gretler:** In the last quarters, the European and Swiss medtech companies have been able to close the valuation gap to their US counterparts. Now, the current valuation level gives the solid growth and profitability outlook a much fairer reflection.

**Can you tell us about the market multiples?**

**Christoph Gretler:** Most investors consider medtech companies as an alternative to pharma companies. Based on 2006 forecasts, the European and Swiss medtech companies trade at 23 times earnings, a 45% premium to pharma companies. Within the medtech industry the valuation differences are very significant. For example, the Swiss listed dental implant companies trade at about 32 times earnings, which is the highest multiple in the industry globally.

**The medical technology sector is regarded by many investors as less risky than the biotech industry. Is this assumption accurate?**

**Marc Klingelfuss:** Yes, it is. Most of the medtech companies that went public already had products on the market and respectable cash flows at the time of the IPO, which is rarely true for biotech companies. Biotech companies attempt to finance product developments through IPOs.



From left to right: Diego Braguglia (Partner, VI Partners), Yvonne Wegmann (Vice President, SWX Swiss Exchange), Christoph Gretler (Director, Credit Suisse First Boston), Stephan Meier (CEO, Bellevue Asset Management) and Marc Klingelfuss (Head Capital Markets, Lombard Odier Darier Hentsch)

**Diego Braguglia:** For conservative investors, the medtech sector is less risky investment than the biotech sector. This is because medtech companies have lower capital requirements and their time to market is not as long as that in the biotech industry.

**Yvonne Wegmann:** Since the bubble burst a few years ago, there is a higher risk aversion than before. Both biotech and medtech have a very high growth potential due to the demographic changes of our society. Since the sector has already reached a higher stage of maturity, the risks involved in medtech investments are still lower than in biotech. That is why the demand for medtech stocks has been very high during the last few months. Ypsomed, for example, has seen its share price increase by more than 125% since its IPO in 2004 and the entire sector has managed to develop very positively during the last twelve months with growth of 36%.

**I'd like to gaze into the crystal ball. Where do you see the greatest potential in the medtech sector?**

**Christoph Gretler:** The most interesting areas definitely include the cardiovascular, dental and orthopaedic industry. New technological innovation, demographics and deteriorating lifestyles are very powerful growth drivers for these industries.

**Stephan Meier:** We see the most attractive opportunities in the area of dental implants. And there's also the area of diabetes, which represents a fantastic and long-term business for Ypsomed. The third area is the spine sector. Back pain is a national affliction and, accordingly, the market for treatments is growing very strongly.

**Marc Klingelfuss:** On the one hand, I see great potential in the convergence of medtech and pharmaceuticals. On the other hand, I think that the 500-plus smaller medtech companies in Switzerland will grow and a number of them will go public or be involved in M&A activity. This will keep the fantasy level in the sector high, will help to stimulate innovation and give the sector a very promising future.

**Diego Braguglia:** Convergence is a very important issue! We are currently seeing a number of small companies developing products that combine knowledge from the medical and the biotechnological sectors. The key idea here is that of «intelligent implants». I feel that this sector has enormous potential and will therefore provide highly interesting and rewarding investment opportunities.

**Yvonne Wegmann:** Due to the extensive and highly successful peer group, the large experience and high expertise within the financial community, the high market multiples as well as the great placing power of the banks, SWX is in a prime position for the quotation of further life science and especially medtech companies. We are in contact with an increasing number of local and foreign companies who are highly interested in the advantages of the Swiss market and will certainly see a further growth of the sector and the unique peer group.



From left:  
Charly Mazenauer,  
Director of Technology,  
Dr Joachim Franke,  
General Manager,  
Kurt Eggmann,  
Director of Sales, Marketing and  
Project Management, and  
Guido Vollrath,  
Plant Manager

**WEIDMANN PLASTICS TECHNOLOGY** The company headquartered in Rapperswil and with four other plants in Switzerland as well as offices and production sites in Germany, USA, Spain and Brazil is an excellent example how it is possible to expand innovative know-how from other branches into the field of medical devices.

For a long time Weidmann Plastics Technology was famous for its innovative technologies solutions in the automotive and plumbing industries. 1999 the management decided to strengthen the company's leadership position built upon its more than 70 years of moulding experience and to expand into the dynamic market of medical devices. «This market continues to grow worldwide and demands more and more highly sophisticated plastics applications», explains Dr Joachim Franke, General Manager Medical Components Division, the step. What started as a «by-the-way project», became 2001 a profit

centre within the company, and in the meantime, combining its experience of value-added injection moulding technology, Weidmann is a market leader in advanced and customised products particularly in labware, in-vitro diagnostics and medical devices. «We expanded our capabilities in this highly important market segment with dedicated manufacturing locations including clean-room facilities on 800 m<sup>2</sup> and high-precision, ultramodern injection presses with the most up-to-date automation and assembly equipment available.»

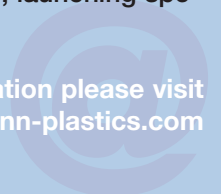
#### **COST-EFFICIENT MANUFACTURING**

It is the company's intention to assume a leadership position in medical components through advanced technology, cutting-edge manufacturing techniques and unparalleled customer service. For this, Weidmann has developed techniques which set it apart from the rest of the industry. «For example, our

unique capabilities in the moulding of microfluidic and microoptical structures that have allowed us to achieve enviable breakthroughs in the manufacture of cost-efficient plastic substitutes for glass chips for high and ultra-high throughput screening applications.» In addition, the company has considerable experience in two-shot injection moulding/co-moulding that allows the most complex combination of plastics. «Together with our automation equipment, a stunning variety of integrated final medical assemblies are possible, which may include non-plastic components like steel lancets and other inserts.» Weidmann's Medical Components Division started with around 20 employees, in autumn 2005 this number will grow up to 80. «At the moment we double our growing rate each year», says Franke. And the division has a lot of well-known customers, such as Roche, Novartis, Tecan, Becton Dickinson, Pfizer or Aventis. Nevertheless, the division plans to grow not too fast. «Since we are a private company held by a family, it is our aim to grow sustainable.»

One of Weidmann Plastics, latest innovations is a lancet drum for the diabetes community with plenty significant advantages over the existing products in the market. «We offer now a mass production of this disposable lancet drum, each containing six lancets.» The drums are part of a lancing system for blood glucose testing. Joachim Franke and his R&D team are pushing not only products in the area of blood glucose testing but also elements for blood coagulation devices. And for the future the company plans to expand into nanotechnology, launching special plastic chips for microfluidic.

For further information please visit  
[www.weidmann-plastics.com](http://www.weidmann-plastics.com)





**OSEC BUSINESS NETWORK SWITZERLAND** In its capacity as Switzerland's official export promotion agency, Osec helps Swiss and Liechtenstein companies to break into international markets. In fulfilling its mandate, Osec can count upon an extensive network in Switzerland and abroad: **Business Network Switzerland**, with its local **Swiss Business Hubs** around the world.

Osec liaises with a comprehensive network of expert partners at home and abroad in order to provide active, local support to Swiss and Liechtenstein companies developing their international activities. In Switzerland, this network is composed primarily of cantonal chambers of commerce, although Osec may also work with industry associations and private specialists on a project-by-project basis. Points of contact abroad are provided by bilateral chambers of commerce, the trade and business sections of Switzerland's official representations, and the Swiss Business Hubs.

Working closely with the trade and business sections of Swiss representations abroad, and with Swiss chambers of commerce, Swiss Business Hubs have been built up as local centres of competence in primary export markets and in markets displaying potential for the future.

There are now fifteen such hubs in countries neighbouring Switzerland – Germany, France, Italy and Austria – as well as in Japan, China, India, Brazil, Spain, Poland, Russia, Dubai, the United Kingdom and the United States. The fifteenth, Swiss Business Hub ASEAN, opened in Singapore in April 2005. With their local expertise and intensive networking activities in their host countries, Swiss Business Hubs



The worldwide Network of Swiss Business Hubs – present in 15 countries.





### **OSEC'S INITIATIVE IN THE SWISS MEDTECH SECTOR**

Osec Business Network Switzerland, as the official Swiss trade promotion organisation, has put a great deal of emphasis on the medical technologies sector. In 2004, Osec compiled comprehensive studies about the medtech branch in Austria, Germany and the USA, and has presented the findings to Swiss firms interested in these markets. The studies pay particular attention to areas where Swiss companies have made important achievements, and therefore are focused upon sectors where Swiss firms have good potential to sell or market their technologies. Furthermore, strategies best suited for success in these countries are presented. The compilation of these studies was realised in collaboration with the Swiss Business Hubs. Furthermore, the studies featured contributions from industry experts. For more information please visit [www.osec.ch/branchenberichte](http://www.osec.ch/branchenberichte).

provide professional support services to Swiss companies seeking advice. Furthermore, they feed the [www.osec.ch](http://www.osec.ch) information platform with in-depth information from their markets. Interested companies can use this platform to obtain free information and useful tips on doing business internationally.

### **SPECIFIC SERVICES TO SMALL AND MEDIUM-SIZED ENTERPRISES**

The hubs offer specific services to small and medium-sized enterprises (SMEs) from Switzerland and Liechtenstein to help them to launch and develop their business relations in foreign markets. The SMEs will enjoy direct access to major players in the commercial, social, political, scientific and cultural fields.

The services offered by the Swiss Business Hubs include: Providing up-to-date market-relevant information and product data, assisting companies who are seeking distributors, representatives and import

partners, individual consulting for small and medium-sized enterprises, assistance to SMEs participating in trade fairs and reporting on these events and information about the foreign economy and market via the central information platform [www.osec.ch](http://www.osec.ch). Swiss Business Hubs also organise promotional events for Swiss industry and provide information on the Swiss economy to local companies and media. Swiss SMEs entering a new market will receive support from the Swiss Business Hubs at every stage in areas such as sourcing information, feasibility studies, action plans, business plans, locating business partners and business expansion.

For further information please visit  
[www.osec.ch](http://www.osec.ch)



**DIAGNOSWISS** Founded in 1999, the company based in Monthey near the lake of Geneva develops a broad biosensor platform based on proprietary microfluidic technologies in sub-microlitre volumes that speed up bioanalytics and reduce laboratory costs.

The story of DiagnoSwiss started at the EPFL, to be more exact at the Laboratoire d'Electrochimie, where Joël Rossier and Frédéric Reymond were developing micromachining tools and strategies for the fabrication of miniaturised biosensors. «We rapidly identified the interest of such devices in the medical diagnostics for rapid analysis and performed preliminary demonstrations for emergency tests», explains Frédéric Reymond, CEO of DiagnoSwiss. «We have then been in touch with a diagnostic company that we could convince of funding a more product-oriented research.» With this first research contract DiagnoSwiss was born.

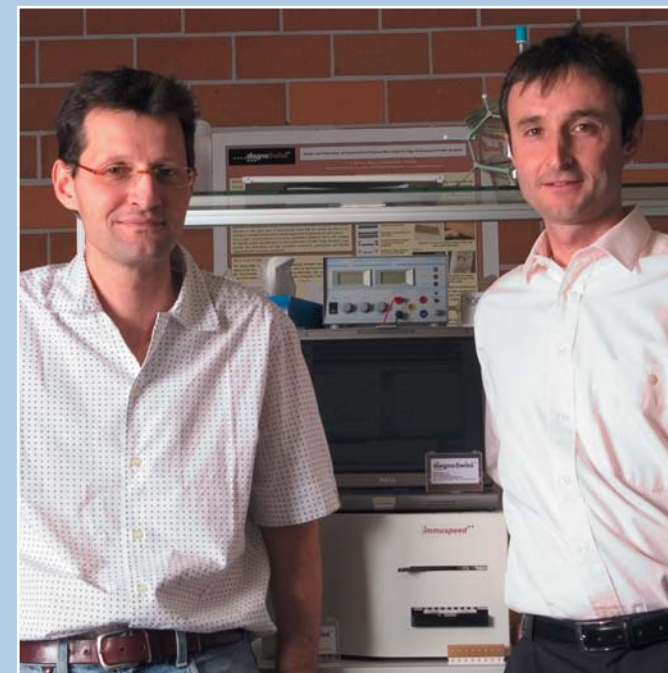
The core piece of the company's technology is a disposable chip, which can easily be customised to a wide range of applications. Microfluidics, biology and electrochemistry are combined to result in a revolutionary integrated analytical system. So far DiagnoSwiss has been committed to the development of ultra-rapid affinity assays (ELISAs) on these micro-carriers.

In the meantime the company found diverse industrial partners and obtained some grants (from CTI and from the European Union) for various applications of its technologies. «Thanks to our R&D contracts and to the licence agreements we are still a privately owned company», says Reymond.

## BENEFITS FROM A HIGH-TECH ENVIRONMENT

In 1999, DiagnoSwiss started with even less than one full-time position. «Since then we hired approximately one supplementary collaborator each year.» Most of the qualified specialists were recruited from the universities and high schools. «In Switzerland, we find all the necessary skills required for the development and industrialisation of our products. For instance, our chips are printed circuit boards that are produced near Zurich and we can benefit from the skills linked to the Swiss watch industry for assembling the small parts constituting our chip products.»

At the moment the team is finalising a first product for rapid protein analysis by immunoassay in small volumes which is dedicated mainly to pharmaceutical research and industrial control like food testing or quality controlling of biotech products. «We have signed an agreement with Biomerieux to serve the field of immunoassays in clinical diagnostics; this agreement opens the way for a worldwide commercialisation of our system in hospital and medical offices», explains Reymond. «In order to serve other markets such as food and biotech industry we will launch our instrument Immuspeed by next year under our own brand.» This launch is part of the management's middle- and long-term strategy. «For the short term, we expect one of our technologies called Off-Gel electrophoresis to be commercialised within next year by our licensee Agilent Technologies.» The advantages of DiagnoSwiss' products are convincing: they offer very rapid responses and enable to reduce the volumes and the quantities of valuable samples and reagents. «To improve the value chain we are developing a derived version of Immuspeed,



Dr Frédéric Reymond, General Manager (left), Dr Joël Rossier, co-founder and Chief Scientific Officer

enabling on-line analysis of processing lines.» In the mid-term, it is the company's intention to provide new kits for the customers so as to enlarge the variety of analyses that are ready to use on its platform. «And we want to decline our apparatus into an handheld device enabling field tests as well as personal monitoring.» DiagnoSwiss is also investigating new partnerships for developing its microchips in biomolecular diagnostics like DNA assays.

For further information please visit  
[www.diagnoswiss.com](http://www.diagnoswiss.com)

# 30 MILESTONES IN MODERN...

■ marked in blue are scientific contributions coming from Switzerland

■ marked in grey are infrastructure/political contributions from Switzerland

- 1895 Willem Einthoven distinguishes five different phases (deflections) of electrical current shown in an electrocardiogram, which he names P, Q, R, S and T
- >> 1899 **Augustus D. Waller presents the first electrocardiogram at the International Congress of Psychology in Basle**
- 1895 Conrad Roentgen discovers a new type of radiation, the so-called X-rays. This is the beginning of imaging technology in medicine
- 1927 The first modern and practical respirator, called the «iron lung», is invented by Harvard medical researcher Philip Drinker, assisted by Louis Agassiz Shaw
- 1932 Engineer, Harry Jennings, built the first folding, tubular steel wheelchair. That was the earliest wheelchair similar to what is in use today
- 1937 The first heart-lung machine is built by physician John Heysham Gibbon
- 1944 First utilisation of hem dialysis machines for blood cleansing
- 1950 Canadian John Hopps invents the first cardiac pacemaker
- 1951 George K. McKee implants the first steel hip endoprosthesis
- 1952 First application of ultrasound in the field of medical technology
- 1953 Cecelia Bavolek becomes the first to successfully undergo open-heart bypass surgery, with the machine totally supporting her heart and lung functions for more than half the duration
- 1954 Becton, Dickinson and Company create the first mass-produced disposable syringe and needle, produced in glass
- >> 1954 **Straumann Institute is established for development of new metal alloys, testing of material properties and investigation of practical applications**
- 1957 Earl Bakken, co-founder of Medtronic, develops the first wearable, external cardiac pacemaker
- >> 1958 **The four Swiss surgeons Maurice E. Müller, Martin Allgöwer, Robert Schneider and Hans Willenegger found the «Arbeitsgemeinschaft für Osteosynthesefragen». AO today represents the world's leading knowledge organisation in osteosynthesis**
- 1958 The world's first cardiac pacemaker, developed by Siemens, is implanted in a critically ill heart patient in Sweden
- 1963 Thomas Fogarty invents the «medical industry standard» balloon embolectomy catheter
- 1969 The inventor of the coronary stent, Charles Dotter, develops his first stent that is implanted in a dog
- 1972 First medical examinations with computer tomography are performed
- 1975 Robert S. Ledley is granted for a «diagnostic X-ray system» also known as CAT scan
- 1975 First diagnosis with positron emission tomography (PET)
- >> 1977 **At the University Hospital Zurich, Andreas Gruntzig carries out the first successful coronary angioplasty (PTCA) on an awake human**
- 1979 First use of engine-driven insulin pumps providing a steady insulin supply
- 1980 In Baltimore, surgeons succeed in first implantation of a defibrillator, an electronic device to monitor and correct heart rhythm disturbances
- 1982 Seattle dentist Dr. Barney Clark is the first person implanted with the Jarvik-7, an artificial heart intended to last a lifetime

- 1983 Introduction of the first implantable and programmable neurological stimulation device for the treatment of chronic pain
- >> 1983 Roche launches Reflolux, also known as «Accu-Chek», the first device that allows patients to monitor their own blood glucose levels themselves
- 1984 First development of engine-driven prosthesis allowing patients to move their fingers
- >> 1984 The first patients are treated with a proton therapy at the Paul Schärfer Institut (PSI)
- 1986 First successful insertion of a stent, a small, lattice-shaped metal tube, in a human coronary artery
- >> 1991 Richard Ernst (ETH Zurich) receives the Nobel Prize for Chemistry for his contributions to the development of the methodology of high-resolution nuclear magnetic resonance (NMR) spectroscopy
- 1993 First freely accessible nuclear magnetic resonance tomograph supplying cross-sectional images without exposing the patient to radiation (X-rays)
- 1996 First market approval of a tissue-engineered product (cartilage) in the United States
- >> 1997 Launching of CTI Medtech, a federal initiative to promote the collaboration between public institutes and private companies
- >> 1997 In Bern, the association «Medizinal-Cluster Bern (MCB)» is set up
- >> 1999 Launching of the platform «Zurich MedNet» which includes 400 companies, research institutes and hospitals
- >> 1999 The Swiss Network on Health Technology Assessment SNHTA, is established
- 1999 In London, a team of surgeons performs the first minimally invasive, robotic-assisted beating-heart coronary bypass graft
- >> 2000 The Federation of Swiss medical devices' trade and industry associations (FASMED) is founded
- 2001 Market launch of first pill cameras (capsule endoscopy) to diagnose diseases of the small intestine
- >> 2002 Swissmedic, the Swiss supervisory authority for therapeutic products, is founded
- >> 2002 Kurt Wüthrich (ETH Zurich) receives the Nobel Prize for Chemistry for his development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of biological macromolecules in solution
- 2002 First approval for drug-coated stents which greatly decrease the rates of restenosis
- 2003 Market launch of first digital cardiac pacemakers
- 2003 After many years of testing, the FDA approves the first bone cement containing antibiotics
- >> 2003 Opening of the Life Science Incubator «biotop» in Schlieren near Zurich
- 2004 First FDA approval for an artificial disc (Charité) for treatments of patients with degenerative disc diseases
- >> 2004 The Swiss Stock Exchange introduces the first two sector-specific indices: the SXI LIFE SCIENCE® and a focused SXI Bio+Medtech®
- 2004 First approval for Merci Retriever, a medical device for the removal of brain thrombosis
- >> 2004 Launching of the national Medtech' Internet portal: swiss-medtech.org
- >> 2004 A pilot project with electronic health cards involving 2'500 insureds, 40 pharmacies, 33 doctors and 7 hospitals starts in Lugano



The Web-based survey of 250 medtech companies carried out by Ernst & Young in summer 2005 once again highlighted the complexity and diversity of this industry. Nevertheless, it was possible to identify some common characteristics. The first of these is the strong presence of independent small and medium-sized companies. Then there is the continuing robust growth in sales and personnel. And finally, the fact that all medtech firms are proactively tackling the challenges of global growth.

#### **STRONG DENTAL CLUSTER**

Diagram 1 shows that 40% of participants operate in the field of dental implants, dental devices and dental consumables. The dental group represents nearly half of the survey results. Orthopedics, electromedical and imaging equipment as well as cardiovascular have a participation of 10%. Biomaterials include tissue-engineered bones, cartilage or skin, as well as other products, while electro-medical and imaging equipment includes X-ray machines, scanners, electrocardiographs, lasers and microscopes. We asked the participants when and how they were founded, and discovered an interesting statistic: 60% of the companies started their business independently. Half of the companies were founded before 1990.

#### **MANY INDEPENDENT AND PRIVATE FIRMS**

Diagram 2 shows that some companies founded after 1990 also started independently, and 20% were the result of academic spin-offs.

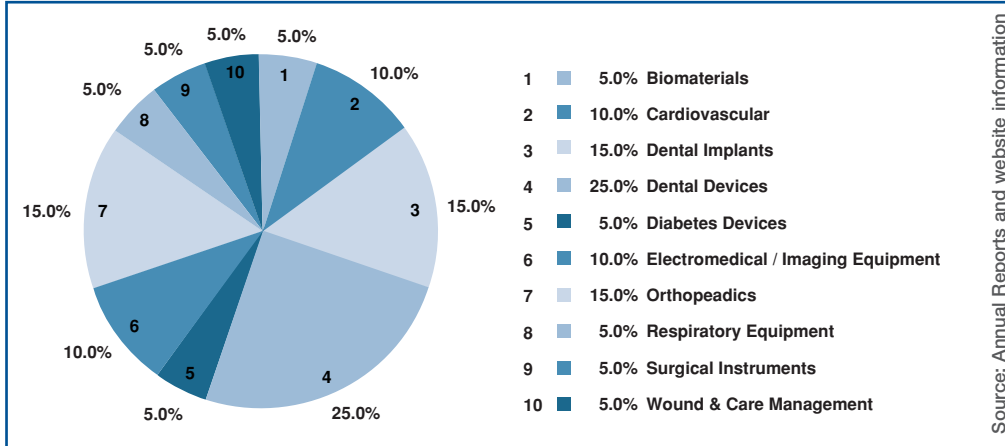
Management buy-outs are rather uncommon in this industry, since good businesses may not be sold to an existing management team. Industry spin-offs were mentioned as well, accounting for 10% of newly founded companies.

#### **STRONGER GROWTH IN R&D PERSONNEL**

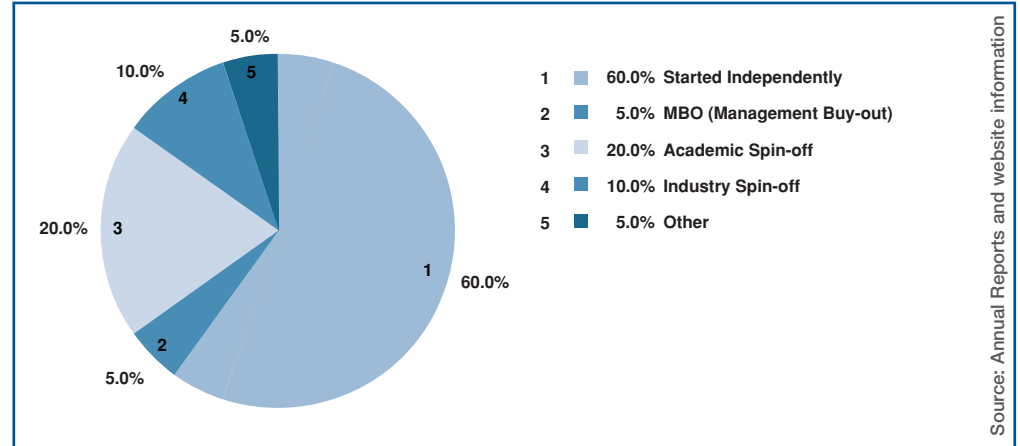
Diagram 3, page 35, shows headcount development in the surveyed companies. Since 2001, total headcount and R&D headcount have grown by over 10% annually. These figures reflect the average headcount growth rate for the whole industry. A slightly higher increase is evident in R&D headcount. On average, 4% of a company's total workforce works within the R&D department with smaller companies employing more R&D staff than larger companies. It should not be forgotten that larger companies have an extensive sales, marketing and distribution operation with a significant workforce, whereas smaller and younger companies often lack these resources and depend on larger companies for the sale and distribution of their products.

Companies founded after 1990 pointed to growth ranging from 30% to 300%. It can be concluded that all the surveyed companies are believed to operate in a high-potential environment. Market saturation is not an issue at all. The challenge will be how to address the opportunities. There are believed to be two major obstacles to growth: the lack of money, and the lack of suitable personnel. However, we believe that the «lack of money» argument in particular is primarily an information problem: start-ups and young companies often lack the experience to find and raise money. In Switzerland especially, there is a

**BUSINESS AREAS** (Diagram 1)



**COMPANIES' ORIGIN** (Diagram 2)



competent venture capital industry with a special interest in medtech.

### FEW LARGE REVENUE PLAYERS

Diagram 4, page 35: Based on their expectations for the future, how do the companies present their current status? In terms of the financial figures as at the end of 2004, both revenues and profits/losses may provide a comprehensive picture. Even though over half of the companies did not provide accurate figures, they did quote the ranges presented in the diagram. A third of the companies generate less than CHF 1 million, the second third generate between CHF 1 million and CHF 10 million and the last third generate more than CHF 10 million. This revenue distribution accurately reflects other survey results and

market investigations in the Swiss medtech industry. Around 35% of the companies are larger companies with turnover in excess of CHF 10 million, while 65% are small and mid-sized companies with turnover of less than CHF 10 million.

### POSITIVE TRENDS

In terms of profitability, 65% of the companies do break even. This is of course related to the number of years in the market. Newer companies have to face high fixed costs and still operate in the red. A few new companies have already posted their first profits, however. Established companies, meanwhile, are almost permanently profitable. This stresses the positive trend and makes it possible to achieve the expected growth rates.

Since profitability figures are always treated very confidentially, there are no reliable sources available to make a statement on the industry as a whole, which is still dominated by privately owned companies. Based on the trend, however, we can conclude that the more years a company is in the market, the better its financial situation. R&D expenses as a percentage of revenues can also describe a company's age. Companies in the start-up phase invest incredibly high amounts in R&D in order to develop a successful product. Established companies in the growth phase spend between 3% and 8% on R&D. These ratios exactly mirror the industry average. No company spends more than 10% on R&D. This average is higher than in established chemical companies (around 4%), but lower than in pharmaceutical companies (15–20%) or biotech firms (around 20%).

## GENERAL CHALLENGES

Medtech companies face a raft of challenges in their daily business. The search for suitable personnel is a main issue. Although all the survey participants mention that they do not have staff shortages at present, difficulties do arise when special positions need to be filled. When looking for researchers, around half of the companies say that they experience problems in the recruiting process. In the search for managers, only a third of the companies are confronted with problems.

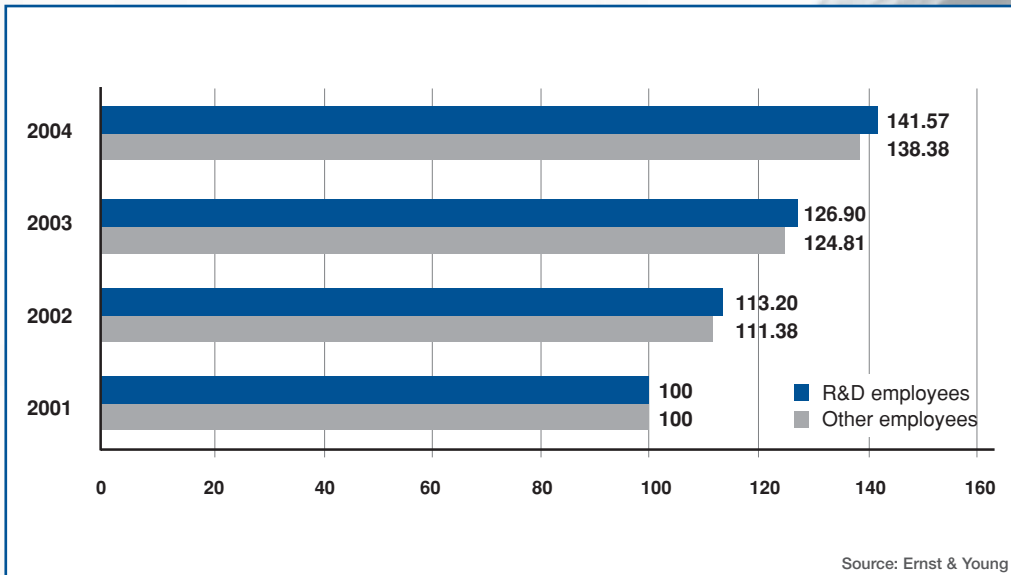
The remaining companies are able to recruit their executives successfully. Start-up companies mention that the whole recruiting process is extremely time-consuming, a statement that might also be attributed to their lack of experience and/or missing support functions in HR management. In terms of creating new jobs in Switzerland, nearly all of the companies expect to hire more people over the next five years. New jobs are planned abroad as well. There is no clear trend regarding where most of the jobs will be created. Since the medtech industry offers huge worldwide market potential and the domestic Swiss market is very limited, strategic decisions for international expansion have to be made. 20% of the participants indicate that they will open a location in a foreign country within the next 12 months. A further 20% say that they will realise the same strategic intention at a later date. Target countries are China, India, the USA and Germany.

When asked about new trends in the Swiss industry, participants indicate that the regulatory environment may decrease the attractiveness for R&D and increase the time to market for new products. It is believed that mergers and acquisitions will be driven

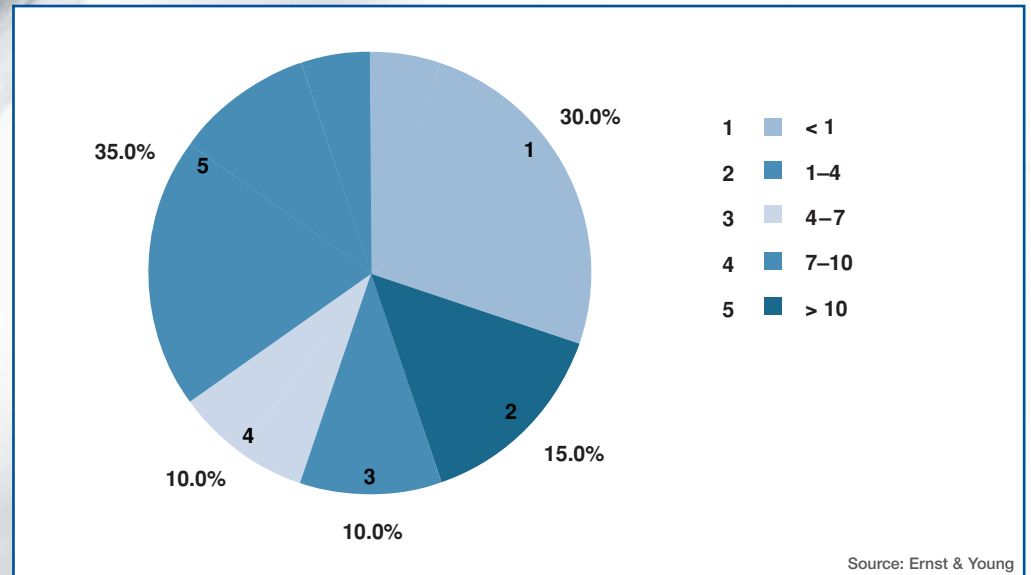
mainly by foreign companies. US firms in particular may try to acquire innovative Swiss companies.

Another general trend is the impact of cost-saving programmes in the healthcare environment, with further decreases in hospitalisation time anticipated. Monitoring of outpatients will therefore become more important, and a premium will be paid for technologies that decrease hospitalisation times. The crucial success factor for the whole industry will be having suitable and committed people to push progress. Switzerland, with its multilingual workforce and full economic integration into the EU, has a lot to offer in this regard.

**HEADCOUNT GROWTH** (Diagram 3)



**REVENUE IN MILLION CHF** (Diagram 4)





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