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biotech focus

Uppsala: turning knowledge into profits

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Drive into the Swedish town of Uppsala, 50 miles north of Stockholm, and you might be forgiven for missing the fact that you had entered a hotbed of life science entrepreneurs. The 13th century brick-clad cathedral and the hoards of bicycling students give the town a deceptively genteel air. But start a conversation with anyone in Uppsala between the ages of 20 and 60, and you realize that this is a town that positively breathes commercial biotech.

Uppsala BIO, an initiative set up to promote the life science sector in the town, estimates that 10% of Uppsala's workforce is employed in the biotech sector, making it arguably the World's most biotech-intensive city. The life science industry has played a key part in the city's business life since the 1950s. It was then that pharmaceutical company Pharmacia moved to the city to be closer to researchers at Uppsala University – one of Sweden's oldest and most respected – who had made significant progress in protein separation and analysis techniques. These became the basis for much of the work at Pharmacia (later Amersham Biosciences), which went on to become a world leader in providing systems for protein analysis and purification.

Vote of confidence

Protein separation, biosensors and other protein-oriented technologies continue to dominate Uppsala's industry. Pharmacia Biotech is now part of GE Healthcare and remains a major force in Uppsala's biotech industry and in its field worldwide. Rising demand for the company's protein separation products led to the company investing US$94 million this summer in a new production plant in Uppsala. The new factory will allow for a 50% increase in production. 'This expansion is a very significant vote of faith in Sweden and in the business', says Nigel Darby, head of Research and Development at GE Healthcare's Uppsala operations. For Darby, the main advantage of being in Uppsala is the ease of recruiting researchers. 'Uppsala has been a prime location for protein science research for many decades, and this is still the case today', he says. 'This means not only that we can get the right staff, but also that plenty of our clients are based nearby.'



TABLE 1

Uppsala life science companies[a]

Company	Website	Description
Biotage	www.biotage.com	Biotage develops, manufactures and sells instruments, software and reagents for medicinal chemistry research and applied genomic analysis.
GE Healthcare	www.gehealthcare.com	GE Healthcare is a multinational company specialized in medical imaging and information technologies, medical diagnostics, patient monitoring and life support systems, disease research, drug discovery and biopharmaceutical manufacturing technologies. In Uppsala, the company focuses on systems for protein analysis and purification.
Gyros	www.gyros.com	Gyros develops, manufactures and sells equipment for miniaturized and integrated laboratory processes based on microfluidics.
Olink Bioscience AB	www.olink.se	Olink specializes in products for proximity ligation, a method for ultra-sensitive protein detection, combining the specificity of antibody recognition with the sensitivity of DNA amplification.
Q-Med AB	www.q-med.se	Q-Med is a biotechnology and medical-device company that develops and produces medical implants. All products are based on the company´s patented technology NASHA (non-animal stabilized hyaluronic acid).

[a]A full list of life science companies in the Uppsala region is available at www.scandinavianlifescience.org/uppsala/

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GE Healthcare cooperates easily with many of the smaller companies that have sprung up in the area – hardly surprising, given that most firms in Uppsala have staff that has worked at Pharmacia at some point. A number of now-independent companies even started life as part of Pharmacia. 'This makes these relationships very natural – one could almost call them family relationships', says Darby. It is these smaller companies that have helped to give Uppsala its entrepreneurial buzz over the past few years (Table 1).

Companies including Gyros, which develops 'microlaboratories' to carry out miniaturized laboratory processes based on microfluids, and protein analysis systems company Biacore started life as part of Amersham Pharmacia. Others, such as Olink, came directly out of the university. Over a third of the 140 companies in Uppsala Science Park are involved in biotech or medical technology. The science park has been developed in recent years in an old army barracks area near Uppsala University and the Swedish University of Agricultural Sciences.

Olink, like most of its contemporaries in the Uppsala Science Park, has a firm base in scientific research. The company is a spin-off from a research project at the university, something that CEO Björn Ekström says was made possible by Sweden's so-called teacher's exemption, whereby individual researchers own the rights to their own discoveries. 'Commercialization is actively encouraged in the university and by local industry', he says.

As part of the effort to encourage commercialization, Uppsala University has founded UUAB, the Uppsala University Holding Company. A private limited company with offices in the science park, UUAB was the first external investor in Olink. Olink took over from the researchers the rights to four technologies and twelve patents when it was set up in September 2004. Like so many companies in the region, its focus is on protein analysis. Olink retains its close links with the university and the Rudbeck Laboratory, where Ulf Landegren developed proximity ligation, a unique method for ultra-sensitive protein detection, on which Olink's business is based.

Building links

As with all start-up companies, networking is vital for Olink. Ekström exchanges business ideas with many of the more-established industries in the Uppsala area. One of the unique things about Uppsala, he says, is the very strong informal network of businesspeople, particularly in the biotech sector. The fact that few companies in the town compete directly with each other is an advantage, as is the compactness of the city. 'If you meet someone here and haven't worked with them in the past, the chances are that you at least have friends in common', Ekström claims.

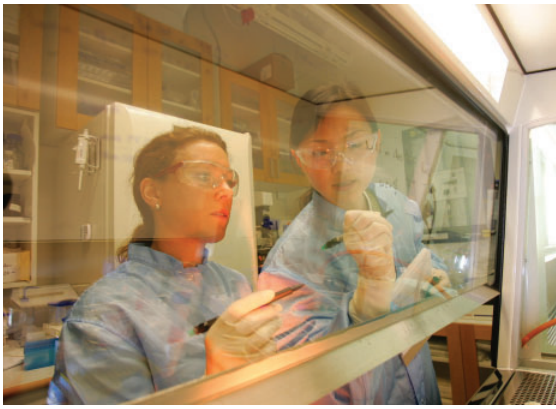
Of course, contacts within Uppsala and the rest of Sweden are just one part of the equation – Olink's network extends around the world. The company recently licensed a number of its technologies to San Francisco-based ParAllele Bioscience. Indeed, most companies in Uppsala have most of their clients and many of their partners overseas.

Whereas some start-ups in Uppsala go on to become major employers in the town, others are bought up and move away. This happened recently in the case of Neopharma, a specialist pharmaceutical company that develops drugs for Parkinson's disease, such as its flagship product Duodopa. When the company was taken over, new owner Solvay Pharmaceuticals decided to merge most of Neopharma's operations with its existing facilities in Belgium.

Organizations that promote biotech in the town, such as Uppsala BIO, are relaxed about such developments. Indeed, it was a testament to the value of the town's industry that Solvay chose to maintain a marketing unit for Duodopa in Uppsala. Still, in any dynamic international industry, companies will move and consolidate in the interests of their businesses. But, as was shown by GE Healthcare's expansion, there are plenty of international companies that choose to stay and grow in Uppsala. There are also a number of companies that have gone on from small beginnings in Uppsala to employ hundreds of people worldwide. One such company is medical implant maker Q-Med, which employs 540 people, of which 350 work at the company's Uppsala headquarters.

Cosmopolitan edge

Bengt Ågerup, who founded Q-Med in 1987 and remains its CEO, says he has stayed in Uppsala 'because there are so many people who are trained in just the right disciplines.' 'Uppsala is also that kind of stable society that encourages loyalty from workers', he adds. That loyalty is shown not just by Swedes working in Uppsala, but also by the many that come from abroad to work for its biotech companies. GE Healthcare's Nigel Darby, himself from England, feels that the town has a cosmopolitan edge. 'The influence from the university and the proximity to Stockholm, which is only 30 minutes away by train, all help create this atmosphere.' Stockholm's airport, the busiest in Scandinavia, is



even more accessible and closer to Uppsala, in fact, than to Stockholm itself. Darby also points out that English, as well as being the working language of international companies such as GE, is universally spoken and understood by Swedes.

'The fact that language barriers are not too high here makes it very straightforward to get people to come and live in Sweden', says Jon-Sverre Schanche, R&D manager at Biotage, another of Uppsala's imports. Originally from Norway, Schanche has been in the town for ten years and says the high concentration of biotech-related companies is a big draw for foreign talent. 'It's very easy here to get in touch with other people, and the local network extends beyond Uppsala to Stockholm, home to the Karolinska Institute and Stockholm University.' Biotage is itself an example that international consolidation can swing both ways for Uppsala. The company, formerly known as Pyrosequencing, retained its headquarters in the town when it took over American company Biotage and British firm Personal Chemistry. The company also retains its listing on the Stockholm Stock Exchange.

Staying close to research

As well as maintaining facilities in the US and UK, Biotage undertakes research collaborations, particularly in Great Britain and Finland. 'Uppsala and its university have a very good reputation



BOX 1

Related links:

- **Uppsala BIO:** www.uppsalabio.se
- **Uppsala University:** www.uu.se
- **Swedish University of Agricultural Sciences:** www.slu.se
- **Uppsala Science Park:** www.uppsalasciencepark.se
- **Uppsala Innovation Centre:** www.uic.se
- **Uppsala University Holding Company (UUAB):** www.uuab.uu.se

for research', Schanche says. 'People from outside want to be associated with it.'

One way in which companies and the universities come together is through the Uppsala BIO-X project, run by Uppsala BIO. This is a cross-disciplinary life science research effort, which funds ambitious, world-class research. The Swedish University of Agricultural Sciences and Uppsala University are the most important participants in BIO-X, but researchers from other institutions in the region, such as Mälardalen University in nearby Västerås, have also been involved in projects funded by BIO-X (Box 1).

One of the first research grants has gone to the lab-on-a-chip/point-of-care project, in which researchers are constructing a small handheld device for analysis of blood samples for common biomarkers. The system will be able to produce results within five minutes. The group, led by Lars Baltzer of Uppsala University, is currently working on a prototype to test for the C-reactive protein (CRP), a common indicator of infection. Researchers say that the system could enable tests to be carried out closer to the patient, even in the patient's own home, which they say gives clear financial gains to international health systems facing increased pressure on budgets.

The policy of Uppsala BIO-X is to make substantial contributions to a small number of projects, which are chosen not only on the basis of their scientific value, but also on their commercial potential. 'The cooperation and influence of local biotech industry is pivotal in ensuring that projects within Uppsala BIO-X are run in an industrial manner', says Jonas Åström, project manager of Uppsala BIO-X. 'Without this type of strong academic and industrial collaboration our needs-motivated focus would easily be lost, and you could be back to 'research as usual',' adds Åström.

An initiative that aids the process of turning interesting research ideas into commercial reality is the Uppsala Innovation Centre (UIC), an incubator where Olink, among others, has its offices, located in the Uppsala Science Park. UIC provides office and lab space for a number of companies, but for many more it is a source of business coaching and advice. 'The fact that Uppsala has so many life science companies is a big attraction for start-ups', says UIC manager Per Bengtsson. 'Many of the companies that we work with come here because there are several potential clients for them in the town', he adds.

Organizations such as UIC – organizations that keep the flow of ideas coming – are in many ways the key to Uppsala's continued success. It's a virtuous circle: Uppsala's existing well-known biotech firms attract smaller firms from outside, which grow and in their turn attract new start-ups to the town. That some of the start-ups might one day go out into the world, leaving Uppsala behind, can still be called a success and shows that the town stimulates commercial biotech that grabs international attention. But most gratifying of all for those involved in Uppsala's biotech industry is the fact that so many of those companies that have their roots in Uppsala choose to stay. Companies, such as Q-Med, Biotage and GE Healthcare, find that they can continue to grow and flourish in a town that breathes biotech.

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