

# Crossing borders

A spirit of collaboration — and an engineering icon — have together supported the emergence of a major scientific hub.

BY NIC FLEMING

Engineers may know Øresund Bridge as Europe's longest road and rail bridge. Aficionados of crime dramas will forever associate the spectacular 7.8-kilometre section between Malmö and Copenhagen with the opening credits of the popular Swedish–Danish series *The Bridge*. For scientists in the region, its opening, in 2000, underpinned the development of Medicon Valley, one of Europe's strongest life-sciences clusters.

Medicon Valley consists of the island of Zealand in eastern Denmark — home to Copenhagen, the country's capital — and the Skåne region of southern Sweden (see 'Science hub'). Its population of 4 million amounts to only around one-quarter of the combined population of the two countries. Yet the valley's 41,000-strong life-sciences workforce accounted for 58% of people working in the sector across both nations in 2015.

The hub is going through a process of change against a backdrop of global disruption, creating both challenges and opportunities for researchers nearby. Some changes are playing out differently on either side of the bridge.

The 2008–15 period, for example, saw employment in the life sciences drop by 31% in Skåne, but jump by 13% in the Danish part of Medicon Valley.

This can largely be explained by events in the pharmaceutical industry. Most prominently, multinational giant AstraZeneca shut its research facility in Lund, with the loss of 600 jobs, in 2011. Growth on the Danish side has been driven by

Novo Nordisk in Bagsværd, which has around 17,500 employees in the region, as well as by smaller pharmaceutical companies.

## MAKING MEDICINE

For early-career researchers intending to work in the region's pharmaceutical sector, demand for solid computing knowledge has grown with the rise of big data — many more businesses now need trained number crunchers. "Once, statisticians could primarily get work in the pharmaceutical industry, insurance and finance, but now they are in demand all over, so we face more competition to recruit them," says Erik Kristensen, a human-resources executive at Novo Nordisk.

The company — which produces drugs to manage diabetes, obesity and haemophilia — is also looking for epidemiologists, pharmacologists, protein scientists, medical doctors and biologists focused on metabolic disease.

However, although Medicon Valley's pharmaceutical companies are hiring for specific positions, hundreds of jobs have been lost in the sector over the past three years. The region's companies are not immune to global pressures facing the industry, not least the long-term decline in research and development productivity. Big pharma's issues have, however, opened up opportunities for others. The biotechnology industry took off in the region in the 1990s, before the bridge was built. Today, there are around 150 biotech companies in the region. Europe's biggest biotech, Genmab, has

its headquarters and a clinical development team in Copenhagen. Founded in 1999, it now employs some 250 people and has 2 approved immunotherapeutic-antibody treatments. Genmab is also working on other antibody therapies, and has more than 100 ongoing clinical trials for various therapies.

For Jan van de Winkel, Genmab's chief executive, Medicon Valley is ideally placed thanks to the proximity of major Danish pharmaceutical players, and Swedish universities and hospitals across the bridge. "Being networked and gaining inspiration from others is key to Genmab's success," says van de Winkel. "I see a very positive future for Medicon Valley as the connections between different parts of the life-sciences ecosystem grow stronger still."

This growing emphasis on collaboration and networking is underlined by the rise of the region's science parks, where researchers, entrepreneurs and established businesses learn from each other. Before the bridge and the creation of Medicon Valley, the only science parks in the area were Ideon in Lund, Medeon in Malmö and Symbion in Copenhagen. Since 2004, three more have opened. Today, one in ten of those working in the life sciences in the region is based in a science park.

The Copenhagen Bio Science Park (COBIS) was set up in 2009 to support early-stage life-sciences organizations. It currently hosts more than 100 start-ups and employs around 350 people. COBIS rents out facilities, offers business-development services

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Øresund Bridge, joining Sweden and Denmark, supports a major science hub.

and provides early-stage investment funding to promising projects.

“There’s a lot of buzz in the sector right now,” says Morten Mølgaard Jensen, COBIS chief executive. “The number of new projects and companies spinning out of institutions is on the rise. We offer an environment where everyone knows each other and start-ups can get established while enjoying cheap offices and access to shared lab space.”

### CROSSING OLD BORDERS

Medicon Valley’s nine universities employ nearly 7,000 life-sciences researchers. Of these, the University of Copenhagen comes out top in terms of international rankings, publication volume and citations. As elsewhere, interactions between academia and industry have grown, thanks in part to policy initiatives such as the strengthening of technology-transfer offices, and wider cultural changes, including how academics view industry.

Nils Brünner, a cancer researcher at the University of Copenhagen, is one of many academics who have embraced this environment. He helped to launch the start-up Scandion Oncology in May 2017. The company is investigating a drug candidate that has shown promise in enhancing the effects of some cancer treatments by overcoming drug resistance.

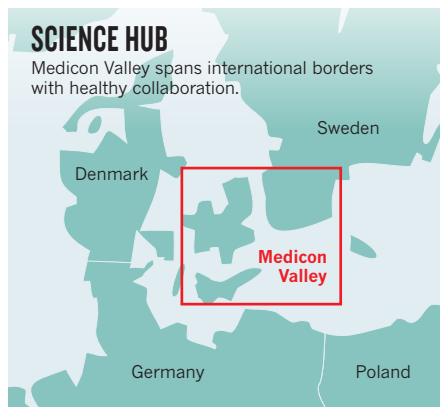
Brünner says that ten years ago, as an academic researcher, you wouldn’t want to tell people you were partnering with industry “because they might think you have a conflict of interest. That has changed very rapidly, and today academics are proud to work with businesses, and if you spin out a company you are a hero.”

Brünner, a Dane born in Sweden, set up an oncology-networking organization in 2016 with the help of the Medicon Valley Alliance (MVA), a life-sciences industry body. This seeks to drive progress against cancer through the sharing of ideas between academics and industry, from both sides of the bridge. The MVA has also set up similar medical technology and microbiome networks in the region.

### INTERNATIONAL IMPACT

After the departure of AstraZeneca from Lund and several years of decline for life-sciences employment in Skåne, there are signs of recovery. The Medicon Village science park, created in 2012 at AstraZeneca’s former research facility in Lund, now hosts more than 100 businesses, including biotech companies. Also in Lund are the MAX IV synchrotron radiation facility, completed in 2016, and the European Spallation Source, an advanced pulsed neutron source currently under construction. Next-generation materials-science facilities are expected to enhance Sweden’s reputation as a leading materials-science hub, providing insights across a wide range of fields and creating job opportunities in nearby universities.

Those who promote Swedish–Danish



collaboration acknowledge that life sciences still face the challenges in the region. “We have everything Boston has,” says Søren Bregenholt, chairman of the MVA and a corporate vice-president at Novo Nordisk. “We have top universities, great hospitals, pharmaceutical companies, biotech, a well-educated workforce, a flexible job market and competences that stretch from early research to manufacturing. However, we are more diluted geographically.” Life-sciences leaders and politicians are discussing new measures to combat this disadvantage, such as improved cross-border research and development, knowledge exchange, clinical-trial collaboration, and coordination of efforts to attract investment to the region.

Another issue is a lack of availability of local capital, which can leave small but promising companies dependent on investment from abroad and vulnerable to foreign acquisition. “We have start-ups and grown-ups, but we lack the scale-ups,” says Bregenholt. In 2015, for example, Danish oncology company EpiTherapeutics was snapped up for US\$65 million by US company Gilead in Foster City, California.

Large companies in the area also report some recruitment difficulties. “People can get higher salaries in the United States and Switzerland,” says Kristensen. “Because of things like free health care and education, good transport infrastructure and a good work–life balance, however, we find that those that come tend to stay.”

To outsiders, a life-sciences hub that crosses a national border and 8 kilometres of cold water might seem strange. Yet Skåne was part of Denmark until the seventeenth century, and the two languages are very close. Øresund Bridge has brought the neighbours closer still.

“Danes understand Swedes and Swedes understand Danes,” says Brünner. “They have more or less the same cultural background. Of course, there are differences in regulations, research focuses and viewpoints. But it’s being exposed to these that opens up possibilities to find more collaborators and achieve higher standards.” ■

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