Working Sweden's Population Gold Mine

One of Hans Wigzell's boldest scientific moves as head of the Karolinska Institute was to encourage a bright Swedish star in cancer epidemiology to uproot his entire department at Uppsala University and move to Stockholm. Since making the switch in 1997, Hans-Olov Adami's team has grown from 40 to 150, consolidating its position among the top epidemiology departments in the world.

Adami had built a reputation at Uppsala on high-impact papers on everything from the cancer risks of hormone replacement therapy to survival rates for early prostate cancer. However, he says, Uppsala's financial support was flagging while Karolinska beckoned with a "much more vital, visionary, and dynamic" environment. "Our faculty locked ourselves up like cardinals and voted to move," Adami says.

Key to Adami's success is his group's access to Sweden's unique national databases, a gold mine of information for exploring how genes and the environment influence disease. The country's national health care system gives each person an identification number at birth and maintains health records in a registry. This allows for so-called "linkage" studies in which cancer cases can be assessed by occupation, for instance, or time of first pregnancy. Karolinska also maintains two high-powered research databases, including the world's largest twin registry with records on over 70,000 pairs.

Doubly precious. Studies of identical twins Ruth and Annié Nyström and others in Karolinska's registry are yielding insights on genes, aging, and disease.

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Once ensconced at Karolinska, Adami did some recruiting of his own, luring behavioral geneticist Nancy Pedersen from another Karolinska department in 1999. She helped the group expand beyond cancer studies. All told, the team churns out a paper every couple of days, over 100 in 2000 alone. Among their recent contributions are studies probing the links between human papillomavirus and cervical cancer, and, for example, caffeine consumption and spontaneous abortions.

The twins database, with the oldest living pairs in their 90s, is becoming ever more valuable now that "enough people are dying or being sick" from chronic diseases, Pedersen says. Some findings based on the twins have been controversial: For example, scientists recently challenged a paper suggesting that cancer risk is linked only weakly to genes (*Science*, 27 July, p. 601). "It was a good contribution, but it indicates how difficult these studies are," says epidemiologist Robert Hoover of the U.S. National Cancer Institute. Another influential study suggested that intelligence is determined largely by genetics, even into old age (*Science*, 6 June 1997, p. 1560). The Karolinska team's skill at working these databases has produced "penetrating findings," says Harvard epidemiologist Walter Willett, who expects to see a steady stream of intriguing papers from Stockholm in the years to come.

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With reporting by Lone Frank, a science writer in Copenhagen.

it from scratch.

Despite professing a desire to return to the lab bench, Wigzell was nominated and elected and took over Sweden's biomedical powerhouse in July 1995. His first task was to work the same magic that he had performed on the actors at the Stockholm theater. He set out to change the attitude "that KI is as good as it could get and shouldn't collaborate with anyone, ... certainly not industry," says Per Hall, vice chair of the Center for Medical Epidemiology at Karolinska.

Industrial deals

Although the institute director does not have the power to direct research, Wigzell took steps to stamp out mediocre work. In 1993, Samuelsson had melded 158 departments into about 30. Under Wigzell, the reforms have proved to be more than just a revised seating plan. Department chairs now control most of KI's federal funding, which provides enough money for a few months' salary. Professors must then compete for funds for the remainder of their paychecks. "It's not that easy to sack people," says Fransson, who says the goal is to "be more elitist, allocating more money to fewer researchers."

Making KI's faculty leaner and fitter is all part of Wigzell's mission to put the institute on a sounder financial footing. With levels of government funding now harder to predict, Wigzell had to find other sources of income. He soon realized that KI's greatest growth potential lies in corporate ties. Five years ago, only about 2% of the institute's funds came from industry; that percentage has grown to 7% in this year's $285 million budget. He is aiming for a 20% share by 2004.

As a first step, KI had to do a better job of licensing its inventions. As in Finland and Norway, Swedish researchers own their own research. But Wigzell realized that having researchers hawk their wares directly to drug companies wasn't working. "Big pharma doesn't want academic people coming to them; they don't know where they've been," says KI's Folke Meijer. Instead, he says, "pharma wants to buy ideas after the proof-of-principle stage." To make Karolinska's ideas more attractive, one of Wigzell's first initiatives as president was to pressure the government to pass legislation allowing universities to set up commercial entities. Within days of the law being passed, he had established KI Holdings AB, a commercial arm of the nonprofit institute. Since then, Wigzell and his top lieutenants have created several companies nested like Matryoshka dolls under KI Holdings.

For example, Karolinska Innovations AB (KIAB) essentially serves as the university's tech-transfer office, filing for patents on behalf of inventors, then selling or licensing them, with a portion of the money flowing back to the inventors. As well as selling their ideas, KI is now encouraging researchers to go into business themselves. In 1999, Wigzell and company set up the Karolinska Fund, with five investors—a major Swedish pension fund, the Wallenberg Foundation, two insurance companies, and the Swedish Medical Association—pooling $50 million in venture capital. Three new buildings, to house a staff of up to 600, are rising to accommodate KI start-ups and should be finished by the end of 2004. Wigzell hopes that within a decade, as many people will be employed by KI companies as are employed by KI itself.