



How Mutant Worms and Other Genetic Oddities May Improve Life on Earth

Cross-Country Genome Collaborations Introduced in Canada and Sweden Succeed in Bringing Teamwork to Research



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Today, in research laboratories ranging from Simon Fraser University in British Columbia to the Karolinska Institute in Stockholm, scientists are peering down their microscopes, trying to understand the workings of a very, very small worm. This mutant nematode, known by scientists as “Caenorhabditis elegans” (*C. elegans*), is providing the scientific community with a better knowledge of the human genome. But while this knowledge is important enough in itself, scientists may soon see an additional bonus. This collaboration, and a few others like it, will likely prove that scientists and funding organizations can get more accomplished across borders and scientific disciplines than on their own. In time, the benefits to the rest of us could be enormous.

The *C. elegans* project, nematode genomics in search of genetic “opposite numbers” in the human genome, was initiated through a unique funding mechanism developed by Genome Canada. This is a Canadian non-profit corporation that is responsible for restoring Canada’s do-

minance in the field of genomics. To date, Genome Canada has invested more than \$310 million across Canada.

A New Way of Paying for Scientific Research

“Money is usually directed to individual investigators, but with genomics, these projects are so big and broad that they don’t usually fit the mold,” says Marc LePage, Genome Canada’s Executive Vice-President of Corporate Development. “Success in genomics is built around alliances on a much larger scale, and Sweden was identified as a prospective partner. Our scientists felt that there is a great deal of complementary research going on in Sweden and that joining forces would work for both parties.” To be a success for both countries would require Sweden to share these costs – the Canadian monies are only available if their partner finds matching funds.

While Swedish scientists have already had substantial research funding in place,

through the Wallenberg Foundation, it was clear that Genome Canada would be a different breed of grant. “The Swedes have made significant investments in network infrastructure – for example a building or major lab facilities,” explains LePage. “That’s a good thing, as you need to have instruments, the people and space for



Marc LePage, Genome Canada’s Executive Vice-President of Corporate Development



them to do their work. But once you have this, you still need the funds for the direct



Governor Mats Hellström of Stockholm

costs of large and intensive studies. I think that, like Canada a few years ago, Sweden still struggles with this. But we were very happy to see the SSF [Swedish Foundation for Strategic Research] invest in this mutual interest.”

The Swedish Connection

How do two countries, separated by an ocean and thousands of miles, decide to get together and develop common resources for genetic research? According to Governor Mats Hellström of Stockholm, it may have something to do with the fact that the two countries already share so much. Like many Swedes, Governor Hellström speaks with pride about the way Swedish biotechnology has developed. He shows great enthusiasm for any program, such as Genome Canada, that will bring benefits to Stockholm.

“We have much in common with Canada, and it goes far beyond the fact that we have similar climates and sports interests. The pulp and paper industries are Sweden’s largest export businesses and are critical to the future of the country. Forests are a major national resource for Canada as well,” the Governor stated. “But Canada has long been considered a raw materials provider, and I believe that they would like

to change this. Often, they provide these raw materials to the USA, which ends up making something of value out of those materials to achieve a larger end result. Programs like this one show that Canada does not intend to be a raw materials supplier any longer – they want to add as much value as possible to each of their major industry sectors. The Scandinavian countries have been doing this for some time.”

Biotechnology and the Forestry Industry in Canada and Sweden

It isn’t just tiny worms that interest these researchers. The humble Poplar tree has attracted top scientists in both Canada and Sweden due to the large amount of Genome Canada and Swedish investments made in the study of the Poplar’s genetic code.

“We like the Poplar because it is easy to work with, there are a lot of tools available to study it, and it has a commercial niche,” says Dr. Brian Ellis of the University of British Columbia. Ellis believes that good things can happen to research when there is attention being paid by the commercial sector. “A lot of commercial potential could lie downstream from this Poplar effort. Interest is quite high right now – particularly because the full genome is about to be published.” Dr. Ellis, a Professor at UBC in the field of plant genetics, believes that the timing of the Genome Canada project on Poplar Genomics is excellent. The US Department of Energy (DOE) will publish the full genome of the Poplar in December 2003; this means that a “map” of close to 500 million base pairs of genes will be accessible by researchers all over the globe. Scientists, knowing more about these genes, will flock to the Poplar as a common system to study potential tree improvements.

Conclusion

Experts say that the money required to do genome research is staggering, and that these Genome Canada expenditures are but the tip of an iceberg. “In the grand scheme of things, the money we are seeing through Genome Canada is quite modest.

But with the way that the program is structured and the collaborators whom we are getting involved, we expect that this modest expenditure will benefit both countries significantly,” describes Dr. Olle Edqvist of the Swedish Foundation for Strategic Research.

Despite the size of these initial expenditures, Christian Ekström, Business Development Officer at the Canadian Embassy in Stockholm, believes what he calls the “business style” of Canadians and Swedes is quite compatible. He expects to see increasing life sciences investment between the two countries.



Christian Ekström, Business Development Officer at the Canadian Embassy in Stockholm,

“Put two business people in the same room, one from Canada and one from Sweden, and they’ll be doing a deal when you come back with coffee,” says Ekström. “The working style of both countries is straightforward and direct, with little time spent on chit-chat. They get right into the meat of the matter at hand.”

With that kind of working relationship possible, we can certainly expect to see more collaborations of this kind coming down the road from Canada and Sweden. Who will benefit? Obviously, the citizens of both countries will. But along the way science itself will profit – not only from these new discoveries, but also from the realization that borders can be bridged by teamwork and ideas that make good sense.

*By David G. Jensen
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