



R&D boutique's big and righteous claims to fame

When it launched 15 years ago, it faced funding challenges, legal obstacles and some skepticism. Today, Moncton-based Atlantic Cancer Research Institute leads the world in commercially viable research on early detection technology. With one patent under its belt, it may soon be ready for the prime time of the global marketplace.

By Alec Bruce

(L-R): The Atlantic Cancer Research Institute's Françoise Roy, executive director and Dr. Rodney Ouellette, president and scientific director. They and their team are leaders in prostate cancer research.

Shoe-horned into an older wing of the Dr. Georges L. Dumont University Hospital in uptown Moncton, one of the nation's leading centers for medical inquiry and technology development is not much bigger than a high school chemistry lab. "On the other hand," laughs its president and scientific director Rodney Ouellette, who holds out his hands as if to suggest that size isn't everything, "you should have seen us when we started."

In fact, despite its cramped and unprepossessing quarters, the Atlantic Cancer Research Institute (ACRI) is at the vanguard of some of the most innovative and important work in the areas of early detection and treatment of a disease that, in its various incarnations, claims nearly eight million lives a year worldwide. Over the past 12 months, it has taken a crucial step towards commercializing its research, having secured a U.S. patent on its molecular method for diagnosing prostate cancer. Now, it has begun the clinical evaluation phase to demonstrate how its process is more precise and reliable than standard diagnostic tools.

"Trying to understand tumor biology is a very worthy goal," Ouellette says. "But, sometimes, there's a gap between the discovery and application of something. So, we've been determined to understand the questions that are important to the people who are actually on the front lines. Essentially, what are the challenges they need to overcome to better deal with the patient population they see on an ongoing basis?"

And just so there is no misunderstanding about ACRI's overarching objective, the organization's executive director Françoise Roy flashes a knowing look at Ouellette and declares: "Our mission is to get from the lab to the bedside ASAP."

It's a startlingly confident statement of principle for an organization that began its institutional life on little more than a wink and a prayer. That was in 1998, when the young Ouellette — who had left his New Brunswick home to earn a medical degree and a PhD — returned with a dream to conduct biomedical research in a setting that nurtured the kind of hard science and practical breakthroughs common in places like Toronto, Vancouver and Montreal.



The Atlantic Cancer Research Institute conducts ground-breaking work in a facility not much larger than a high school chemistry lab. Shown here, ACRI's Dr. David Barnett, research scientist and head of mass spectrometry.

The problem was there was nothing to come back to in Moncton. "At that time, the landscape, research-wise, in New Brunswick was pretty barren," Ouellette says. "There really wasn't very much going on. Universities typically chose other areas to spend their research dollars on. A lot of this was tied to natural resources. Also, though, we didn't have medical training programs which often serve as centres of gravity for health and medical research."

There were other, more pragmatic, obstacles to hurdle. "In fact, the law in New Brunswick didn't allow (public health dollars) to go to health care research," Roy explains. "So, right from the get-go, there was no money to be had to finance this activity, as it was against the law. ...So, the onus was on us to go out and find funding. Quite frankly, we had to be entrepreneurial. But the challenge allowed us to be a bit more nimble than we might otherwise have been."

And more inventive. In the end, the solution was to establish the nascent institute as a not-for-profit operation, which gave it the independence it needed to qualify for broad funding programs. "We couldn't have a finger pointed at us," Ouellette says. "We couldn't have anyone saying we were doing research on the back of patient care. Our structure gave us actual opportunities to grow within the health care system. Some doors that were initially closed to us probably opened."

Even so, the early days were hard

going. Getting people to understand the research was one thing. Getting them to appreciate that advanced, practical science could actually flourish in this part of the Maritimes, and deserved to be taken seriously, was a little like convincing a politician that particle physics is a job-creation strategy. But Ouellette and his staff — one research technician and a student — persevered. Slowly, minds changed and opportunities came knocking.

"Initially, support from the community was crucial," Roy says. "It remains crucial."

Indeed, says Ouellette: "It started with the community. The hospital foundation and some large corporations, like Assumption Life, National Bank and Dooley's, came on board. And that provided us with the leveraging capability that we needed to help us build the infrastructure that, in turn, gave us the credibility to continue."

Arguably, ACRI's biggest break arrived in the form of a large contribution from the Atlantic Innovation Fund, administered by the federally managed Atlantic Canada Opportunities Agency, early in the last decade. Since then, the Institute — which operates with an annual budget of about \$3.5 million from government grants, donations and revenues derived from medical services it renders to other organizations — has raised a total of \$30 million for research. Today, Ouellette is pleased to report, ACRI employs more than 40 of the best researchers and technicians in the world.

A man is shown from the waist up, smiling. He is wearing a dark blue suit jacket, a light blue shirt, and a striped tie on the left side of his body, and a black tank top on the right side. He is holding a white rectangular sign with both hands. The background is a bright, sunny beach scene with people, umbrellas, and a building with large windows.

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*Statistics Canada Report on the Demographic Situation in Canada (July 2011)

**KPMG Competitive Alternatives Study (2006, 2008, 2010)

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Above: Dr. Rodney Ouellette, president and scientific director of ACRI, looking into Laser Microdissection Microscope. He returned to his native New Brunswick in 1998 to realize his dream of conducting biomedical research in a setting that nurtured hard science and practical breakthroughs. Right: Dr. Stephen Lewis, research scientist at ACRI.



"That's really what it is all about: attracting the best," Ouellette says. "But to get them to come here, you have to provide them with the infrastructure and the opportunities. That's what it takes to be a truly competitive research institute. A young researcher is not going to sacrifice his or her career to work in a place that doesn't provide the tools, a competitive laboratory environment. So we have to keep fundraising and being entrepreneurial. In fact, we've often acted as a contract research organization for other colleagues."

Adds Roy: "They are also attracting other scholars with their own national grants. So we're a magnet and there's a multiplier effect."

The effect, it seems, is working to great advantage.

Scientists at the Institute and Sackville, N.B.-based Sorcimmed Biopharma Inc. are currently studying how the molecular target of the toxin from the lowly shrew can be used to develop a screening test for breast, prostate and ovarian cancers. The procedure could identify patients who would most likely benefit from treatment based on a compound derived from the toxin.

Meanwhile ACRI researchers Dr. Stephen Lewis and Dr. Gilles Robichaud have obtained grants from the Canadian Institutes of Health Research. The former will continue his work on apprehending the way a particular protein in the human body controls the production of other cancer-promoting or suppressing

proteins. His research may provide vital insight into the underlying mechanisms that cause the growth of the disease, itself. For his part, Robichaud will investigate the processes that transform healthy cells into cancerous ones. The research should improve understanding of breast cancer biology and, in turn, lead to more effective diagnostic tools and therapies.

Not to be left out, Ouellette, himself, along with ACRI staff Michelle Davey and others, have received a grant from Colon Cancer Canada and the Colorectal Cancer Screening Initiative to fund research designed to assist scientists in their efforts to demonstrate that intact cells shed from the colon can be isolated and ultimately used to develop an accurate, non-invasive test for early detection of the disease.

To support these initiatives and others, ACRI recently acquired a state-of-the-art mass spectrometer — which it installed in the chemistry department of Mount Allison University — to enable researchers to more fully investigate the subtle factors that underlie and contribute to the disease progressing.

And then, of course, there's the groundbreaking molecular methodology for diagnosing prostate cancer, which ACRI developed in collaboration with the National Research Council's Fredericton-based Institute for Information Technology. "Essentially, we found that we could identify a certain group of genes that would change in the same way when the cell is cancerous, and would change in the opposite way when the cell is normal,"

Ouellette says. “So instead of looking at 25,000 genes, we can deploy a micro-array to whittle that number down to find a very small number of genes that we could develop in a kit to screen patients,”

If it sounds complicated, that’s because it is. But the real-world potential of this and, indeed, all of ACRI’s not-quite-ready-for-prime-time innovations is tantalizingly close. And if any of these processes, technologies and applications reach the market, they will almost certainly save billions of dollars for health care systems and millions of lives around the world.

This promise, alone, is worth the occasional struggles ACRI has endured over the years. “Actually, things are getting better for research here,” he says. “Over the past four or five years, New Brunswick (the government) has decided that innovation and research and development will be part of the province’s economic fabric. And we get CVs on a regular basis. Our doors should be open.”

Now, if only Dr. Ouellette can find a place to put them all. | ABM

Preparing to launch

The number of “ready-for-market” R&D companies in New Brunswick is on the rise thanks, in part, to organizations like the Fredericton-based New Brunswick Innovation Foundation (NBIF), a venture capital and research funding provider.

Among its many clients are several that are either nearing commercialization or just beginning to stretch their legs in the increasingly competitive marketplace for the next big idea. Here are three promising candidates for long-term success:

Established in 2009 after winning the \$50,000 second prize in NBIF’s Breakthru Business Plan Competition, KnowCharge has developed an environmentally sustainable and inexpensive method to build static protection or anti-counterfeit capabilities into a simple sheet of paper. The company’s R&D program has also produced a piece of paper that can store and discharge an electrical charge equivalent to that of an AA battery.

Incorporated in 2005, Inversa Systems’ patented technology lets engineers and technicians literally see through solid surfaces of industrial infrastructure (pipes, walls and other closed systems) with greater ease than ever before. Traditional x-ray imaging requires equipment situated on both sides of a particular object. Inversa’s “back-scanner array” enables them to peer inside from only one vantage, helping businesses achieve both deep and cost-effective inspection of dense materials.

Founded in 2006, Atlantic Hydrogen’s CarbonSaver device strips carbon from natural gas and, in the process, produces clean, hydrogen-enriched fuel. Using a plasma charge, it breaks apart the carbon and hydrogen found in the gas’s most abundant compound, methane. After the charge, a certain amount of solid carbon falls and natural gas [HENG] passes through the device generating any CO₂ emissions. The company has attracted over \$16 million in investments from a variety of organizations and individuals, including natural gas producers EnCana and Emera.



[actual size of a golden egg]

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