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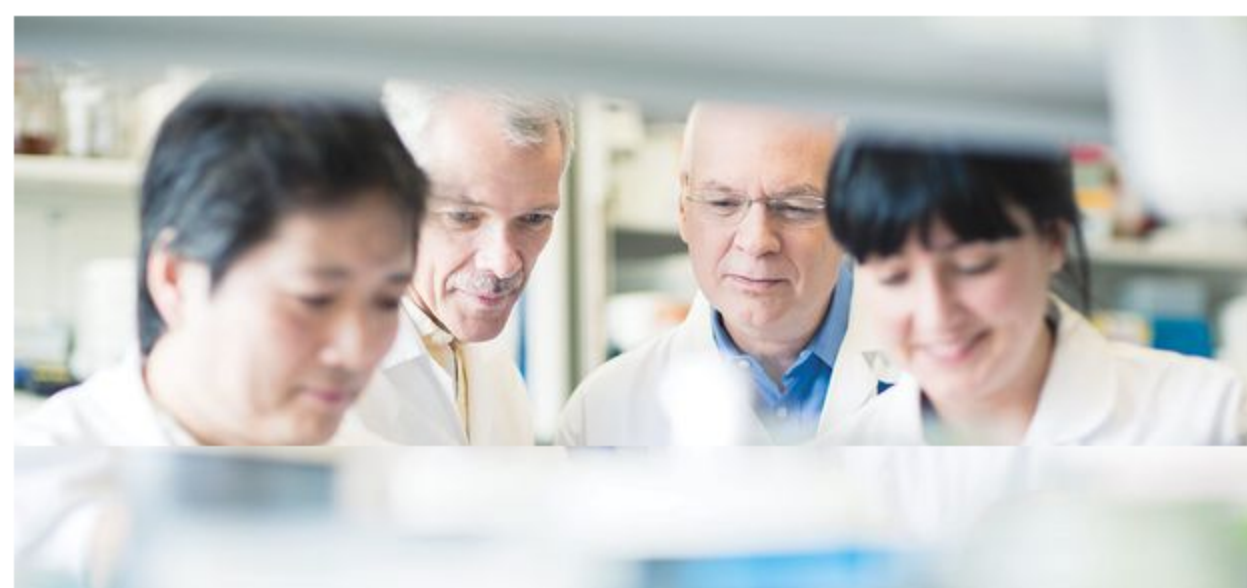
HARRY ROSEN

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## Taking cancer medication from research to market

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Along with its missions to advance basic cancer research and develop innovative treatments, the Institute for Research in Immunology and Cancer (IRIC) at the Université de Montréal has a mandate to train tomorrow's basic and applied scientists.

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Taking a promising therapeutic molecule from the laboratory bench to clinical trials and, ultimately, to a new drug on the market, is a costly, time-consuming and high-risk journey. A unique operating model has helped speed up that journey at the Institute for Research in Immunology and Cancer (IRIC) at the Université de Montréal – allowing IRIC to make promising advances in the fight against cancer.

The institute has a number of strengths that set it apart and support development of new cancer treatments. A key differentiator is the fact that it houses people doing basic research alongside medicinal chemists and other specialists in the design of drug therapies, in a highly collaborative environment.

“We are the only academic institution in Canada to have cutting-edge basic scientific research under the same roof as a full drug-discovery unit,” says Michel Bouvier, IRIC'S CEO and principal investigator in the institute's Molecular Pharmacology research unit. “Working together in one institution, and sharing a culture of mutual confidence and cross-fertilization, our teams collaborate to accelerate the transition between innovative discoveries and therapeutic solutions.”

When IRIC was created in 2003, it focused on foundational research into the biological mechanisms of various cancers. The anticancer drug-discovery unit was created in 2006, and two years later, a not-for-profit subsidiary called IRICoR was set up to establish partnerships with biopharmaceutical companies with the aim of developing and marketing the discoveries. Today, IRIC has a team of 500, with 70 members solely dedicated to drug discovery activities.

“We now have four molecules in clinical trials, producing promising results in cancer patients, and we have created two spinoff biotech companies, ExCellThera and SpecificIT. In addition, IRIC catalyzed creation of a subsidiary of a French company in Montreal, Domain Therapeutics North America,” Dr. Bouvier says. “That has occurred over the past 13 years. In the context of the innovation cycle in the life sciences, we can say we have been quite successful.”

The institute's model also allows it to earn revenues that can be reinvested in its research. “The drug discovery business is risky because the chances of success are not that high; so we share the risk and the benefits.

“We don't only win if the molecule makes it all the way to the end; we will also be rewarded through a structure of milestone payments all along the maturation process of these projects, giving us ongoing revenues to support further research.”

Along with its missions to advance basic cancer research and develop innovative treatments, IRIC has a mandate to train tomorrow's basic and applied scientists. Giving students and post-docs the opportunity to learn more about the drug discovery process is important, Dr. Bouvier says.

“In the last few years, growth in academic science positions has plateaued, and the reality is that only 15 to 20 per cent of our graduates will work in universities. It is important to expose them to other rewarding and interesting careers, and one is to do drug discovery and therapy development in biotech and pharmaceutical companies.”

The institute contains 11 cutting-edge technological core facilities and was one of the first research centres in Canada to use an approach called “integrated systems biology.” The emergence of sophisticated technologies and new scientific disciplines, such as genomics, proteomics and bioinformatics, has given researchers new insights into complex disease processes and pathways at a cellular or molecular level.

This new knowledge about the complexity of disease processes has been revolutionary for the development of targeted therapies for cancer.

“We tend to see cancer as one disease, but it is many different diseases,” says Dr. Bouvier. “Each one is driven by some mutation or dysfunction that tends to trigger a web of biological changes.

“Until about a decade ago, we didn't fully appreciate the diversity of dysfunctions that underlie different cancers. With systems biology, bioinformatics and, more recently, artificial intelligence – all the developments we call “big science” – we are able to foresee the development of drugs with the potential to solve the intricate dysfunctions occurring in previously untreatable cancers.”

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