Cell Biology, Eh! Yes, It's Great in Canada.
La Biologie Cellulaire au Canada—Oui, Ça Marche!

Canadian research has made numerous important contributions to cell biology. James Till and Ernest McCulloch at the University of Toronto helped identify stem cells. Yoshio Masui, also at the University of Toronto, contributed to the discovery of cell cycle regulators. Nahum Sonenberg at McGill University revealed how the cell controls translation initiation. The invention of site-directed mutagenesis by Michael Smith at the University of British Columbia revolutionized how we use molecular biology to study cells. Many others have made groundbreaking discoveries in cell biology and its interface with developmental biology, cellular signaling, cancer, immunology, neurobiology, and systems biology.

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Research in Canada

Canada's largest research communities are in its major cities: Toronto, Montreal, Vancouver, Calgary, and Edmonton. These communities are centered around public universities with associated research institutes and hospitals, and are as large as any in the U.S. Smaller universities also make important contributions to research and training, and are located across the country. As in other countries, the major centers are more research-intensive, and teaching contributions are considerably greater at the smaller universities. Canadian biomedical research makes a broad range of fundamental and clinical contributions, and government programs are promoting increased translational research.

Funding in Canada

Recently, there has been major growth in the biomedical research community in Canada. This expansion was spurred by the Canada Research Chairs program, which was initiated by the Canadian government in 2000. These and other salary grants from federal and provincial sources have recruited many young cell biologists to Canada as PIs. Alongside this salary support, the Canada Foundation for Innovation (CFI; another federal government agency) has equipped the new labs and provided funds for state-of-the-art microscopes and other "big" equipment items.

Operating funds are available from two major federal sources and other more specialized granting organizations. The Canadian Institutes of Health Research (CIHR) has a mandate comparable to that of the U.S. National Institutes of Health and provides operating grants for three to four lab personnel, with a success rate of approximately 17% in the last competition. The Natural Sciences and Engineering Research Council of Canada (NSERC) is the counterpart of the U.S. National Science Foundation and provides smaller operating grants for one to three lab personnel, with a success rate of approximately 57% in the last competition. Both of these agencies also offer special funding opportunities, as does Genome Canada, which mostly funds large projects in high-throughput genomics. Grants are also available from specialized foundations such as the Cancer Research Society, Heart and Stroke Foundation, The Foundation Fighting Blindness, Canadian Diabetes Association, The Terry Fox Foundation, and others, including provincial government agencies like les Fonds de la recherche en santé du Québec (FRSQ).

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Interestingly, in Canada, faculty salaries can never be taken from operating funds. Instead, they can be garnered independently in the form of salary awards and/or are provided by the professor's university department. After tenure, this salary is typically guaranteed by the university.

Training in Canada

Graduate training in Canada is distinct from that in the U.S. and Europe in that most students initially pursue a Master's of Science (MSc) degree. All major universities have MSc and PhD programs. Students who decide to pursue research typically transfer into the PhD program after one to two years, and complete their PhD in five to six years of total graduate training. Students who decide to pursue nonacademic biomedical positions, professional schools, or related work can finish their MSc degree in two to three years.

Graduate students and postdoctoral fellows are eligible for trainee fellowships from all the major federal and provincial funding agencies (CIHR, NSERC, etc.), as well as from some foundations. Similar to eligibility in other systems, eligibility for postdoc fellowships is limited to a set amount of time after receipt of the PhD. A typical proportion of trainees holding independent funding at major research centers is 30%.

Canadian departments tend to have a smaller cadre of postdocs versus those in the U.S. Prestigious fellowships, including the Banting, awarded by the CIHR, have been initiated to attract the best scientists from all over the world. The small postdoc population is in part due to the fact that many Canadians go to the U.S. (and elsewhere) for postdoctoral training (they can be identified by their classic "out" and "about" pronunciation, or when asking for a "serviette" instead of a napkin). Many return to Canada to start their independent career, but many new PIs in Canada are Americans and other nationalities.

Life in Canada

Life in Canada is great. In the cities of major research centers, the downtown areas are multicultural, safe, fun, and livable. This allows researchers to live relatively close to work, in a neighborhood with convenient shopping, parks, and good public schools. We also enjoy universal healthcare and community services (including affordable daycare in Québec). Although our winters are colder and longer than in most of the U.S., we are well equipped to weather them and embrace the chance to practice winter sports. Because Canadian domestic and international policy tends to be financially conservative, we fared relatively well in the recent financial crisis. In some ways Canada is quite distinct from the U.S., but we are close enough for convenient travel to our neighbor to the south.

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Challenges

The main challenge facing Canadian scientists is the same facing our colleagues all around the world: securing operating funds. Two factors specifically impact our struggle. First, the recent burst of new hires stimulated by the creation of the Canada Research Chair salary awards added many new investigators to the pool competing for operating grants. Also, a rearrangement within the major cancer agency (the Canadian Cancer Society Research Institute) recently eliminated its basic science operating grant program. This has forced many researchers to find alternate funding sources. To help address funding challenges, the Canadian equivalent of the ASCB, the Canadian Society for Biochemistry and Molecular and Cellular Biology, promotes research advocacy and encourages members to lobby government officials for investment in basic research.

Another challenge to Canadian research is the geographic separation of the major centers of our large country. Nonetheless, the Canadian cell biology community is vibrant, strong, and as tight-knit as our tuques. ■

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