Better Together

Special article by Dr. Janet Rossant, President and Scientific Director, The Gairdner Foundation, and Dr. Tina McDivitt, President, Spindle.

The pandemic has highlighted deficits in many systems that are key to the resilience of our society. Inequities in access to health care and income support, fragmented public health policies and public communication, vulnerabilities in industrial supply chains, food production and distribution: all of these are challenges that we must address going forward. Canada's biomedical research and innovation community has been praised for its responsiveness to COVID, but many of the research projects were small scale, local and often not linked to international efforts. Companies like Abcellera, Medicago and Acuitas were already poised to be able to respond at scale and have been a success story of the pandemic. How can we position Canada in the future to be leading the charge in international responses to health and wellbeing challenges, whether pandemics, climate change or other concerns?

INTENTIONAL COORDINATION & RATIONALIZED STRATEGY

We argue that we can do better in coordinating and leveraging our current scientific assets, which have been built on layers of investments from governments, institutions and the private sector. Without such intentional coordination, the country is just too big, and our pockets of excellence are too broadly distributed for us to pack a real punch on the global stage. Canada's major biomedical research hubs in Toronto, Montreal, Alberta and British Columbia are highly regarded and well-recognized in their own right, but their expertise is not always available and linked to the many other smaller high-performing nodes of research across the country. We should build a national R&D highway that links and coordinates these different efforts. We have all learnt in the past 18 months that geographical separation is no barrier to exchange of ideas and data, so there is no excuse for inaction. With smart, targeted investments in high-tech research and commercialization infrastructure and expertise development, we can continue to keep up with the pace of technology and lead in scientific solution development as a nation. The key term here is "targeted"— investments should occur across the country in jurisdictions that have established and emerging specializations, whether

that is related to their special human populations or their unique infrastructures. With a rationalized strategy, we can mobilize assets appropriately and in an accelerated fashion to fill specific components of research and development pipelines, whether they are small investigator-led projects, large cross-Canada programs or even massive international endeavours. And we can integrate more diverse voices into the design and delivery of science in Canada.

But what does this all mean in practice? Through various federal funding pockets, particularly CFI, Genome Canada and the CECR programs, Canada has already invested in fundamental and highly-specialized research infrastructure and services. These investments take the form of centralized national academic and innovation platforms that are meant to support the advancement of biomedical research and its translation into improvements in human health across the country. These facilities house world-class capabilities and equipment to help tease apart the mechanisms of emerging human diseases, to identify and develop new medicines, to provide preclinical models for testing drugs and vaccines, to conduct large-scale monitoring and surveillance of emerging infectious disease threats, and to manufacture vaccines and novel therapeutics. But somehow, when it came to our pandemic response, it was difficult to put all these facilities to meaningful use in a coordinated fashion to drive the development of speedy and effective solutions against COVID-19. The Canadian COVID-19 Genomics Network (CanCOGeN), coordinated by Genome Canada, did act rapidly to build a pan-Canadian, cross-agency network for large-scale SARS-CoV-2 and human host genome sequencing, with linkages to public health agencies across the country. However, other national facilities struggle with usership, even in non-pandemic years. Institutions in Canada continue to focus on duplicating technology nodes locally, despite the inefficiencies and lack of technological innovation involved.

BRIDGING THE GAP BETWEEN SCIENCE AND SOCIETY

So what would it look like if these facilities were woven into a coordinated national biomedical research and innovation system? Institutions with specialized infrastructure and expertise in particular areas of biomedical research would be positioned as the national hubs for technology and research services in those areas; they would be linked to one-another to generate more cross-cutting and accelerated R&D pipelines; they would be highly known and broadly used by researchers across the country for their cutting-edge technology and know-how. As part of this strategy, these facilities should also be positioned at the interface of science and government, not only to help bolster government-based research and development, but also to advise on emerging policy and regulatory needs related to scientific progress in their particular domains. Bridging the gap between science and society, another key weakness that became

evident during the pandemic, can also fall within the purview of Canada's network of academic research and development platforms. No one particular organization is at the moment accountable for keeping the public abreast of technological advancements, the process of research and biomedical innovation, as well as the ethical and legal implications of scientific advancement. This seems like a natural fit for Canada's network of academic research platforms, the very institutions that are enabling cutting edge science in this country. Public institutions like the Gairdner Foundation, the Royal Society and the Council of Canadian Academies can help disseminate the science and explain its impact on society.

The geography of biomedical science in Canada is disperse, but that doesn't mean our impact on people's lives has to be that way too. ■

Dr. Janet Rossant is a world-renowned leader in developmental biology. Her current research interests focus on stem cells, and molecular genetics. She is the President and Scientific Director of the Gairdner Foundation.

Dr. Tina McDivitt is the Founder and President of Spindle Strategy Corp., a management consulting firm focused on advancement of the Canadian research and innovation sector.