

D. Robert Siemens, MD, FRCSC¹, in a conversation with Madhuri Koti, DVM, MVSc, PhD²

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Reinvigorated from another successful (socially and scholastically) Canadian Urological Association (CUA) annual meeting, I was struck not only by the quality of the educational opportunities, but also the seemingly renewed vigour and interest in urological research that was apparent not only during the sessions, but also as a focus of all the affiliated multidisciplinary advocacy group meetings. This reminded me of an ongoing discussion I have been having with an early career, urology-focused basic science investigator at our centre regarding some hotly debated issues around the health of biomedical research in North America.^{1,2} For your perusal, some of the ideas/issues from these conversations are extracted herein.

"The beginning of my independent research career coincided with a rather historic decision in 2014, by our major health research funding agency, phasing out the long-adopted funding schemes and shifting the research priorities across Canadian research institutes. As an investigator at early career stage, it is difficult for me to clearly label this shift as a "disruption" or one geared towards an improved mechanism for sustaining research. As a scientist embarking on a research journey in the field of cancer, the uncertainties of getting our research funded, surprisingly, did not make me anxious, given the long-standing and well-documented shortfall in support from the major governmental agencies in North America."

"I do, however, feel privileged to have had the opportunity to apply for several grants from philanthropic/advocacy agencies that have helped fill in some funding gaps in Canada: The Cancer Research Society, Ovarian Cancer Canada, Prostate Cancer Canada, Bladder Cancer Canada, Canadian Urological Association, The Canadian Cancer Society Research Institute. Success in getting funding support from some of these not-for-profit agencies, facilitating collaborations with other investigators across the country, has allowed me to streamline research themes and develop scientific communication strategies to be able to better compete in the current funding environment. Another experience worth mentioning as an early career investigator was the opportunity to participate in multiple grant review panels, which were reassuring of the fact that the limited availability of funds is a major determinant of reduced success rates, far outweighing the actual nature of the applications. Nonetheless, phasing out of traditional funding schemes by the major health research funding agency, unfortunately did impact my time spent on structuring applications due to yet undefined guidelines of what makes the best or, better said, a fundable grant."

One of the most inspiring and recently adopted funding models for biomedical research is probably Europe's major initiative, Horizon 2020,³ investing €80 billion in research. The program was primarily implemented to fund high-risk innovative research. As outlined in its mandates, the 2018 report⁴ on the European Research Council highlighted the fact that one in five of the projects funded under this scheme led to a scientific breakthrough. "Clearly these assessments relied on evaluating the outcomes of the completed project and did not solely rely on bibliometrics. Most encouraging from this independent assessment was the outcome that the majority of the projects leading to breakthroughs were high-risk and high-reward, which eventually contributed to promoting young scientists and talent retention in the country." The most positive result of this review was the increased incentive for the Horizon 2021–2027, with a proposed budget of €100 billion. Notably, a key criteria of funding success through this mechanism was investment into new projects.

Last year, the Naylor report gave voice to some of these concerns for the future of biomedical research in Canada — where we have previously punched well above our weight. By various measures, Canada's research competitiveness has fallen behind, not only with flat-lined research spending, but also given the shift away from independent, novel research questions to those that were more "priority-driven." The report was a call to arms demanding a phased-in investment of \$485 million over four years directed to funding investigator-led research across disciplines. Furthermore, any discussion on biomedical research funding is incomplete without highlighting the status of United States National Institutes of Health (NIH). Recent statistics indicate that NIH funding will potentially face 18% reduction in

2018. The impact will mostly be felt by early career investigators, who in the recent past, only constituted 7% of the total funded cohort comprising of scientists at all career stages. The dismal success rates for young scientists are not only forcing them to quit scientific research, but also, unfortunately discouraging students to pursue a career in academia.⁵

Accompanying the funding landscape changes, the research community has also been recently grappling with a key unattended issue of gender bias in science. “I have recently had to re-think these issues around the representation by women in science after reading an opinion piece by Giorgia Guglielmi published recently in *Nature*.⁶ Within the piece, there was discussion of a provocative report summarizing gender bias in peer-review by funding agencies. An analysis was performed on approximately 24 000 grant applications between 2011 and 2016 showing higher success rates of male applicants over females. Interestingly, this report also highlighted the positive aspects of female scientists as potentially more favoured over men after establishment of their potential in earlier stages. Thankfully, likely attributed to improved review policies, this bias was not observed in the grants funded in the 2016–17 cycle, where equal success rates of male and female scientists were seen.”

Following a similar theme of “diversity matters,” research teams are most productive when they truly reflect the societal structure in which they strive to serve. Best supported by Charles Darwin’s theory of evolution, scientific research productivity is no exception to the rules of diversification to achieve survival benefit. The best recent example is a study conducted as a meta-analysis of 9 million papers and 6 million scientists encompassing factors such as diversity as ethnic variation, age, gender, and discipline, which demonstrated diversity as a strongest predictor of field agnostic scientific impact.⁷ “Fortunately, Canada is recognized as the most diverse in the new world countries, so why not capitalize on this key asset of the scientific community in building next-generation dream teams?”

To me, the themes that came out of these conversations are essential and timely in the Canadian research community. An unanswered question is how we have been doing in the urological sciences, an arguably underfunded specialty? The CUA has taken advocacy to advance biomedical research in urology to heart for over 45 years and specifically has supported early career investigators through the Canadian Urological Association Scholarship Fund (CUASF). The CUASF was established in 1973 to bolster Canadian urology research productivity through critical early financial assistance to promising Canadian urologic researchers (CUA members). Over the years, the CUASF has supported more than 100 academic physician investigators, as well as many community-based and international researchers through parallel programs, and has therefore played an enabling role for these young clinical scientists, as this had often represented their first peer-reviewed support at a pivotal point in their careers. Although this support had been modest in the past, the number of new training grants and fellowship opportunities has greatly expanded over the last five years, including collaborations with other engaged partners. Most impressively, the CUA has committed significant funds, for a non-governmental philanthropic organization, by creating a CUASF Career Development Award with an annual investment of \$100 000 for up to five years. The priority for this award is for the CUASF Career Development Scholar to develop a network of mentor(s) to help build research knowledge and skills to ensure the success of these clinician scientists. Last year’s awardee was Rob Hamilton from Toronto and the 2018 Scholar was recently named at the CUA annual meeting — Lysanne Campeau from McGill University. This commitment to our future health as a specialty in Canada is to be lauded and needs to continue!

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