

Event

This Spring, the Montreal Neurological Institute and Hospital (the Neuro) launched its implementation of a pioneering institution-wide Open Science (OS) research and innovation model. The Neuro's primary goal is to accelerate discovery, innovation, and research impact by encouraging rapid public sharing of data, samples and other scientific materials. The model aims to break down barriers between researchers, datasets, and innovation partners to create a dynamic knowledge hub in Montreal.

Significance

Despite decades of research and clinical practice, our understanding and treatment of neurological disorders remains elementary. The diminishing market entry of innovative health interventions and rising research costs^{1,2} call for a new approach to spur advances. In particular, researchers are inhibited by a culture of secrecy, limited sharing of data and materials, and intellectual property (IP) protections on increasingly basic scientific findings. This culture leads to inefficiencies, the inability to replicate findings, inequity in access to knowledge, and has dampened translation in a field that is already developing treatments far too slowly. Simultaneously, Canada receives continued poor innovation rankings internationally – a flourishing 'ideas economy' remains an aspiration. OS offers a key opportunity to break down systemic barriers to progress in upstream research, and to speed its clinical translation and societal impact.

Analysis

The Neuro is establishing itself to combine the power of genetics, brain imaging, environmental influences, behavioral data, and other variables to elucidate the underlying mechanisms of disease. Specifically, the Neuro will make the data relating to the genetics, brain structure, environment, and behavior of patients with mental disease publicly available (subject to confidentiality and privacy concerns), will share physical biosamples, and will engage in open collaborations with firms and institutions around the world without costly negotiations over IP rights. These measures are designed to open new avenues for follow-on research and bring new partners together, accelerating the progression of neuroscience research and development. Future collaborations are expected, across fields ranging from finance to physics, drug development, community mental health interventions and visualization software.

In parallel, OS at the Neuro is poised to enhance local economic development by establishing Montreal as the hub of a dynamic innovation eco-system through which to fuel a new generation of innovative firms. Specifically, the Neuro's information hub – tools and approaches to analyzing complex integrated datasets, linking big data and individual patients, cell lines and clinical expertise - creates knowledge that is embedded in Montreal and the region. Researchers and firms will freely share ideas as rapidly as possible. However, expertise and some knowledge will be 'sticky' to Montreal as these reside in the minds and interactions of individuals living and working in the area. Only by setting up operations locally will firms be able to fully exploit the knowledge generated by the Neuro's OS activities.

Conclusion

There is a clear need for novel approaches in the biomedical arena to energize innovation, and leverage the 'ideas economy'. OS at the Neuro is addressing these needs by promoting open access to scientific resources, free of IP and protracted negotiations, and building a knowledge hub to attract new innovators to the region. This model promises to extract the full value of investments in research, nurture economic development and accelerate innovation with broad societal benefits.

1. Hopkins MM, Hogarth S (2012). Biomarker patents for diagnostics: problem or solution? *Nature Biotech* 30(6). 498-500. doi: 10.1038/nbt.2257
2. Owens B (2016). Access all areas. *Nature*, 553. S71-72. doi: 10.1038/533S71a.