

Tangles of Neurogenetics, Neuroethics, and Culture

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Neurogenetics promises rich insights into how the mind works. Researchers investigating the range of topics from normal brain functioning to pathological states are increasingly looking to genetics for clues on human variability and disease etiology. Is it fair to assume this interest in neurogenetics is universal? How should researchers and clinicians approach ideas of consent to research or prediction of disease when a subject or patient understands the mind with concepts or language incompatible with neurogenetics? In this paper we consider how non-Western philosophies bring complexity to ideas of individual and community consent and confidentiality in the context of neurogenetics.

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Neurogenetics seeks to elucidate risk factors for neurological conditions based on the genes of individuals and the environment they live in. Neurogenetics falls under the umbrella of “personalized medicine,” and presents an opportunity to create individualized treatments for neurological conditions. Philosophically, neurogenetics is based on a positivistic and individualistic worldview. That is, the risk of disease for an individual can be measured and predicted through an objective scientific method (positivism) and that individual has an explicit right to make use of, and personally benefit from, his or her genetic material (individualism). The pursuit of neurogenetics is consistent with ideas of neuroessentialism: the brain is considered the “self-defining essence of a person” (Racine et al., 2010). Neurogenetics is constructed, ultimately, as the key for the blueprint (genetics) to understanding the self.

Positivism and individualism are not universal values. In this article we explore ethical issues when conducting neurogenetic research with people from cultures that value communalism over individualism and that hold holistic, rather than reductionist, views on health and wellness. We will demonstrate the potential harms of leaving the foundational philosophical assumptions underlying neurogenetic science unchecked. In particular, we will consider indigenous concepts that render notions of “individual ownership” of genes problematic. There are implications for consent (individual and communal), confi-

dentiality (individual and communal), benefit and relevance of research knowledge, and dissemination of research findings about indigenous communities. Although we focus on indigenous philosophy, the concerns we raise can be generalized to any group (e.g., religious, refugee, immigrant) that does not implicitly subscribe to Western scientific values.

Indigenous Worldviews

There is a growing literature on indigenous worldviews in the context of research (e.g., Wilson, 2008; Gillett and McKergow, 2007; Arbour and Cook, 2006). Although there is no “Pan-Indigenous” theory that covers all indigenous philosophy, there are commonalities for indigenous groups around the world. For example, in his book *Research is Ceremony*, Wilson (2008) explores the relational aspect of knowledge and knowledge generation common to both Canadian and Australian indigenous peoples. In Western ontology, knowledge is thought to reside with the individual and research seeks to extract knowledge from groups of individuals and physical phenomena in order to construct objective truth. In contrast, indigenous knowledge is relational, woven together from teachings received through all of one’s relationships, including relationships with other people, with animals, with the Ancestors and with the land. The ethical framework of indigenous research is relational accountability that preserves and honors the relationships that give rise to the knowledge.

Artifacts including bodily tissue and genetic material are not thought of as

property: an indigenous person engages in *stewardship* rather than ownership of materials (Gillett and McKergow, 2007). Gillett discusses how “for some groups the removal and dissection of aspects of their being may require stringent protocols and respect for tradition” to ensure that the health of the people is not compromised, either individually or collectively. There are two high-profile examples of the consequences of researchers not attending to the protocols of the people they are studying. In 2006, Arbour and Cook (2006) described the fight for the repatriation of genetic materials to the Nuu-Chah-Nulth First Nation and the concept that DNA should be considered “on loan” from indigenous peoples, rather than the property of the researcher who collected it. Members of Nuu-Chah-Nulth First Nation had offered their genetic materials for research for the purpose of understanding the high rates of arthritis affecting their community. In 2010, the Havasupai Native American tribe settled their 6 year lawsuit against scientists at Arizona State University (ASU) for unauthorized use of blood samples taken initially to search for genetic risk factors for diabetes (Santos, 2008). In both cases, the leaders of these Nations and individual research subjects consented to the use of their tissue for investigating a single disease, only to discover that their tissues were being used to investigate a wide range of unauthorized questions, including genetic factors in schizophrenia and genetic ancestry.

In addition to abrogating academic responsibility for informed consent about

secondary uses for data, both research teams fundamentally disregarded the sacredness of the biological samples entrusted to them. Frank Dukepoo, a geneticist of Hopi and Laguna origin, explained that, “To us, any part of ourselves is sacred. Scientists say it’s just DNA. For an Indian, it is not just DNA, it’s part of a person; it is sacred, with deep religious significance. It is part of the essence of a person.” (Petit, 1998.) The UN Declaration on the Rights of Indigenous Peoples asserted in Article 31.1 that “Indigenous peoples have the right to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources...” [United Nations (2007): www.un.org/esa/socdev/unpfii/en/declaration.html] (italics added). Neurogenetics research with an indigenous group, therefore, must follow the group’s protocols and traditions.

Community-Driven Neuroethics Research

Implicit in neurogenetics is a biomedical model of health that focuses primarily on biological processes. This model is not necessarily consistent with concepts of health used by religious groups (e.g., who supplement medical care with prayer) and other cultural groups who have developed other explanatory models for health and illness. Indigenous Canadians (First Nation, Inuit, Métis) define health broadly to incorporate the mental, physical, emotional, spiritual, and social aspects of health [NAHO (2007): <http://www.naho.ca/english/publications/vaccho.pdf>]. The health and well-being of communities and individuals are seen as interdependent. The determinants of health extend beyond genetic endowment and encompass history and politics through the enduring consequences of colonization. This has implications for the relevance and dissemination of neurogenetics research.

It is useful to distinguish between community-driven research and research driven primarily by the curiosity of the researcher. The Nuuchal-nulth and Havasupai Nations sought genetic information on clinical issues faced by their peoples. Their later objections were to

the exploratory research to which they had not consented. Within a stewardship model, indigenous people are individually and collectively responsible for their heritage, and this responsibility includes all aspects of culture as well as genetics. Engaging in genetics research is not taken lightly because it holds the potential for disrupting culture. Just as indigenous concepts of health and wellness extend beyond the biomedical model, so do explanations of disease and illness. To reduce the understanding of illness to a genetic explanation may be a disservice to a community. Explanatory models of illness create order and meaning (Kleinman, 1978), and influence the care that is given. By introducing genetic explanations about disorders—that offer, for the most part, only probabilities for developing an illness—there is a risk of destabilizing approaches to care within a community. Santos (2008) writes, “If academic research undermines the cultural fabric and beliefs of a group, it is tantamount to stripping them of traditions and practices that have also served as protective factors for generations.” Without first collaborating with a community to determine the relevance of the research question, the soundness of the methods, and the potential implications of the results, researchers could do harm merely by conducting the study (Caldwell et al., 2005).

Consent and Confidentiality

To explore issues of consent and confidentiality more deeply, we highlight research we are conducting in collaboration with a Canadian First Nation for whom there is a high incidence of dementia due to a genetic mutation that leads to early onset familial Alzheimer’s Disease (EOFAD). Members of our research team identified the novel mutation in the Presenilin 1 (PS1) gene: the first reported genetic mutation leading to EOFAD in an Aboriginal population (Butler et al., 2010). This genetic mutation is autosomal dominant with 100% penetrance. Age of onset in this extended pedigree is 47 to 59 years of age. The research team engaged the community in outreach activities to explain the genetic mutation, and continues to offer clinical services for genetic counseling and predictive and diagnostic genetic testing. To main-

tain community confidentiality publications of this mutation have not revealed the name of the First Nation.

The neurogenetics research was followed by a neuroethics question: what is the meaning of EOFAD for this community? Using a community-based participatory approach, we brought together a research team that included Elders, band counselors, health professionals from the Nation, academics, and clinicians to identify research questions that were relevant to the Nation. The team learned that community members seek to achieve an understanding of EOFAD that integrates both medical and traditional approaches, and require access to research findings so that they are better equipped to make decisions around EOFAD prediction, diagnosis, and care.

In the context of these goals, the team addressed the question of community confidentiality. On the one hand, there is potential harm for individuals and the community if the name of the community is revealed. For example, Norton and Manson (1996) described the dramatic consequences of an article in the New York Times in 1980 announcing that “Alcohol Plagues Eskimos.” Overnight the Standard and Poor bond rating of the local community dropped, and the community was unable to finance planned municipal projects. They became reluctant to engage in research activities, foregoing possible benefits from such participation. In the case of our research, we must explicitly attend to the potential harm to the community from discrimination, recognizing that public knowledge of the genetic mutation puts the Nation at risk for external and internal stigma and other adverse outcomes such as difficulties in securing extended health insurance whether or not one carries the mutation. On the other hand, as one team member who experienced life-long discrimination for being a First Nation person expressed, “I am not worried at all about the stigma because stereotyping has always been part of the First Nations... This one gene should not put a whole Nation at risk as being any different than any other ethnic group.” [GD.] GD added further concern about confidentiality, saying, “We won’t be acknowledged for the work we will be contributing.” Mohat and Thomas (2006)

wrote: "In many Native cultures, not identifying yourself, your family, your homeland, and so forth is not acceptable." Indeed, in keeping the name of participants and their community confidential, we as researchers could undermine the higher ethical principal of relational accountability. Moreover, in maintaining confidentiality, the Nation will be less able to act on the findings through public advocacy for future services, including a much-desired long-term care facility.

There are also academic consequences to not naming the community. As researchers we are currently unable to refer to existing academic literature or community reports about this Nation in our publications and oral presentations and through digital media such as our website. We cannot use the Nation's language to describe their experiences and, as GD suggested, the philosophical premise of participatory research is compromised when participants are not acknowledged for their work.

Closely aligned with the challenge of balancing community confidentiality is the challenge of consent: who can consent to reveal the name of a community? The requirement for community consent to identify a community in the dissemination of results appears in 10 out of 16 international guidelines for conducting research with indigenous communities (Weijer et al., 1999). However, in many instances it is difficult to determine who has authority to speak on behalf of the community. Is it the traditional band council? Elected government? Both? How should individual research participants play a role in determining whether a community is identified, and what about people who have chosen not to participate but will be inevitably affected by public dissemination of the results? One legal scholar argues that, "The existence of a mutation in a family should be regarded as familial information, not capable of veto by one family member who does not want to share the information with other family members. Only the person's own status with regard to the mutation—positive or negative—should be within the person's control" (Skene, 2002). Similarly, Port et al. (2008) suggest that in a hierarchical tribal context, the rights of the individual may be relinquished in favor of the rights of the tribe.

Increasingly, Canadian researchers working with indigenous peoples are following the principles of OCAP that promote the collective Ownership, Control, Access, and Possession of data by the community [First Nations Centre (2007): www.naho.ca/firstnations/english/documents/FNC-OCAP_001.pdf]. It is not clear how to reconcile a community's right to self-determination for neurogenetics research as enacted through OCAP with established academic and clinical structures that have been created to protect individual confidentiality and enable researchers to have full access to data.

Integrating Biomedicine and Non-Western Worldviews

To date, members of the First Nation with whom we are working have generally not sought predictive genetic testing. Low rates of uptake for predictive testing have been observed in other adult-onset neurological diseases, such as Huntington's. This may be explained by the potential social, economic, and ethical consequences that accompany predictive testing, including stigma and reduction of quality of life (Illes et al., 2007). Here, we are seeking to learn how members of this Nation understand EOFAD within both traditional and medical frameworks. It is possible that disease prediction through neurogenetics represents a type of hubris. Perhaps in the absence of a cure or treatment for EOFAD, traditional understandings take precedence, and medical and scientific explanations are less relevant.

More broadly, it is not clear who can speak on behalf of groups that are less well defined than this First Nation, or how to measure potential harms and risks to its members. Our paper seeks to encourage researchers to consider the sociocultural implications of their work beyond the science itself.

The power of neurogenetics to explore and explain neurological variance and disease exists within the context of Western ideas of consent, ownership, confidentiality, and benefit. In research with indigenous peoples or other groups with non-Western cultural practices or moral philosophies, combining neurogenetic research with community-based

participatory approaches can serve to maximize benefit while minimizing potential harm to individuals and to communities. In conducting research that demonstrates respect for the diversity of people and cultures through asking community-driven questions and using culturally appropriate methods, neurogenetics can address critical clinical concerns and has the potential to provide compelling options for prediction, diagnosis, and care of neurological diseases.

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