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Ethics Transplants? Addressing the Risks and Benefits of Guiding International Biomedicine

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In agreement with Wolpe (2017), we cannot find that the planned body-to-head transplant (B-H-T) procedure meets key standards of research ethics. Ren and Canavero (2017) argue that the extraordinary opportunity presented by this *avant-garde* experiment is more compelling than any moralistic orthodoxy. They also claim that ethical conservatism can be discounted due to medical ignorance, media malpractice, and cultural prejudice. Canavero's previous accounts of his project had emphasized its tentative nature, as a procedure based upon limited experimentation in animal models, and laden with technical and ethical questions and concerns. Engagements with ethicists were presumed, on issues such as obtaining consents informed about post-operative consequences, and guaranteeing continuity of care with medical resources and services.

To some extent, we have been supportive of Canavero's ongoing view that cutting-edge brain science can and should be invented and employed—if and when sufficiently mature—in order to accelerate the development of advanced neurological care. The caveat to our support demanded that experimental research should fully consider and meet ethical responsibilities to maximize patient safety, minimize risk, and afford clear and probable benefit. As with any novel neuroscience and neurotechnology (neuroS/T), the maturity of techniques and technology, grounded in evidentiary support from well-designed studies, is essential to those responsibilities. The mere possibility of a B-H-T was destined to be provocative and certainly contentious. In our view, only the most realistic acknowledgment of both its capabilities and limitations could provide due perspective upon its technical and ethical aspects. One of us (Giordano) has also drawn attention to philosophical questions about individuality and identity, implying further ethical and social problems (Pascalev, Pascalev, and Giordano 2016).

Ren and Canavero now argue that the B-H-T is viable, valuable, ready to be attempted, and represents a major and important step in neurological research and medical care. Has the academic capacity for offering well-informed neuroethical assessments kept pace?

Any experimental procedure carries elements of risk, success is never certain, and known boundaries may be surpassed. One need only consider the history of "firsts" for novel medical procedures (organ transplants, artificial organs, and so on) in this regard. Because animal experiments can enable refined techniques essential to research progress, as Wolpe recounts, we similarly judge, in the absence of proven results from prior animal studies, that trials on human patients are premature. We also wonder what constitutes even a modest "success" for a B-H-T experiment. Learning a few things while patient after patient expires is nothing worthy of calling medical "progress." If the hoped-for result is to restore functionality, has that goal been delineated in practical terms? No one knows whether a body-head anastomosis affords the type and extent of neurocognitive and behavioral integration required for functioning as a person.

Ethical standards protecting patients may sound conservative to overly ambitious pioneers, but overreactions of staunch opposition from ethicists can sound just as rash. Philosophical theories will yield rules about impermissible harms to persons. Yet they may not provide the situational sensitivity that medical judgment can show, or the historical memory that a nation's laws can respect. Furthermore, the professional ethics of one society, or the legal norms of one country, can seem too conventional or culture-bound from an outside perspective. Imposing those kinds of standards beyond their area of concern and region of origin, especially at biomedical frontiers such as those probed by neuroS/T, can seem either parochial or dictatorial. Why should an inventive technique be halted by formulaic strictures remote from the domain where its application shows promise?

The value of human experimentation is undeniable; the most courageous pioneers will always be patients more so than researchers. Clinical ethics rightly asks for some appreciable possibility of therapeutic benefit to experimental subjects, sooner or later, as demonstrated through accumulated evidence. At research frontiers, the unknowns—and attendant risks—can multiply as fast as the potential benefits. Preliminary investigations to establish the workability of

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techniques, and the validity of protocols for properly using those techniques, must be amply conducted. It is too easy to overestimate the potential benefits to patients and medicine, while underestimating how little is understood about novel experimental techniques. That lapse is both ethically troublesome and technically problematic.

But perhaps a different head (of state) will grow attached to Ren and Canavero's body (of work); here we confront another feature of this proposed B-H-T that warrants attention. Canavero now proposes to perform this surgery in China. Western medical ethics may not be uniformly meaningful to the precepts, needs, and values that characterize biomedical research and translational applications in China (or elsewhere). At a recent meeting of the International Neuroethics Society, Dr. Mu Ming Poo of the China Brain Science Project pointed out how the administrative infrastructure and governmental regulation of brain science in China, which differs in some important ways from that of many Western countries, may attract international neuroscientists. Dr. Poo has explained that China offers opportunities to engage in types of research not easily conducted elsewhere (Poo et al. 2016).

Questioning how China views and will use the knowledge and tools of brain science has already begun, as the global scientific community could be affected—in ways perceivable as positive or negative. Might this encourage a cadre of visiting and/or expatriate researchers to undertake studies conducted under different regulations, for example, seeking "research tourism"? Could translation of this research foster another "medical tourism" destination as well? What is unquestionable is the path taken by China to rapidly increase its widening capabilities—and global prominence—in many areas of brain research, which will exert influences in and upon international medical projects and economic markets. No country could be unusual, or automatically unethical, for pursuing research and innovation helpful for domestic growth and international leverage. Nor would a country be unwise for selecting agendas that trade upon building strengths and positional advantages vis-à-vis strategic partners and foreign competition. Innovative research and its impacts rarely, if ever, remain within their country of origin.[1] This is especially true when a country strives to be respected for world-class scientific achievement.

The medical profession has become no less international in its pursuit and exchange of knowledge, including foundational and translation brain research (Yuste and Bargmann 2017). The professional ethics of researchers and clinicians has followed that trajectory as well, and there is no reason why neuroethics should fall behind (Greely, Ramos, and Grady 2016; Shook and Giordano 2017). Any profession's ethical values and priorities, regardless of country of origin, should be taken seriously as both internationally relevant and interculturally valuable. It is precisely because context matters, and today's context is thoroughly international in scope and implications, that ethics has no choice but to transcend boundaries in order to remain relevant (Lanzilao et al. 2013).

Basic duties toward human subjects and medical patients should be integral to experimental design. The hard ethical lessons from disreputable research learned anywhere should be respected everywhere. In this light, research plans such as those exemplified by Canavero's B-H-T experiment look more like opportunism at present. All the same, the controversial issues regarding intra- and cross-cultural ethical norms and conduct do create a timely opportunity to develop a broader and deeper conception of a globally relevant neuroethics. We strongly urge that neuroethics embrace this intercultural vantage point.

Neuroethics need not—and should not—dictate social priorities or impose a regulatory code based on a single country's lessons learned from hard experience. Nuanced neuroethical evaluations can develop practical guidelines by asking contextual questions first and delivering recommendations second (Shook and Giordano 2014). This approach would not retard progress; it would be a positive resource to enable the highest quality professional conduct and scientific credibility. Nor is this a message of moral relativism. That would let the moral standards from each society be its default ethical guidance, leaving countries unable to appreciate each other's ethical wisdom garnered from professional experience. The country that goes it alone ethically, like the country that walks alone technologically, is less enriched in human resources and more vulnerable to cultural blind spots.

Neurothical consultations should be cooperative, deliberative, future-oriented, and multinational as any neuroscientific project. In so doing, neuroethical engagement should avoid inflexible absolutism as well as relativism (Shook and Giordano 2017), appreciating instead a consensus view of what constitutes good science and sound medical practice. There is no need to transplant Western ethics or law into non-Western countries, or vice versa. Neuroethics as an international enterprise should guide innovative brain science with sensitivity to both the exigencies of particular cultures and the contingencies of intercultural engagement. It is in this spirit that we encourage collaborative efforts in neuroscience and neuroethics with China and other nations. Countries can share mutual goals—and formulated standards—in biomedical and biotechnological advancement, while respecting differential advantages accruing from distinct research priorities.

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1. Excepting defense-related activities, of course; such dual-use focal advances are irresistible and inevitable, for any country (Giordano 2014; Palchik et al. 2017).

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Personal Identity and Head Transplant: A Psychological Analysis

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Personal identity as intended by embodied cognition theories is deeply challenged. If the sense of selfhood is maintained through the reciprocal dialogue between our cognition, which depends upon the experiences we do by way of the body, and our body, whose sensorimotor capacities are unique and embedded in our broader bio-psychological context, what could be the impact of the head transplant on personal identity? In other words, the body is our coherent way to be in the world and experience it, and cognition is the mean through which we transcend our body and become involved in the world recognizing ourselves as an "I," knowing that different sensations and feelings—ways of being—belong to the same individual, a signifying totality. Hence, who will be the HEAVEN-GEMINI survivor? Should we reconsider the notion of personal identity? How can we deal with the potential cosmetic purpose of this procedure? The feasibility and success of the head transplant depend also on the preservation of the integrity of personal identity and the sense of selfhood, which should be a fundamental goal of research, right next to concerns about the technical aspects. As health care professionals and researchers, we must look into psychological well-being as well as physical well-being.

As technological and medical knowledge advances, it comes as no surprise that surgical procedures for body-to-head transplantation (BHT) have been under investigation over the past few years. The medical team led by the Italian neurosurgeon Sergio Canavero proposed the HEAVEN (head anastomosis venture; Canavero 2013) and GEMINI (spinal cord fusion; Canavero and Ren 2016) protocols—two procedures that should assure the successful transplantation of a healthy brain (body-recipient, the head) on a brain-dead body (body-donor). The team of doctors had scheduled the first head transplant to be performed in a human for the end of 2017, which turned out to be an optimistic prediction, considering the safety and feasibility issues related to the two procedures stemming from the uncertain and premature results of clinical trials in animal models.

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