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Head Transplants: Ghoulish Takes on New Definition

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Just when we thought we had seen it all, *AJOB Neuroscience* devotes pages to the head transplant. Ren and Canavero (2017) argue enthusiastically, but often incoherently for it; Wolpe (2017) argues respectfully against. In an opinion editorial in November 2016 in the *Vancouver Sun*, British Columbia, Canada, we too argued against it. Our opposition to this medically dubious endeavor is grounded in both science and ethics. We take the opportunity here to once again expose the emptiness of Canavero and Ren's vision with the hope that it is finally set aside. We further hope that after the attention it receives in this prestigious journal, precious future publication space can be kept for morally salient and rational discourse that actually affects people's lives not just fuels ghoulish fantasies.

The science is absent: Safety and efficacy—fundamental, and indeed the most rudimentary criteria that are historically mandated for clinical trials—are absent in the head transplant context. The targets for treatment are unspecified, the value of the procedure is unsubstantiated, and the means for monitoring outcomes are undetermined. In animal studies, the outcome is always the same: death. The arguments and justification from the literature by the pro-transplant authors are akin to pseudo-science. If their preliminary work was indeed as groundbreaking as they claim, there would be publications in high-impact, peer-reviewed journals with international reach. Single animal experiments, opinion pieces, TED talks, and unpublished observations do not support the claim of groundbreaking. The authors use the term *equipoise* incorrectly—there is no uncertainty about whether their procedure will work—it will not. Indeed, none of Emanuel's seven requirements for the ethical conduct of clinical research are met (Emanuel et al. 2000), and Canavero and Ren make no effort to follow the IDEAL Framework for surgical innovation set out by the Balliol Collaboration in 2009 (Barken et al. 2009).

The neurosurgical context: Canavero and Ren claim to have addressed the issue of technical feasibility but, in our opinion, without sound neuroscientific or surgical justification. Effective treatments for recovery of function in

complete spinal cord injury (SCI)—essentially what will happen when the spinal cord is transected in both the donor and recipient—continue to elude the SCI research community. Use of stem cells in SCI in an attempt to regenerate fiber tracts remain largely in the preclinical and safety phases of study (Manley et al. 2017). Similar to SCI, the treatment of cerebral ischemia is one of the most studied subjects in clinical neuroscience and, while progress continues to be made at the laboratory bench, translation to the bedside has frustrated clinicians for decades (Romano and Sacco 2015). In claiming to have resolved these two issues alone, the authors imply that they have solved two of the most pressing neurosurgical and neurological issues of our time. Besides these, other unresolved technical challenges remain daunting and include rapid and effective arterial and venous anastomoses, bony spinal column fusion, and sympathetic and parasympathetic nervous system function. Among the countless technical challenges, even if nerve tracts could fuse, a human recipient could be left in agony if tracts follow incorrect pathways.

Patients and society: We do not uphold the view that head transplants represent any real advance for society. They do not represent a case for compassionate use since there is no ethical or clinical justification to provide a treatment with no reasonable prospect for success, regardless of the burden borne by persons suffering from admittedly horrible disease states. They prey on the hopes of people with severe neurologic conditions, even those who see through the far-out nature of these propositions. These are individuals who are among the most desperate and vulnerable in our society. They deserve our undistracted attention and focus on real science in attempts to improve their outcomes. They deserve better funding for health care and research, and the therapeutic benefits that can bring them and their loved ones real promise, hope for improved quality of life, and reduced suffering.

Allocation of resources: Beyond considerations of human experimentation, the concept of head transplants challenges

well-developed and resource-stretched health care systems overall, and organ donation specifically. Each donor body lost if this experiment proceeds represents a much larger loss. Even one failed attempt means persons currently on transplant waiting lists will not get the kidneys, heart, liver, and lungs they could have received. Many others will lose access to other donated tissues such as corneas and bone. The benefactor-to-recipient trade-off when a viable body is used for a single transplant is unforgivable, given the low prospect for success in this context. Head transplants then threaten equal access, producing little chance at positive outcomes at the cost of many more useful proven and promising applications. In addition, the inevitable negative press resulting from the deaths that will occur if Canavero and Ren are allowed to proceed may make persons and families considering organ donation less likely to do so, further diminishing an already scarce resource and potentially increasing organ transplant wait lists.

WHY ARE WE STILL TALKING ABOUT THIS?

In our view head transplants are *not* the science fiction of today that will become the exciting therapeutic reality of tomorrow. They are *not* the heart transplant of the 1960s and 1970s, or the lung transplant of the 1980s. The claims made by Canavero and Ren could not stand up to the rigors of a scientific peer review, and while we hope that the *AJOB Neuroscience* publication shines a light on the questionable science and ethics underpinning the proposed procedure in order to help ensure it never occurs, we fear that the authors will use its publication in such a reputable journal as a badge of legitimacy and as further justification to proceed with what can only turn out to be a medically sanctioned execution. Ongoing discussion of this topic gives undeserved credibility to those who advocate for this procedure and the claim that they will soon do it. They should not do it, and we should not talk about it any more.

ACKNOWLEDGMENT

Some of these views were originally published in the *Vancouver Sun*, November 16, 2016 (Head Transplant or Body Transplant? Ghoulis Human Experiment Unjustified, Emanuel Cabral, Tanya Feng, Judy Illes, <http://vancouver.sun.com/opinion/opinion-head-transplant-ghoulis-human-experiment-unjustified>). Judy Illes is a founding editor of *AJOB Neuroscience* and current senior editorial advisor. She was not involved in the original decision to publish the Ren and Canavero article. ■

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Animal Testing and Medical Ethics in Human Head Transplantation

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In 2016, Sergio Canavero announced plans to perform the first human head transplant by the end of 2017. While the procedure, to which Canavero assigned the acronym HEAVEN (Canavero 2013), has been pushed back for various logistical reasons, Canavero and his collaborator, Xiaoping Ren, are committed to performing the operation in the relatively near future. The two have received significant backlash, with

medical experts and ethicists arguing both that the technique is not possible given our current technology, and that even if the patient survived, the procedure would likely be unethical.

Ren and Canavero, however, claim that academics and popular media have failed to engage in fair, open conversation about the ethical issues at play in human head transplantation. They claim that they have successfully demonstrated the

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