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The resurrection of the body and the life everlasting

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On the other side of death awaits a new body or a virtual self, for those who believe – or are willing to pay.

Photo: Einar Nilsen

The dream of eternal life – of triumphing over death by liberating the soul from the troublesome body – has accompanied humans throughout the ages and is central to all the major religions. However, while the quest for *as long a life as possible* has always fallen within the domain of doctors and medical science, the dream of eternal life has largely been the purview of religion. The exception is the more fanciful outer realms of science, revitalised in recent years as part of the so-called transhumanist world view (1).

And now, here we go again: In November 2017, we heard the news that the surgeons Sergio Canavero and Ren Xiaoping had succeeded in transplanting the body of a corpse onto the head of another corpse (2). According to Canavero, the procedure was a success. The next phase – the same surgical procedure performed on two brain-dead persons – is said to be imminent. The next full step will follow, and the world's first transplantation of a living head onto a new body will be performed in 2018, again according to Canavero (3).

A spectacular surgical procedure of this type has been the holy grail ever since the French Nobel prizewinner Alexis Carrel transplanted the head of one dog onto another in 1908 (4). For a brief period, the head showed some visual and cutaneous reflexes before the animal was euthanised. In the 1950s and 1960s similar transplantations were performed on various animal species, enabling the animal to live for a period ranging from a few hours to a few days (4). Nevertheless, hopes did not run high until the development of immunosuppressive drugs made extensive allotransplantations possible, such as the first successful full facial transplantation in 2006 (4). Yet to proceed from this to preventing rejection in a full body transplantation remains a long and uncertain step. The most significant technical obstacle, however, is the reconnection of nerve tissue between donor and recipient. New surgical techniques and the development of 'fusogens', polymers that fuse cell membranes, have given hope to persons with spinal cord injury. However, reconnecting a ruptured medulla is still far from being feasible in patients with spinal cord injury – far less between two different individuals, as in a full-body transplantation.

In addition to the technically unresolved challenges of full-body transplantation, numerous medical, legal and ethical aspects arise that are problematic, to put it mildly. To mention but a few: The belief that a human's experience of an 'ego' is a purely cognitive process – and therefore something that is restricted to the brain alone – has been largely abandoned in today's neuroscience. The brain is not alone; it is formed of, and forms, the body to which it belongs, throughout the ontogenesis of the individual. Sensory and motor information from the body is a necessary component of self-experience (5). Billions of signals between the brain and an entirely new body might entail a high risk of a breakdown in self-experience, with resulting psychosis and in the worst case, death (6). Legally, something as fundamental as informed patient consent is also problematic in a donor situation of this nature. Ethically, it is also doubtful whether it is justifiable to allow an entire donor body to be given to one patient and not to the many other patients in need of organs whom it could otherwise have helped. And what about the two donors' personal legal rights – do they belong to the head or the body of 'the new' person?

It is to be hoped therefore that Sergio Canavero's promise of a body transplantation in the near future is exaggerated. However, he and other body transplantation optimists are not the only ones who harbour the hope that eternal life can be achieved with medical technology. Cryonics – the low-temperature preservation of the brain or the entire body after death – in the hope of reanimation at some future time when the body can be restored to life or the brain given a new body, is increasing in popularity, despite an almost complete absence of scientific evidence for future success when the body is defrosted (7). On the contrary: When the brain is frozen, in the best possible case its anatomy is preserved – the information about the brain's connectivity. But the individual's neurobiological hallmark lies at least as much in the brain's functionality – the living differences in gene regulation, chemical microenvironment and local and regional dynamics of neurotransmitters, in much the same way as a living city consists not only of its streets and buildings, but equally of the activity that takes place there. If the only information available concerns connectivity, there is a wide gap between this and capturing the essence of the thinking, feeling individual. The belief that the brain will be able to wake up as 'itself' after being deep-frozen is thus at best naive, as is the belief that it will be possible to upload the information in the unfrozen brain to future supercomputers that will endow the self with eternal, virtual life (8). Notwithstanding this, smart business people offer low-temperature preservation for around USD 100 000 per brain, with the help of 'scientific'-looking websites and clever marketing to a growing client group (9). As is so often the case, willingness to pay appears to be directly proportional to naivety.

Common to body transplantation, cryonics and uploading of the virtual self is that they promise us something more on the other side than what we fear the most: inexorable death. Traditionally, this is religion's domain. There are sound scientific reasons to continue to adhere to this tradition. It is worth reminding ourselves of this as the most important Christian religious holiday approaches, with its story of immortal God born as a mortal human.

LITERATURE

1. Humanity+. http://humanityplus.org/ (4.12.2017).

2. Osborne H. Head Transplants: Sergio Canavero Is About to Perform the First Human Surgery—and There's Nothing to Stop Him. Newsweek 13.11.2017. http://www.newsweek.com/head-transplant-surgeon-sergiocanavero-dangerous-maverick-medical-revolution-709332 (4.12.2017).

3. Johnsen P. Hodeløst fremskritt. Morgenbladet 24.11.2017.

4. Lamba N, Holsgrove D, Broekman ML. The history of head transplantation: a review. Acta Neurochir (Wien) 2016; 158: 2239–47. [PubMed][CrossRef]

5. Meteyard L, Cuadrado SR, Bahrami B et al. Coming of age: a review of embodiment and the neuroscience of semantics. Cortex 2012; 48: 788–804. [PubMed][CrossRef]

6. Čartolovni A, Spagnolo AG. Ethical considerations regarding head transplantation. Surg Neurol Int 2015; 6: 103. [PubMed][CrossRef]

7. Hendricks M. The false science of cryonics. MIT Technology Review 15.9.2015. https://www.technologyreview.com/s/541311/the-false-science-of-cryonics/ (4.12.2017).

8. Miller KD. Will you ever be able to upload your brain? The New York Times 10.10.2015. https://www.nytimes.com/2015/10/11/opinion/sunday/will-you-ever-be-able-to-upload-your-brain.html?_r=2 (4.12.2017).

9. Cryonics Institute Cryonics Institute. 2017. Cryonics Institute Cryonics Institute. http://www.cryonics.org/ (4.12.2017).

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