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Editorial

Human head transplantation. Where do we stand and a call to arms

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Ever since being announced in 2013, the HEAVEN head transplant initiative – also known as allogeneic head body reconstruction, the GEMINI spinal cord fusion protocol and the first head transplant procedures in mice[1-3,5-8] have received scathing remarks from several official medical, surgical, and ethical bodies.[3]

Medical history shows us that many of the "quantum leaps" almost always fly in the face of conventional wisdom. Today's standard of care was yesterday's experimental treatment, and before that, in many cases, it was one man's visionary idea. The history of medicine includes many examples of ideas that were initially ridiculed or rejected by the medical establishment but that later became widely adopted, thanks to the courage of researchers and clinicians who stood by their ideas, often in the face of withering criticism from their colleagues. Notable examples would include Semmelweiss (antiseptic handwashing), Gruentzig (balloon angioplasty), Rous (viruses and cancer), Marshall (*Helicobacter pylori* and ulcer), Prusiner (prions), Pasteur (germs), Mendel (heredity), and many others. The last in the list is HEAVEN.

The question arises spontaneously: Why? Why so much acrimony for a lifesaving procedure?

The reason is psychological: HEAVEN opens the Pandora's box of medical failures.

"Despite biomedical research blossoming in terms of accumulated data, evolving technologies, and published articles… few advances in biomedical science materialize into human applications that affect health; even when successful, the translation sometimes takes decades… as proposed discoveries accumulate, a major challenge is how to promptly translate them into something useful. The current pipeline remains inefficient… effective application in saving lives and improving health has been limited. The excuse that not enough time has passed is not really satisfactory… human genetics research has received tremendous funding… few lives have been saved because of accumulated human genetics knowledge to date, and future prospects (e.g., extension to personalized and precision medicine) also are not promising… intellectual fascination in neuroscience for many decades has led to few new practical applications. It is unclear whether newly announced efforts in this… discipline will fare any better… even the most recent ones, e.g., optogenetics are already a decade old… most Nobel prizes in medicine have been given recently for discoveries that offer brilliant mechanistic insights, but have not yet moved (and may never substantially move) the dial of life expectancy."[4]

This is the state of affairs in biomedicine in the early 21st century. Medicine at large has failed for chronic conditions or is still stuck with gross procedures (injecting insulin for diabetes - since 1922). The only bright spot

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– infectious diseases – is losing its sheen, as resistance is mounting around the world to available antibiotics. Acute care medicine - which is often lifesaving - is equally often trailed by long-term disability. And of course, bioengineering advances cannot be conflated with biochemical medicine.

Had "brilliant mechanistic insights"[4] proven "brilliant," we would be free – or on the way to – of the major killers that affect humankind. There would be no need for a full body exchange.

HEAVEN bears brutal testimony to this simple fact. When you have to change a body because you cannot fix it, that is a sign of failure. Actually, the whole field of transplantology attests to the fact that our biochemical insights have led nowhere, despite vast amounts of money spent over the past 50 years! Since we cannot reverse a biological process gone awry, we are left with little else than replacing this or that organ.

Unfortunately, humility is not a part of the medical lore.

No one in the media and society at large truly grasped this fact: HEAVEN stands for failure.

Whose fault is it?

There are several parties at fault, and it would be too long a list, but standing at the very top is the current peer review system that vets research to be published: "A major advance may be difficult to express in primary 'original' articles reviewed by other similar-thinking specialists. The ability to break loose from the shackles of narrowly focused specialists who thwart out-of-the-box ideas may characterize major disruptive innovation."[4] Had it been for the specialists of the time, no airplane would be flying over our heads presently, since heavier-than-air flying vehicles were deemed impossible in 1900. Moreover, many other current technologies equally apply (a medical favorite: Mullis' polymerase chain reaction).

So what is the solution?

Involving private entrepreneurs is one,[4] since "they have strong reasons to generate truly working solutions and effective interventions rather than simply publish articles and obtain grants." Is it so?

Founded in 2012, Breakthrough Prizes are the richest prizes in science, bankrolled by Silicon Valley billionaires, including Google's Sergey Brin, Facebook's Mark Zuckerberg, 23 and Me's Anne Wojcicki, Alibaba's Jack Ma, and DST Global Milner. This year's prizes were awarded for optogenetics research and an assortment of genetic mutations that have not changed the prognosis of the related conditions an iota (https: //www. newscientist. com/article/dn28461-glitziest-science-prize-hands-out-21m-to-1300-top-researchers). This means that the billionaires still rely on the traditional peer review process. And that is a setback to properly financing breakthrough science.

This is not surprising. As the world knows, in June 2015, the two authors delivered their combined talks to the AANOS/ICS annual meeting in Annapolis, Maryland. Unfortunately, the science behind spinal cord fusion and other aspects of head transplantation were basically unknown to the audience and - one can safely conclude - to the cadres of critics (and reviewers), despite seven papers published in both SNI[1-3] and Central Nervous System Neuroscience and Therapeutics.[5-8] Even Dr. White's work has been grossly misconstrued: Ethical criticisms were both unsupported and populist.

Happily, on August 27, 2015, Xinhua, China's official news agency announced the start of the cooperation between the two authors toward the first human head transplantation. A plan has been laid down that involves experimentation with brain-dead organ donors. The manufacturing of the GEMINotome, an ultra-sharp nanometer-grade blade and of a negative pressure micro connector for polyethylene glycol circulation, is a part of this endeavor. In the meantime, scientists from the Institute of Theoretical and Experimental Physics in Moscow (Prof. Maevsky and Orlova) have volunteered their know-how to boost the HEAVEN neuroprotection protocol. Health professionals from all around the world, including the USA, have offered to be a part of the transplant team.

Thus, it is most unnerving that no patients' association ever contacted any of us, likely advised against by "academic critics," the same kind of "experts" billionaires rely upon.[9]

Hence, we thank this journal and its editor in allowing us to make its readership apprised of this simple fact: that academic arrogance once again is stifling scientific innovation.

We urge all those interested, and above all those who stand to benefit the most, the patients, to look at the facts and start funding for our project. At the same time, all unbiased physicians who would want to independently test several aspects of this paradigm are urged to contact us.

HEAVEN is growing into a major international collaboration. In the meantime, people are dying because we doctors failed. This is a time for humility. But also, a time to act. Doctors, patients, and funding bodies (including well-meaning but naive billionaires), together.

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