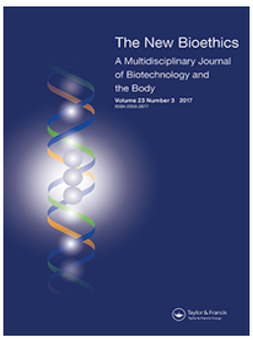

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Transplanting the Body: Preliminary Ethical Considerations

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A dissociated area of medical research warrants bioethical consideration: a proposed transplantation of a donor's entire body, except head, to a patient with a fatal degenerative disease. The seeming improbability of such an operation can only underscore the need for thorough bioethical assessment: Not assessing a case of such potential ethical import, by showing neglect instead of facing the issue, can only compound the ethical predicament, perhaps eroding public trust in ethical medicine. This article discusses the historical background of full-body transplantation, documents the seriousness of its current pursuit, and builds an argument for why prima facie this type of transplant is bioethically distinct. Certainly, this examination can only be preliminary, indicating what should be a wide and vigorous discussion among practitioners and ethicists. It concludes with practical suggestions for how the medical and bioethics community may proceed with ethical assessment.

KEYWORDS biomedical/biotechnological advances, full-body transplants, biomedical-community ethical consensus, organ transplants, procedures with insufficient science, public responses to biomedical/biotechnological advances

> The body, lad! The body is the main thing.
>
> The body cannot be substituted
>
> by any music of the spheres!
>
> Mann, Fiorenza (tr; H.T. Lowe-Porter)

Introduction

It is likely that as biomedical and biotechnological research increasingly taps into more sensational ground, it will become harder to distinguish the merely sensational from the groundbreaking sensational. Witness the recent controversy of the first published study of CRISPR-Cas9 germline gene-editing in human embryos by

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Liang *et al.* (2015) as Scott (2015) describes. Germline genome-editing has been widely viewed as off-limits for now because of tangled ethical problems. The Liang *et al.* study, involving insertion into a gene connected with thalassemia, was largely a demonstration of what cannot be done with such technology and the dangers of attempting it. Whether such a study – because it does pioneer at the frontier of human germline-editing research – should even be pursued became part of the controversy. But importantly, sensational as the report became, the research may at most have shown what ground simply cannot be broken for now and so was arguably trivial – or 'frivolous' as Scott (2015, p. 2) labels it – despite the wide concerns.

However, another area of biomedical research has elicited a strong response among both professionals and the wider public before the proposed project has been implemented. This area of research has apparently been widely viewed as so sensational as not to be taken seriously enough by ethicists, with rare exceptions such as Pascaley *et al.* (2016), and so has not engendered a consistent systematic ethical outlook among the bioethical community, compared with the ethical foundations laid for germline gene-editing. Yet, in this newer case, for all its sensationalism, its very pretension to breaking scientific ground warrants ethical attention commensurate with that given to germline genome editing. This area of research is into so-called 'head transplantation'.

The prospect of such transplantation may strike many people, including bioethicists, as too Frankensteinish – too far from mainstream of ethics – to warrant serious ethical consideration. However, now that an Italian surgeon and a Russian patient (Canavero 2013; Mims 2013; Whiteman 2015), with the approval of a donor and of a hospital, have set plans for such a surgery and publicized it, thorough ethical analysis is urgent. Furthermore, the apparent ghoulishness and science fiction that observers may attribute to such a procedure is no cause for withholding ethical consideration but in fact warrants bioethicists to investigate such a potential procedure.

This article, recognizing the first steps provided by Pascaley *et al.* (2016) and Steinbok (2015), aims to bring out more fully the spectrum of ethical issues involved. Even if many observers dismiss the likelihood of such a surgery's success in the near future and thus minimize need for ethical inquiry, such a response only heightens the need for inquiry, as explained below. At the least, a human subject/patient (besides the human donor) is at stake, even if voluntary and whether or not the surgery can succeed. A procedure fated to failure is due no less ethical investigation that one presaged for success.

Before proceeding, terminology must be clarified. In the media, the procedure in question is commonly called a 'head transplant'. This term is confusing. In usual medical terminology, an '*X* transplant' refers to the organ *X* that is taken from a donor and placed into the patient. In a so-called 'head transplant', it is the donor body (sans head), not a head, that is transferred to the patient, whose body from the neck down is excised. The assumption behind the operation is that most, if not all, of the patient's essential being resides in the head; the patient after the procedure remains the same one as before. Thus, the projected operation should be termed 'full body (sans head) transplant', or simply 'full-body transplant' (FBT).[1]

[1] Thus, the 'full body' is to be understood as all of the body except from the neck upward.

Since the operation has not only been publicized but is in the process of being realized, possibly by the end of 2017 (Mims 2013; Whiteman 2015; Wong 2016), it is moot to focus merely on whether the procedure can succeed. If it does succeed, and the patient recovers to have some degree of a good life, to the extent he or she finds acceptable, such an outcome would still not mean that the procedure is ethically sound. Conversely, if the procedure fails and the patient dies during the operation or lives to have an unpleasant existence, this outcome would not alone mean that FBTs are unethical. In short, possible success or failure is only part of the overall ethical issues involved in such a procedure.

Furthermore, a philosophical facet unique to this procedure – whether the person who goes into the operation is the same as the one who comes out, as Pascaley *et al.* (2016) and Steinbok (2015) discuss – calls into question just how one can measure success of such an operation. The facts that (1) the head, specifically the brain, of the patient must somehow meld with the donor's (neck-and-below) body, and (2) the body and extensive nervous system would have to form a new interface with the brain, call into question just whether one can plausibly aver that the operation has indeed succeeded. Thus, does the patient indeed survive the operation? (See Tobia 2016, for a general discussion of this philosophical problem of identity for the neuroethics of biotechnology and biomedicine.) Thus, bioethics of an FBT involves a metaphysical hurdle, the ancient problem of identity; and among the many bioethical concerns that arise for such a procedure, part of the discussion may have to involve whether it is indeed necessary to resolve this metaphysical challenge before one can even begin to offer cogent suggestions for the ethics of FBT. This article will focus on some other basic potential ethical problems of FBT that need attention at least while discussions of identity and FBT proceed.

I consider one immediate objection to the very idea that FBT needs special bioethical attention, then provides the background to FBT, which comes into play in the ethical investigation to follow. This first objection is twofold. Transplant procedures, even involving cross-species organ donations such as porcine livers to human patients, are widely accepted as ethical in medicine (Reiss 2000; Veatch 2002; Bramstedt and Down 2011; Jonsen 2012). (Japan offers a notable exception to this tendency, in that it has taken decades to develop laws allowing transplants (Kimura 1998) and lags far behind other industrial countries in transplant cases. Much of this difference may be tied to distinct cultural beliefs in Japan about the body, death, and decision-making by family members about patients (Hoshino 1997; Kimura 1998).) It is not apparent that FBTs should be any different by standards similar to those for other types of transplants. Furthermore, at least in this initial FBT case of Canavero's, the subject-patient has been fully informed about the dangers and is willing to proceed (Whiteman 2015). In all, then, general organ-transplant precedence and fully informed consent would seem to render this case ethically acceptable, even if, as Pascaley *et al.* (2016) and Steinbok (2015) contend, one's identity cease to exist and replaced by a new one. To round off this twofold objection, transplant surgery over the past decades has only helped advance medical knowledge and practice, and FBT should only greatly augment this growth.

Instead of responding to these objections right away, this article starts with these objections as assumptions. That is, it starts with the idea that there is nothing significantly ethically different about FBT, compared with other kinds of transplant procedures, and then examines reasons to warrant ethical concern. Before proceeding to the argument, the historical and factual background to FBT is pertinent.

Historical background of FBT

Studies in mammalian whole-body transplants stretch back at least to 1908, when the American physiologist Charles Guthrie transplanted a dog's body to another dog's head (Stephenson and Kimpton 2001). Although Guthrie worked closely with French scientist Alexis Carrel on vascular surgery and Carrel went on to win the 1912 Nobel Prize in Medicine, apparently the prize committee overlooked Guthrie because of his body transplant work. (Stephenson and Kimpton 2001). In the 1950s, the Russian organ-transplant scientist Vladimir Demikhov grafted two dogs' heads onto one body, which inspired American neurosurgeon Robert White to perform FBTs on monkeys, one subject living for nine days post-surgery, capable of hearing and seeing (McCrone 2003; Mims 2013). Yet, since full spinal transfer was not performed, the monkey could not move. White proposed human FBT for paralyzed actor Christopher Reeve and physicist Stephen Hawking, although he died before having a chance to do these operations.

However, White's work in turn inspired Italian surgeon Sergio Canavero (2013) to pursue White's general proposal for human FBT. Studies appeared indicating the possibility of reconstructing the brain–spinal linkage in rats after spinal-cord severance, which operation would be crucial for a human FBT (Estrada *et al.* 2014). By 2015, Canavero announced that he had found a patient, Valery Spiridonov, willing to undergo the FBT procedure (Whiteman 2015). Spiridonov suffers from a severe and fatal genetic muscle-wasting disorder, spinal muscular atrophy, so that he cannot walk or sit up unaided. Canavero plans to perform the surgery by the end of 2017, in Vietnam (Wong 2016), as many other countries may offer strong objections to the procedure. It is projected to cost at least 10 million euros (including a $200,000 surgical knife), require upwards of 100 surgeons, and take 36 hours. (Mims 2013; Whiteman 2015)

Public responses to FBT and increasing evocations of immorality

Why a technique such as FBT might provoke intimations of immorality should at least be considered before actually assessing ethically the proposed procedure. As Nobel decisions are expressly hermetic, one can only speculate as to why Carrel received the prize but his oft-partner Guthrie did not. Perhaps Guthrie's dog work tipped the delicate Nobel balance. But why should such work on dogs elicit undertones of public disapproval, when animals across the world were being painfully killed for their meat? Certainly, complex moral factors are at work in a culture and may not always lead to consistency. (See Rollin 2011, for discussion of shifting moral attitudes about animals.) Even in 1912, dogs presumably were often

considered as members of the household, thus quasi-human, whereas cockroaches and wild mice were not, though dogs often lived inside. Monkeys were rarely household members, but with growing awareness and moral standing widely granted to animal consciousness or sentience, by mid- and late-twentieth century, monkeys rapidly attained among Western societies a quasi-human moral status. Thus animal welfare activists vigorously protested against White's work on monkeys, staging demonstrations (Waters 2011). With the growing moral view that such human-likeness of many animals at least evokes emotions triggering calls for simian moral status (as the Great Ape Project vividly signifies; see Cavalieri and Singer 1993), it is hard to claim it is merely the FBT done on these monkeys was what brought protests, as if people already had developed a moral outrage about FBT *per se*. Rather, it seems to be the relative extremity of the procedure which activates a potent photogenicity in the animal victims. It is then implausible to infer that society was, at this relatively early stage of FBT, already injecting its own bottled moralities into FBT *per se*.

In contrast, Canavero's proposed human FBT has evoked direct moral outcries. Bioethicist Arthur Caplan, head of medical ethics at New York University's Langone Medical Center, published an opinion piece denouncing FBT as unethical, at least within the current level of the pertinent science (Caplan 2015). An FBT would mean rewiring the spinal cord's many dense neural processes, a procedure well beyond current knowledge. Witness the fact that thousands of spinal-injured paralyzed patients remain paralyzed, Caplan notes. Knowledge of pertinent stem-cell growth factors to do the job also falls far short, he continues. Immunosuppressive drugs for more routine transplants such as liver cause enough troubles, including cancer. The most insuperable ethical challenge vis-à-vis the science involved is that the brain is not an isolated organ but is highly integrated with the rest of the body (Caplan 2015), leading to the possibility that it may be very difficult to get the two systems to mesh and operate synchronously and thereby endangering the patient.

Richard Borgens, Director, Purdue University's Center for Paralysis Research, contends that 'There is no evidence that the connectivity of cord and brain would lead to useful sentient or motor function following head transplantation'. (Fecht 2015, no page) As happens in many transplants, scar tissue develops at the cut, creating special problems for sufficiently reconnecting nerves, as in the spinal cord, because of their very signaling function. Jamie Shores, hand-transplant surgeon at Johns Hopkins University, notes that despite the practical complications remaining for FBT, 'There are countries with much less oversight and regulation than here in the U.S. where people have done some very controversial transplants that have resulted in the death of the patient'. (Fecht 2015, no page)

At this very early stage of FBT development and research, theethical concerns among the medical community also appears to be at its earliest stages. The ethical concerns evoked by evoked by CRISPR-Cas9 germline gene-editing in human embryos (Liang *et al.* 2015) were also once at a similar nascent stage but, now have mounted so precipitously as to delay that technique's development. Certainly, FBT raises different kinds of ethical issues from CRISPR. This apparent parallel between FBT's and CRISPR's growth of ethical concerns does not entail that the CRISPR case should serve as a model of ethical investigation for FBT. Rather, the point is that when researchers in areas related to FBT become duly alerted to

the bioethical issues, the community itself may be alerted to begin speaking directly and thoroughly to the ethical concerns until it can decide which routes to take for ethical guidance of such research, whether through medical-institutional or government policy. Indeed, the fact that a wide range of the public has exhibited worries about FBT raises a red flag indicating such procedures are worth more than cursory ethical consideration. Thus, the call here to begin taking a more deliberate and, ideally, systematic, approach instead of scattered, often gut-level, responses to the proposed technique, so that all parties, from pro to con, may join in fair ethical consideration.

Short- and long-range ethical concerns

For this preliminary inquiry, it proves useful to look both at concerns about Cavanero's specific proposed human FBT and at wider-scope concerns that may apply to any FBT now or in the future.

General ethical concerns of Canavero's planned procedure on Spiridonov

Canavero has acknowledged that for the procedure, 'The real stumbling block is the ethics. Should this surgery be done at all? There are obviously going to be many people who disagree with it'. (Whiteman 2015, no page) However, before such a procedure is done, more is needed beyond pointing out that there may be an ethical problem and that many people may object to the procedure's being done. Indeed, the fact that many people would object to it may understandably call for a practitioner's pausing and considering these concerns before proceeding with a human FBT. Yet, one as well may object, 'We have no time to stop and consider these concerns, knowing that ethical debates can go for years without resolution, as this patient direly needs treatment because his malady is eventually fatal'.

The starting point of the ethical examination will be the neutral position, that is, that an FBT is ethically comparable to other transplant types (as discussed in Veatch 2002). Certainly, the patient's (Spiridonov's) need is of ethical concern as well and rates similarly to problems that underlie much of biomedical and biotechnological ethics, especially more controversial transplants (such as face; see Siemionow *et al.* 2007; Caplan 2015): Namely, to what extent should we proceed with untested treatments on patients who have fatal maladies? Typically, one may first ask to weigh the pertinent benefits and costs: which benefits go beyond this one patient's needs and beyond costs other than the monetary and to the long-term, wider ethical issues. Sometimes, treatments not sufficiently tested by standard levels of clinical trials have proceeded, with due informed consent, as in small pilot-studies (Hulley 2007) or in waivers in military research (McManus *et al.* 2005).[2]

[2] The philosophical question remains of just what constitutes 'fully informed' in informed consent. One may plausibly question whether Canavero's patient, Spiridonov, indeed has informed consent if, as many medical researchers such as Caplan and Borgens, mentioned above, have emphasized, the science is simply not yet available, and if the knowledge simply does not exist although must exist in order to qualify proper informed consent, then such consent would not currently be possible.

The challenge for FBT is that of the degree to which the new therapy is sufficiently similar to tested treatments, whether on humans or non-humans.

Unfortunately, it does not seem there is a hard-and-fast measure by which to assess whether the new procedure is sufficiently close to similar tested, mainstream transplant treatments. For specific, first-time proposed treatments such as FBT, the medical-scientific community can often approach a reasonable consensus only case-by-case. So far, the response to FBT among prominent leaders in the medical-research community has been concern that there is not simply one unknown but too many unknowns in the Canavero/Spiridonov case for it to proceed (Caplan 2015; Fecht 2015; Whiteman 2015).

The focal medical problem for this case is that of reconstructing the complex nerve bundle, the spinal cord, after asseveration. In the animal cases, blood vessels between donor and patient were connected, but not the subject's spinal nerves to the donor's. This first proposed human FBT raises an alarm among many in the community not only in its complex problem of connecting all of the patients' nerves to the donor nerves, but also in this challenge itself being exacerbated by the formation of scar tissues (thus the 100 or so doctors and $11 million or more estimated fee), Furthermore, in the few FBT animal studies, while the subjects lived a few minutes (Ren *et al.* 2014) to a few days (White *et al.* 1965, 1971; BBC News 2001), the subjects remained paralyzed because of the un-reconnected nerves. Such condition would represent little improvement for a patient such as Spiridonov. While Canavero's surgical team seeks methods to reconnect the spinal nerves using a method involving polyethylene glycerol (Thielman 2015), scientists have warned that insufficient peer-reviewed research has not verified such a method's promise (Wong 2016; quoting Caplan).

In this light, it would be veritably incumbent upon medical researchers to come forth with serious examinations of Canavero's proposed case and work toward a reasonable degree of consensus, even if the operation occurs in a venue where such tenuous new procedures can nonetheless be carried out. Because of the timeliness – the relative immediacy – of the planned procedure, community response is urgent. Preempting the treatment may seem unfair to the patient who consents to the procedure, braving all risks. However, with many technical (besides ethical) unknowns, a low probability of success may mean the patient would not actually be treated *unfairly* by missing the opportunity, even if unfortunately. The surgeon's proposed procedure, if it comes about, would not be taking place in a social or moral vacuum but within a global medical community composed of patients and practitioners which has been seeking a general coherence, ideally consensus, concerning medical ethical issues.

Patient's benefit vs. broad social and community costs

Certainly, cost–benefit analysis for such an ethical situation, especially in biomedicine, has its doubters (Mooney 1980; Hollinger 2005), particularly for its utilitarian and possibly specious quantification of intangibles. However, it is worthwhile here, in order to show that a human FBT poses at least one ethical challenge that needs to be considered before such surgery occurs. In this case, one needs also to consider

inequalities (Benjamin 1998; Douglas 2003) which, as a minimum, would be remedied before such a medical procedure proceeds.

In general for cost–benefit analysis,

Given B = benefit, C = cost, P = patient, and S = society/community (and for the moment assuming these B and C are quantifiable), ideally one would want

$$B_P \geq C_P$$

and

$$B_S \geq C_S.$$

Combined

$$B_P + B_S \geq C_P + C_S,$$

or,

$$B_P - C_S \geq C_P - B_S.$$

If the units for each variable are $B_P = 100$, $B_S = 0$, $C_P = 50$ and $C_S = 100$, then the inequality in (1) would not hold, and the procedure would not be done.

The problem, of course, long haunting many kinds of such consequentialism, is how to assign the variables tractable numbers. For example, consider an FBT procedure, while ethically discouraged by the community (whether at large, or specifically medical), which succeeds to the point that *P*, who was immobile and would have died in six months without the procedure, now lives five years with marked mobility. However, society now suffers because the procedure has inspired 50 ethically unapproved FBTs in permitting countries and all these operations result in rapid deaths. Social costs then appear to outweigh *P*'s benefit. Yet, real situations are unlikely to be so clear-cut. Instead, *P* may live six months postoperatively with feeble consciousness and on heavy medication to combat transplant rejection, while countless people who knew body-donor *D* are greatly disturbed to see *P* sporting *D*'s body everywhere; one person, *X*, is affected to the point of requiring clinical attention. This scenario is almost immune to quantification because *P*'s consciousness is indeterminable and so cannot be weighed against, for example, *X*'s response, which may have been too extreme by normal standards to be fairly accountable.

Despite such severe drawbacks to cost–benefit analysis in the case of FBT (not to speak of medical–ethical situations in general), this idealized analysis provides a springboard for considering moral factors involved for patient, society, and community, not necessarily quantifiably. Next I name some social burdens and benefits that could be of moral concern in discussing the ethics of FBT, along with – besides the obvious potential patient-benefit – some drawbacks for the patient that may have moral significance.

Wider-scope moral concerns if a medical-community consensus is not reached

One effect upon the general global public could be that of a widespread fear of illegal traffic in 'souls', if you will. Thus, if an FBT surgery were performed without the

medical community's ethical approval, in what may be perceived as a disreputable institution, in a country less scrupulous about ethics and human rights, the procedure could well be perceived as morally dubious, if not connected to clandestine organizations. The operation could widely be interpreted as nefarious, or at the least attracting nefarious elements and leading to illegal procedures. Earlier concerns about illegal trade in organs such as kidneys have been partly quelled by governmental and the global medical-communities' policies mustering ethical means to ensure transplanted organs are acquired above-board and fairly distributed (National Organ Transplant Act 1984; see Jonsen 2012 for how the various concerns of transplants ethics have helped shape ethical policy).

Although U.S. policy has tended toward encouraging no monetary trade in organs, many theorists argue that there are moral reasons to uphold free monetary trade in organs (see Cohen 2002; Taylor 2002; Veatch 2003; Gill 2002). In any event, illicit organ trade continues (Scheper-Hughes 2000, 2014), with potential for general panic. Proceeding with FBTs before the worldwide medical-practitioner, medical-ethics, and medical-research community, perhaps with governmental policies, have acted with reasonable unity on such a procedure could add unnecessary rifts within these and other communities. Furthermore, FBT may, understandably, heighten widespread fears of trade in (unwilling) donor bodies for operations performed upon those who could pay.

Such fears could exacerbate a related social cost, specifically in eroding public trust in the medical community and its ethics. With the specter of the pharmaceutical industry looming over the public's somewhat sensitive trust in medicine (Kessell 2014; Norton 2014; Weller 2014), with that industry's seeming strong valuing of profit, headlong rush into FBT, especially with its tremendous costs and use of resources, plausibly could be viewed as yet more of the 'typical' chase for high earnings and lack of care for the extensive, more common conditions that massively affect global well-being.

Wide-scope moral concerns intrinsic to FBTs in General

These moral concerns also prompt another angle on the ethics of FBT. So far, the concerns in this section have been contingent upon what would happen if the medical community cannot decide about the ethics before an FBT operation is performed. Further moral concerns are more intrinsic to FBT itself (whether or not the community reaches consensus before the first one is performed). One such concern is the signal that an FBT would send to the world and to the medical-research community about the latter's priorities. As the BBC News (2001) quoted neuroscientist Stephen Rose, the quadriplegic community might be better assisted by research into regenerating spinal fibers. Should scarce research talent, time, effort, and funds be expended on FBT research and development of techniques that are likely to be very costly and benefit very few? (See Benjamin 1998 for the general ethical problem here.) It may be objected that in the sciences all knowledge is good. Some of it, such as in particle physics and space sciences, happen to be very expensive; others, such as butterfly research, less expensive. Research on FBT could well teach us much about the spinal cord, both peripheral and central nervous

systems, and perhaps much about related psychophysiological issues. However, in response, there are further ethical problems that do not make FBT R&D quite comparable ethically to other Big-Science research.

One distinction for FBT research is that it not only builds on animal research done before animal research guidelines were in place (thus, if used, would be analogous to, if not quite as reprehensible as, our relying on Nazi-doctor research), but it also may require, if pursued thoroughly, research on dogs, as White *et al.* (1965) did; primates, described in BBC News (2001), and possibly Great Apes. Another distinction of FBT Big Science is the further ethical concern for the patients themselves, whatever their confessed desires. Thus, there are ethical limits on what the global medical community can endorse in terms of letting people do what they want to themselves. Even in countries such as The Netherlands and Belgium, where voluntary euthanasia is allowed (Levy 2010), the practice follows strict guidelines. But FBT diverges even from euthanasia: Instead of simply ending life, FBT involves the construction of the patient's unforeseeable future life. FBT may lead to patient trauma when or if the spinal cord does not connect with brain. The patient, if surviving long enough to be conscious, may have severe identity crisis (Pascaley *et al.* 2016), due to mismatched spinal or peripheral nerves and the difference of body type and of peripheral and central (spinal cord) systems. (See Northoff 1996 and Burd *et al.*, 1998 for similar if dissenting discussion in brain-tissue transplants.) It remains an open question as to how body type can shape individual psychological identity.

A more libertarian objection may say that such a procedure is entirely in the hands of donors and patients, who may enter into a legal contract of their own choosing, as it involves only them. This objection, though, neglects the fact this procedure does involve more than the two – donor and patient – working in conjunction with a surgeon and scientific team: An FBT procedure would also involve not merely the patient, donor, donated body, and surgeon as in the usual transplant (Jonsen 2012) but others as well, in ethical quandaries to an extent not seen in other kinds of transplant. One potential burden for the donor's community, already mentioned in passing, would be that of the donor *D*'s community, who could be disturbed by (even possibly seeing) *D*'s body with a different head. (Conversely, some of that community may be glad that *D*'s body has gone on to benefit someone's life.)

Furthermore, the libertarian objection misses the fact that medical procedures, particularly one of such an immense scope as FBT, do not occur in isolation but are interwoven within global scientific research and practice. Those researchers and practitioners work as a body within codes of practice (even if some members may prefer other codes), and working against these codes works against the group, its members, and its goals of ethical practice. Very importantly, in media reports medical observers have noted that little of the research supporting Canavero's proposal procedure is peer-reviewed (Caplan 2015; Wong 2016), further lending public and scientific-community greater doubt of the proposal's ethics.

A further consideration, concerning other individual patients and practitioners who may have a legitimate interest in the procedure, arises from the fact that the donor body may by contrast be put to much more effective, surer use in a variety

of transplants, such as cardiac, hepatic, and nephrologic. (Murphy 2002 discusses the ethical problems of multiple-organ transplants, of which FBT would be a case.) The perpetual complaint of organ shortage intensifies this concern about FBT organ usage. (Daar 1998; Browning and Thomas 2001; Koppelman 2003; Bramstedt *et al*. 2004; see Koenig 2003, for contrasting views.) In fact, more lives may be saved – and possibly for much longer time – than if the full body is given to one patient. The objection may again be that the choice is entirely the donor's; and in general, it is. (See Taurek 1977, for more on the degree to which 'the numbers count' in saving lives.) The point here is that ideally the patient, donor, and surgeon can be encouraged to make the most ethical choice.

Ethics of FBT in light of theories of the body

The fact that FBT involves such a large piece of the body, as if the head were a separate and separable part, calls for looking at theories of the body, especially recent debates, but also those extending back to Descartes, and how these can help add perspective on ethical analysis. Certainly, Descartes' theory that, uniquely in the human species, the body is of an entirely different substance from the mind is forerunner of contemporary ambitions to extract from the mind the essential oil of its substance and inject that into a device so the mind may continue in this alien environment. Many pegs comparable to Descartes' along history's route connect his conjecture to the contemporary one. Yet, also recently, theories of the embodied self have called that historical trend into question. Researchers, such as Leder (1984, 1990, 1998, 2005), taking the lead of Merleau-Ponty (1962), have suggested that the self can, *pace* Descartes, only be understood at all as being not just within but inseparably one with the body. Too easily, in the Cartesian line of thought that has dominated much metaphysics and ethics, the body is essentially absent from discourse, to the point it is obscure, alien, forgotten, and neglected. This attitude becomes a danger in medical practice, which has been strongly influenced by the same tradition, as if the body is a mere vehicle for the mind and of indefinite identity. (Leder 1984) In fact, Leder (2005) contends that the divisive terms 'mind' and 'body' pose a danger in their very divisiveness and implicit dualism and would best be laid aside.

If the human is understood to be not as partitioned between a mental and physical but is in fact a unity, there could be ethical reverberations not only in psychiatry and psychology but other branches of medicine and the biosciences. For example, the common concern that contemporary medicine too often 'treats the symptoms and not the disease' exemplifies the tradition not to treat the person as a whole entity, as other medical traditions attempt to do. Whether or not one concurs with, say, Chinese medicine's holistic approach (and I am not here condoning it *per se*), nonetheless the fact there is significant discussion that the medical tradition stemming from the mind/body division may actually harm patients, at least signals there is room for ethical discussion.

This ethical concern of the partitioning of the patient arises graphically in FBT. Assume then, the mind/body are indeed not readily divisible, but the mind is, let us suggest, 'spread' throughout the body. Then FBT in a real and significant way

would involve dividing and markedly subtracting from and diminishing the person. The act of deliberately subtracting from a person, especially when the person aims on retaining that person intact, would arouse moral concerns, such as deceit or fraud (corroborating the person's understanding that the whole self would remain) or doing deliberate harm (even with the person's supposed consent).

One may argue that this very contention that mind and body are inseparable runs into inconsistency if it is used to stigmatize FBT ethically. In saying that cutting away the 'body' – essentially all but the brain or at least the head (call either the '*caput*', from the Latin) – and retaining the caput diminishes the mental, one is concurring with the notion that the mental is indeed in the *caput*. Yet, this objection misses the point that the embodiment argument is not asserting that the entire mental is in the caput, rather than what is termed the mental is not to be found solely in the brain, so cutting away the non-caput body would be diminishing both the 'mental' and psychical aspects of the person.

A further objection is that this representation of, at least, Leder's conception of the 'dysappearance' of the body – which in itself can be a source of pains, fears, and even alienation of oneself if one feels one's physical shape is inappropriate. – is not a fully faithful rendering of Leder's theory. Rather, as happens with transsexuals, one should have a fully ethical option to switch bodies to one more appropriate to oneself. In response, I first must note that I need not here digress into a full argument for whether Leder's viewpoint in particular can lead to moral justification for trying on various bodies until you find one that fits. Such argument would be beside the point here, which is not to concur or dispute Leder's argument but more modestly to bring up how embodiment theories can lead to reflections on the ethical issues of FBT. Second, Leder and his acknowledged influence Merleau-Ponty, while indeed prominent leaders in the philosophical debate about embodiment, are not the final word. Thirdly, I cannot go into the entirety of that debate within this article about preliminary ethical considerations; that debate and how FBT fits into it warrants a separate further investigation and discussion. Fourthly, the material about embodiment theory presented here, abstracted from the wider discussion, is sufficient to show the following: It could at least be inconsistent with one salient basis of embodiment theory – the inseparable unity of 'body' and 'mind' – to cut away and retain only the body part (the brain) in which the mental and the seat of this deciding agent would be supposed to reside, and then attach another non-caput 'body'.

Finally, and most important and the ultimate point of this response to the objection: To introduce the notion of shopping for the right body in turn invokes a new ethical concern: How ethical is it to establish a market in bodies, some version of which would be needed to make it possible to shop for a non-caput body? The moral effects and reverberations of establishing such a market would have to be considered. Further, the medical, social, and practical prospects behind FBT is much more complex than, say, that for transgender operations: The latter involves only a few body parts, and there is a widespread political–psychological element – that of gender itself – that is particular in motivating such cases; whereas motivations behind FBT would be much more varied and diffuse, without the particular political element (beyond such matters as 'I have a right to an FBT!'). Practically speaking,

then, the many, many body parts involved in the non-caput portion would make it highly implausible that one selected body will lead to the rate of satisfaction with the change that transsexuals may find with their much simpler and highly focused situation and its specific political–psychological element. More plausibly, to reach satisfaction would require trying on many different bodies; and with the stated complexities involved with the manifold of parts of the non-caput body, satisfaction with the first body tried-out would be unlikely. Thus, the need for steady shopping, which produces its own ethical problems. One obvious way out here would be to allow a fully non-human non-caput body – that is, a mechanical one – to render the person a cyborg and thus circumvent much of the problem with the FBT. That option may more efficiently do the job for those dissatisfied with the non-caput-body. However, such an operation involves a different moral consideration, as it is not an FBT.

Discussion

At first blush, an FBT seems to share much with established types of transplant surgeries. Transplants as a whole appear to be effective and overall ethical methods for saving lives via donor generosity. How could there then be any objection to an FBT – beyond the contingent problem that at present more medical science is needed before proceeding – when it seems just as humanitarian, altruistic, and potentially life-saving as other transplant types? This article's examining FBT more closely has, for one matter, revealed that FBT diverges in kind from established transplant types. An FBT's donor body could be better directed to help save many lives instead of one, via surer procedures. Being such an extreme surgical case involving notable monetary cost, FBT could provoke fears about illegal trade in donor bodies, especially if the procedure does not receive ethical imprimatur and thus remains widely deemed unethical, shady, or ghoulish. An FBT can affect the donor's community in a way that a single-organ transplant is unlikely to do.

As a second matter, as long as the medical-research community remains undecided on this issue, it can heighten general public disapproval and exacerbate medical science/public rupture. The FBT procedure done within such a contentious context can even be seen as condoning and promoting abuse and mutilation of oneself. A third set of concerns arises from the fact that broad research consensus seems to be that the science underlying FBT is too insufficient for executing the procedure, potentially harming the patient significantly. To proceed without the level of knowledge that researchers can concede is adequate for patient safety would run counter to medical practice's avowed responsibility not to cause a patient undue harm.

With FBT's many basic ethical and technical issues unresolved, the worldwide biomedical community faces choosing at least two major actions: (1) short term, before the Canavero procedure or one like it takes place; and (2) long term, to reach a solid plurality on whether or how this global community should allow, oversee, and assess work toward such a procedure. The short-term action may best not be a ban on such procedures, as such formal restriction may only heighten contention. For germline gene-editing, Evitt *et al.* (2015) recommend a wide-reaching regulatory framework

to help deal with the moral problems of such research, with greater reach and effect than the current NIH funding moratorium. For FBT, a more widely endorsed professional moratorium than simply one by the NIH (which likely would not now fund FBT research anyway) may be a more viable and consensus-building avenue than a ban. Such a wider moratorium may be upheld until a reasonable amount of work can be done in determining where the science stands, what level of knowledge about the relevant subfields would be reasonable before seriously considering such an operation, and which kinds of ethical policy in medical guidelines would be needed. It may even prove that, after fuller discussion of the intrinsic ethical concerns about FBT as brought up here, along with inevitably further concerns, stronger restrictions on such procedures may still be appropriate.

The inquiry in FBT ethics may also benefit by considering it within the broader context of related medical-ethics issues. For example, FBT ethics depends significantly on sufficiently ensuring the patient's informed consent. That is, with the pertinent neuroscience and techniques lacking, as commentators noted above have remarked, it may not be possible to give the patient duly informed consent. Such issue arises in other areas concerning exceptions to fully informed consent (Hartman and Liang 1999), such as whether patient guardians can validly provide informed consent for a new drug suggested for an unconscious patient. Other groups vulnerable to incomplete informed consent include those of subalterns. Guyatri Spivak (1994) built up Gramsci's idea that, in postcolonialism, the subalterns are persons or groups whose identities are marginalized by colonialist cultures. Bharadwai (2013) argues that a subaltern ethic manifests in stem-cell research, particularly that carried out by a small clinic in India offering stem-cell therapy. Bharadwai's 'notion of *consensibility* – consensual and circumscribed rules of scientific engagement' may help us to understand 'ethicality on the margins of an *ethic of consensibility* as inherently subaltern'. (25) 'Informed' consent to FBT may be usefully viewed as subaltern in terms of a postcolonialist attitude persisting in heavily industrial cultures. Further, debates about allowing euthanasia, or physician-assisted suicide, in many countries including Austria, Canada, and Scandinavia, pertain to FBT ethics: If it were legally and professionally permissible to end a willing patient's life, it is not evident that a patient should prevented from consenting to a procedure such as FBT that may turn out to be an inadvertent suicide. All of these issues, and likely more, warrant attention in FBT ethics.

The point of this article is explicitly not to endorse or offer advice on which actions the medical community should take, but rather to point up the strong need for serious and concentrated bioethical investigation and the need, given the uniqueness and extraordinary nature of the procedure, for some kind of immediate action and then some longer-range action.

What about the patient awaiting Canavero's proposed FBT? Is not his health at stake? Should not an exception to more traditional, deliberate institutional process, not to speak of a moratorium, be allowed in the patient's interest? Although the probabilities of success and failure are too hard to assess (which is the major ethical stumbling block for this case), given the animal studies and the complexities of the human spinal cord, there is a plausible case that he would be harmed more with the procedure than without.

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