




Emerging moral status issues

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Abstract

Many controversies in bioethics turn on questions of moral status. Some moral status issues have received extensive bioethical attention, including those raised by abortion, embryo experimentation, and animal research. Beyond these established debates lie a less familiar set of moral status issues, many of which are tied to recent scientific breakthroughs. This review article surveys some key developments that raise moral status issues, including the development of in vitro brains, part-human animals, “synthetic” embryos, and artificial womb technologies. It introduces the papers in this Special Issue, contextualises their contributions to the moral status literature, and highlights some enduring challenges of determining the moral status of novel types of beings.

Keywords Moral status · Embryo research · Cerebral organoids · Ectogenesis · Animal ethics

Bioethics has a longstanding fascination with issues of moral status. To possess moral status is to be the kind of being that is worthy of moral consideration; it matters, morally, how we treat beings with moral status (Warren 1997). Rational human adults are a paradigm case of an entity with moral status. For those who think moral status comes in degrees, human adults can moreover be considered a paradigm case of a being with the highest possible level of moral status, or “full” moral status. When we say that normal human adults have (full) moral status, we are saying that the interests of normal human adults are morally important. A rock, conversely, is a paradigm case of an entity without moral status. This is not necessarily to say we may treat rocks in any way we wish; it would be wrong, for example, to throw a rock at the head of a normal human adult. But the wrongfulness here has everything to

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do with the moral status of the human, and nothing whatsoever to do with the moral status of the rock.

Between adult humans and inanimate rocks lie a range of beings whose moral status is unclear or contested. How we ought to treat such beings is often deeply controversial. Consider some of the debates surrounding those David Degrazia (2002, p. 28) has described as “non-paradigm humans.” The category of “non-paradigm humans” includes human embryos and fetuses, which are unquestionably human but lack many or all of the emotional, experiential, and cognitive capacities of human adults. Debates on abortion and embryo research are, in large part, debates about the moral status of humans at early stages of development (Lagercrantz and Changeux 2009; Wertheimer 1971; Zarzeczny and Caulfield 2009). Other bioethical debates centre on the moral status of humans with severe cognitive disabilities (Kittay 2005; McMahan 2002), humans in persistent vegetative states that display evidence of continued mental life (Levy and Savulescu 2009), and newborn infants (McMahan 2007).¹ The question here is whether any of the differences between the mental lives of paradigm and non-paradigm humans track differences in their moral status. Outside the scope of human life, bioethics has also long grappled with the moral status of non-human animals—particularly in relation to animal research, which sacrifices vital interests of non-human animals to promote the wellbeing of humans (DeGrazia 1999; Lauwereyns 2018; Singer 2015). Animal research likewise raises questions about whether (or which) laboratory animals have moral status, and of how their interests ought to be weighed against those of the humans who stand to benefit from animal experimentation.

In addition to these long-running debates, questions of moral status are becoming increasingly relevant to novel types of biomedical research. Advances in stem cell science, genomics and other disciplines are granting scientists fine-grained control over biological systems. This power has led to the creation of new kinds of entities of uncertain moral status, which often can't simply be slotted within our existing moral or legal categories. For example, organisms that contain both human and animal cells (human-animal chimeras) have been created to model human disease, and might one day be used to generate transplantable human organs. Whether these creatures have the same moral status as their animal or human ancestors—or perhaps some sort of hybrid status—is a hotly debated topic in bioethics (Koplin and Savulescu 2019b; Koplin and Wilkinson 2019; Robert and Baylis 2003; Streiffer 2005). Another key scientific finding is the discovery that the brains of dead animals can be partially revived hours after the animal was slaughtered (Farahany et al. 2019; Knoppers and Greely 2019). This raises questions about whether it will become possible to restore consciousness to disembodied brains, and if so, how we should understand the moral status of entities we would currently classify as dead.

A key driver of many recent scientific advances has been the development of the Nobel Prize winning technology CRISPR-cas9 genome editing system (CRISPR). CRISPR allows scientists to precisely modify a cell's genetic code. It can be used

¹ *Monash Bioethics Review* has previously published a special issue on the last of these subjects (see: Giubilini and Minerva 2012).

to turn one cell type into another, and thus provides mechanisms to study a range of cellular diseases in the lab. One controversial application of this technology has been to create human brain organoids (which resemble miniature *in vitro* human brains) to study brain development and neurodegenerative disorders (Koplin and Savulescu 2019a). In the future, the gene editing system CRISPR-cas9 could be used to radically alter human or animal capacities, and thus give rise to another set of questions regarding moral status. For example, if genome editing allowed us to create “enhanced” humans whose cognitive capacities were far superior to our own, would this bestow on these humans a superior moral status? (Douglas 2013).

In comparison to the well-established debates on the moral status of nonhuman animals and non-paradigm humans, there is scarce bioethical work on the moral status of part-human animals, revived brains, enhanced humans, and other novel beings. This Special Issue aims to help build a body of literature that can help us think through the relevant ethical questions.

1 New kinds of beings

Andrea Lavazza’s contribution to this issue looks at one of the most striking areas of science that is raising new moral status issues: the creation of human brain organoids. Brain organoids can model the development, spatial organization, and electrical activity of developing human brains, resulting in something like a miniaturised *in vitro* human brain. Brain organoid technology raises the intriguing possibility of creating conscious human brains in vats—a possibility which until recently was relegated squarely to the realms of science fiction (e.g., Dahl 1979) and supernatural horror (e.g., Lovecraft 2009).

Current brain organoids are generally thought to lack consciousness (Farahany et al. 2018). Lavazza, however, argues that this might not always be the case. Indeed, there might be good scientific reasons to create conscious brain organoids to help study human consciousness (and disorders thereof). Where others have argued that conscious brain organoids should be extended similar protections to those we grant research animals (e.g., Koplin and Savulescu 2019a), Lavazza defends a stronger set of restrictions. Specifically, Lavazza argues from a Kantian perspective that once brain organoids develop complex forms of consciousness, it would be illicit to use them as a mere means to our scientific ends.

The ethics of brain organoid research also connect to another increasingly important area of bioethical debate—the ethical treatment of human-animal chimeras. As Lavazza describes, some researchers are implanting brain organoids into the brains of non-human animals so they can mature further than is currently possible with organoids that are kept *in vitro* (Lancaster 2018). This process creates animals whose brains are neither wholly human nor wholly non-human. Theoretically, humanising animals’ brains in this way could “humanise” or enhance their cognition (though this has apparently not happened in past experiments, in which the brain organoids made up only a small proportion of the research mice’s brains) (Mansour et al. 2018).

The ethical issues here go beyond those raised by in vitro organoid research. Here, the question is not (only) whether the organoids *themselves* might have moral status, but whether their integration into animals' brains might affect these newly humanised animals' moral status. Similar issues come up in relation to other kinds of research with part-human animals, a category which includes both human-animal chimeras (which are composed of a mix of human and animal cells) and transgenic animals (whose genomes contain a mix of human and animal genes).² One key question here is whether the usual standards for animal research are appropriate for part-human animals, and particularly for part-human animals with “enhanced” cognition (Koplin and Savulescu 2019b; Streiffer 2007).

One of the papers in this Special Issue –“It’s not worse than eating them: the limits of analogy in bioethics”—considers the prospect of growing transplantable human organs inside of human-animal chimeras. In this paper, Koplin asks whether we can circumvent moral status concerns by limiting the human cells’ contribution to the chimeric animals’ brains (and thereby ensuring they do not develop enhanced cognitive abilities). Koplin argues, counter-intuitively, that we cannot. Such measures would prevent us from inadvertently “enhancing” the chimeric animals’ moral status—but even so, it is at least arguable that the kinds of animals we might use to generate organs already have sufficient moral status that it would be unethical to use them as a source of organs. This point is often overlooked, given societal acceptance of practices that, like factory farming, harm non-human animals for comparatively trivial purposes. Koplin argues, however, that we should not accept organ generation via human-animal chimeras merely on the basis that it is *less bad* than these other practices. After all, factory farming might (as many philosophers argue) be gravely unethical—in which case the analogy between factory farming and organ generation in chimeric animals would tell us little about the moral acceptability of the latter practice.

As we have seen, human-animal chimera research raises concerns that we will enhance animals’ cognition beyond species-typical norms. What of the cognitive enhancement of humans? Here, some bioethicists worry that creating radically enhanced beings might elevate their moral status above that of normal humans. This might leave us in a similar moral position with respect to enhanced humans as many people believe non-human animals hold with respect to us (see e.g. Agar 2014). In his paper, Jesse Gray provides an alternative way of understanding the relationship between human enhancement and moral status. On some views, moral status increases according to the complexity of a creature’s mental life. But this is too simple. Gray argues that principles of violability are deeply involved in moral status, a move which fundamentally alters the relationship between moral status and cognitive ability.

Moral status is often defined in ways which suggest if a creature has a lower moral status, it is ethically acceptable to sacrifice its life, or its interests, to benefit creatures with higher moral status. This is why many are concerned that enhancing some

² For a thorough overview of different categories of research involving part-human animals, see: Academy of Medical Sciences (2011).

humans would leave the rest of us in a precarious position. However, under Gray's conception of moral status, the worry that enhanced human will have a higher moral status than the un-enhanced gets matters backwards. Radically enhanced humans will likely be able to control their mental states more effectively than we can control our own, meaning that they will be less susceptible to (or better able to mitigate) negative experiences like pain, anger, embarrassment, and other forms of suffering. This would render enhanced humans less vulnerable to our actions than normal humans. Because enhanced humans can absorb punishment and discomfort more readily than the non-enhanced, they should (Gray argues) be afforded *less* protection against aversive experiences, not more.

A good demonstration of Gray's thinking is to imagine a pandemic that is spreading through a world populated by both enhanced and non-enhanced humans. In order to eliminate the virus, 50% of individuals must stay at home at all times, except for an hour a day. In such scenarios, application of Grey's argument suggests we should lock down the enhanced humans. This is because the enhanced humans would presumably be less negatively affected by their isolation, given the rich inner life they have accessible to them via their enhancements. In this sense, the enhanced humans actually have a lower moral status than the unenhanced. Vulnerability can imbue creatures with moral status by forcing their interests to get greater consideration.

2 New issues involving embryos and fetuses

Not only are scientific advances giving rise to entirely new kinds of beings, they are also complicating existing areas of debate. Nowhere is this more obvious than in relation to human embryos and fetuses. While the moral status of embryos and fetuses has never been decisively settled, emerging technologies are raising new issues and revealing new tensions in how we regard these early forms of human life.

Consider the advent of "artificial" or "synthetic" embryos. These entities, which are created using stem cells, can closely resemble natural human embryos. In some cases, the resemblance is so close that the artificial embryo could theoretically develop into a normal human being. For many commentators, one key question is whether (or under what conditions) artificial embryos ought to be treated, legally and ethically, as human embryos (see e.g. Rivron et al. 2018). If these models are equivalent to natural human embryos, then—the argument goes—we should subject them to the same regulations that govern human embryo research.

In "Avoiding the potentiality trap," Monika Piotrowska offers a rather different approach to the problem of synthetic embryos. For Piotrowska, it makes no sense to ask whether synthetic embryos classify (and should be treated) as "real" embryos, since we lack a satisfying definition of what an embryo is. Piotrowska focuses specifically on attempts to define embryos in terms of their potential to develop into a human person. The problem Piotrowska sees is, roughly, that technological advances have led to a "'potential' explosion"; it is now possible to manipulate many kinds of biological materials into developing into a human being. Accordingly, Pitrowska recommends that we look not at whether synthetic embryos have the same potential as natural embryos, but whether they exhibit *actual* morally salient properties, not

merely the potential to develop them. We might, for example, tie synthetic embryos' moral status to whether they have developed neural substrates that imply the possibility of pain, or some other feature that is morally relevant in its own right.

Grant Castelyn's contribution considers a different set of scientific advances that are likewise re-opening debates on the moral status of early embryos. Castelyn's focus is on the guideline known as the 14-day rule, according to which embryo research is only permitted during the first two weeks of embryonic development. The 14-day rule, which has its origins in a 1979 US report (Ethics Advisory Board 1979) and a 1984 UK report (Warnock 1984), has long functioned as a politically valuable compromise between pro- and anti-embryo experimentation views—albeit a compromise that arguably lacks a coherent philosophical basis (Chan 2018). For a long time, the 14-day rule was widely accepted, not least because scientists were unable to culture human embryos for longer than about 1 week. In 2016, however, two groups reported sustaining *in vitro* human embryos for 12–13 days, bringing them close to the 14 day limit—and motivating calls to extend this limit to facilitate further research (Hyun et al. 2016). We could theoretically learn more about early human development by extending the 14-day rule to 21 or 28 days, or perhaps even further.

Castelyn suggests a useful approach for assessing possible extensions to the 14-day rule. Castelyn argues that the strongest rationale for restricting embryo research is to avoid embryo or fetal suffering. Since suffering is not possible until after the embryo develops sentience, Castelyn recommends allowing research up to the point that embryos develop “key sentience precursors” (i.e., features of the embryo that are necessary for the sensation and awareness of pain.) These sentience precursors are likely to arise later in development than 14 days. If we extend embryo research to this later threshold (wherever it might fall), then we could theoretically extend the 14 day limit without thereby raising any moral status concerns beyond those implicated in existing embryo research.

Evie Kendal's contribution considers yet another way that scientific advances might require us to re-open debates about the moral status of human embryos and fetuses. Kendal discusses ectogenesis (the gestation of humans inside of “artificial wombs”). Ectogestational technologies have been criticised by some on the basis that they could compromise reproductive rights. If a foetus can be transferred to an artificial womb at any stage of pregnancy, it can be thought of as “viable” from conception. The point of “viability”—where a foetus can survive independently from its mother—has been seen by some as the point at which it acquires an independent moral status (Campbell 2009). Artificial wombs, thus, may increase the relative rights of fetuses compared to mothers. If unwanted pregnancies can be transferred to an artificial womb, women may lose their right to terminate pregnancies (or at least terminate the life of the foetus) as a foetus's interest in continuing to live may override a mother's interest not to be a genetic parent. If this happens, artificial wombs may usher in a world when women are increasingly forced into genetic parenthood.

Kendal's response to this concern demonstrates problems with using viability as a criterion of moral status. Essentially, Kendal characterises the foetus as a collection of cells within the mother which do not possess the characteristics of moral

persons (i.e. they lack desires, interests, conscious awareness, and rationality). These cells are a part of the woman's body, and are completely reliant on it for survival. The fact that a foetus *could* survive outside a body is immaterial, as the same can be said of any of the cells in our body. The fact that our skin cells can survive in a petri dish, for example, does not grant them an independent moral status.

Kendal argues we should embrace thinking of foetuses as a human-derived tissue, and shows how this view addresses concerns regarding artificial wombs and reproductive rights. Our cells, tissues and organs are not persons, and have no right to be transferred to another living medium. However, persons can *choose* to donate their tissues and organs to others, or potentially choose to keep some of their cells indefinitely alive by donating them to research.³ When a foetus is viewed as a human-derived tissue, then decisions about its future are solely the domain of the individual whose body the foetus is a part of. Pregnant women have the same right to donate this tissue, or potentially to grow it in an artificial womb, as individuals currently do to make kidney donations.

Rather than being a threat to abortion rights, Kendal's account shows that ectogenesis may challenge existing views about what embryos and gestation are, in ways that promote women's bodily sovereignty.

3 Neglected moral status issues

The above papers look at new and emerging technologies. Christopher Wareham's contribution looks, instead, toward an existing practice that has been neglected within bioethics and research ethics: the excavation of the remains of hominin species other than *Homo sapiens*. While there has been some bioethics research on non-human animals (like chimpanzees) that might count as "non-human persons" (Andrews et al. 2018), there has been little discussion of the moral status of our closer evolutionary relatives, or of what this status might entail for contemporary research on their remains. Christopher Wareham's paper might be the first in-depth discussion of this particular issue.

Wareham gives as a case study the excavation of the remains of the hominin species *Homo naledi* from a "graveyard" in the Dinaledi caves in South Africa. After citing reasons to think these *Homo naledi* were likely persons in a moral sense (and therefore had full moral status), Wareham argues that we have a pro tanto duty not to violate wishes that they had while alive. This duty entails, inter alia, that we should not disturb their remains without good reason (as it seems these non-human persons had specific desires about their and their families' resting places). Moreover, if we do disturb their remains to carry out valuable research, Wareham argues that we ought to treat these remains with attitudes of respect.

³ Too often in biomedical research, immortal cell lines have been created from individuals who did not consent to, or even know about, their use for this purpose (Beskow 2016).

4 The task ahead

This is a diverse set of articles, both in terms of the entities they discuss (ranging from synthetic embryos to non-human hominins) and the theories of moral status that they draw on. Taken as a whole, what lessons can we draw from this collection?

The first and most straightforward lesson is that new technologies and practices (as well as some familiar ones) can involve entities that do not slot neatly into our existing moral categories. Human-animal chimeras straddle the categories of human and animal. Brain organoids are a form of human biological material, but they also have the prospect of developing a mental life of their own. Synthetic embryos resemble “natural” embryos, but the resemblance can be less than perfect, and their method of creation differs greatly from that of a normal embryo. And while many of us have established views on how we should treat human remains, we still need to ask whether we should afford similar consideration to the remains of non-human hominins. We need to consider our treatment of such beings carefully, given that existing regulations might be inappropriate for their moral status.

The second lesson is, in some ways, the inverse of the first. Scientific advances are not only creating beings that blur or skirt existing categories; they are also calling these traditional categories into question. This is particularly clear in the papers on embryo ethics. The advent of artificial embryos highlights existing tensions in our definitions of embryos more generally, the newfound possibility of culturing embryos beyond 14 days are re-opening questions about when/if human embryos attain moral status, and the development of ectogestational technologies would re-open questions about our moral obligations to fetuses (which could be artificially brought to term after the pregnancy is terminated). The other topics canvassed in this issue likewise provide impetus to revisit and refine existing moral categories. Sentient brain organoids are neither (mere) biological materials nor full human persons; part-human chimeras are neither wholly human nor wholly animal; and both the prospect of radical human enhancement and recognition of the cognitive sophistication of other hominins challenge humans’ claim to a unique or special degree of moral status.

Bioethicists, then, face two challenges when confronting emerging moral status issues. First, we need to work out how to apply existing philosophical thought to novel contexts, especially those at the cutting edge of scientific research. Second, we need to consider how these novel contexts can help us refine existing approaches to thinking about moral status. We hope this Special Issue will further both these goals.

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References

Academy of Medical Sciences. 2011. *Animals containing human material*. London: Academy of Medical Sciences.

- Agar, N. 2014. *Truly human enhancement : A philosophical defense of limits*. Cambridge, MA: MIT Press.
- Andrews, K., Crozier, G., Donaldson, S., Fenton, A., Johnson, L. S. M., Jones, R., . . . Pena-Guzman, D. (2018). *The philosophers' brief on Chimpanzee Personhood*. Retrieved from <https://www.nonhumanrights.org/content/uploads/In-re-Nonhuman-Rights-v.-Lavery-Proposed-Brief-by-PHILOSOPHERS-74435.pdf>
- Beskow, L.M. 2016. Lessons from HeLa cells: The ethics and policy of biospecimens. *Annual Review of Genomics and Human Genetics* 17.
- Campbell, A.V. 2009. Viability and the moral status of the fetus. *Abortion: Medical Progress and Social Implications* 115: 228.
- Chan, S. 2018. How and why to replace the 14-day rule. *Current Stem Cell Reports* 4 (3): 228–234.
- Dahl, R. 1979. *William and Mary Roald Dahl's tales of the unexpected*, 256. London: Joseph.
- DeGrazia, D. 1999. The ethics of animal research: What are the prospects for agreement? *Cambridge Quarterly of Healthcare Ethics* 8 (1): 23–34.
- DeGrazia, D. 2002. *Animal rights : A very short introduction*. Oxford: Oxford University Press.
- Douglas, T. 2013. Human enhancement and supra-personal moral status. *Philosophical Studies* 162 (3): 473–497.
- Ethics Advisory Board. (1979). *Report and conclusions: HEW support of research involving human in vitro fertilization and embryo transfer*. Retrieved from Washington, D.C.:
- Farahany, N. A., Greely, H. T., Hyman, S., Koch, C., Grady, C., Paşca, S. P., . . . Ting, J. (2018). *The ethics of experimenting with human brain tissue*. Nature Publishing Group.
- Farahany, N.A., H.T. Greely, and C.M. Giattino. 2019. Part-revived pig brains raise slew of ethical quandaries. *Nature* 568 (7752): 299–302. <https://doi.org/10.1038/d41586-019-01168-9>.
- Giubilini, A., and F. Minerva. 2012. Defending after-birth abortion. *Monash Bioethics Review* 30 (2): 49–61.
- Hyun, I., A. Wilkerson, and J. Johnston. 2016. Embryology policy: Revisit the 14-day rule. *Nature* 533 (7602): 169–171.
- Kittay, E.F. 2005. At the margins of moral personhood. *Ethics* 116 (1): 100–131.
- Knoppers, B.M., and H.T. Greely. 2019. Biotechnologies nibbling at the legal “human”. *Science* 366 (6472): 1455–1457.
- Koplin, J.J., and J. Savulescu. 2019a. Moral limits of brain organoid research. *The Journal of Law, Medicine & Ethics* 47 (4): 760–767.
- Koplin, J.J., and J. Savulescu. 2019b. Time to rethink the law on part-human chimeras. *Journal of Law and the Biosciences* 6 (1): 37–50.
- Koplin, J.J., and D. Wilkinson. 2019. Moral uncertainty and the farming of human-pig chimeras. *Journal of Medical Ethics* 45 (7): 440–446.
- Lagercrantz, H., and J.-P. Changeux. 2009. The emergence of human consciousness: From fetal to neonatal life. *Pediatric Research* 65 (3): 255–260.
- Lancaster, M.A. 2018. Brain organoids get vascularized. *Nature Biotechnology* 36 (5): 407–408.
- Lauwereyns, J. (2018). *Rethinking the three R's in animal research: Replacement, reduction, refinement*. Springer.
- Levy, N., and J. Savulescu. 2009. Moral significance of phenomenal consciousness. *Progress in Brain Research* 177: 361–370.
- Lovecraft, H. P. (2009). *Whisperer in darkness The call of Cthulhu and other dark tales* (pp. xv, 459). New York: Barnes & Noble.
- Mansour, A.A., J.T. Gonçalves, C.W. Bloyd, H. Li, S. Fernandes, D. Quang, et al. 2018. An in vivo model of functional and vascularized human brain organoids. *Nature Biotechnology* 36 (5): 432–441.
- McMahan, J. 2002. *The ethics of killing : Problems at the margins of life*. New York: Oxford University Press.
- McMahan, J. 2007. Infanticide. *Utilitas* 19 (2): 131–159.
- Rivron, N., M. Pera, J. Rossant, A.M. Arias, M. Zernicka-Goetz, J. Fu, et al. 2018. Debate ethics of embryo models from stem cells. *Nature* 564 (7735): 183–185.
- Robert, J.S., and F. Baylis. 2003. Crossing species boundaries. *American Journal of Bioethics* 3 (3): 1–13.
- Singer, P. (2015). *Animal liberation: The definitive classic of the animal movement*. Open Road Media.
- Streiffer, R. 2005. At the edge of humanity: Human stem cells, chimeras, and moral status. *Kennedy Institute of Ethics Journal* 15 (4): 347–370.
- Streiffer, R. 2007. At the edge of humanity: Human stem cells, chimeras, and moral status. *Journal of Philosophical Research* 32 (Supplement): 63–83.

- Warnock, M. (1984). *Report of the committee of inquiry into human fertilisation and embryology*. Retrieved from London
- Warren, M.A. 1997. *Moral status : Obligations to persons and other living things*. Oxford/New York: Clarendon Press/Oxford University Press.
- Wertheimer, R. 1971. Understanding the abortion argument. *Philosophy & Public Affairs*: 67–95.
- Zarzewczny, A., and T. Caulfield. 2009. Emerging ethical, legal and social issues associated with stem cell research & and the current role of the moral status of the embryo. *Stem Cell Reviews and Reports* 5 (2): 96–101.

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