

# FRA FORSKNINGSFRONTEN

## BIOETHICS AND BIOLOGICAL KNOWLEDGE

### A CONFLICTED RELATIONSHIP

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#### Introduction

Bioethics is a relatively new field of applied ethics, which has prospered since the 1970s. The term has a slightly different denotation in American and European usage. In the US it denotes the area of applied ethics that deals with medicine and the biosciences when these are related to humans. Whereas in Europe it encompasses a broader area including in addition all of the biosciences, animal and environmental ethics.

Bioethical arguments often necessarily include biological empirical premises. In order to reason about gene-editing, ectogenesis (gestation of embryos and fetuses outside the womb), or the moral status of the great apes, you need biological knowledge. You need to know something about human genetics, human reproduction, or the cognitive abilities of the great apes; and you need to be able to use that knowledge in your analysis. In this paper, I provide a critical analysis of how bioethicists appropriate and use biological knowledge in their arguments, with a specific focus on reproductive ethics.

Biological knowledge plays 4 main roles in bioethics, and in the following all of these will be briefly analysed:

1. As 'pure' empirical premises
2. As quasi-empirical premises
  - a. Extrapolation from the lab or animals to humans
  - b. Extrapolation from similar contexts
3. As indicators of future promissories
4. As points of departure for thought experiments

#### The four main roles of biological argument in bioethics

A particular feature of bioethical argument is that it is often cyclical or repetitive, and that each new cycle is most

often precipitated by some new scientific development and not by an underlying change in moral philosophy. Both gene-modification in humans and ectogenesis were, for instance, extensively analysed and discussed in the 1970s (e.g. Ramsey 1970, Fletcher 1971, Karp & Donahue 1976). However, the field seems to forget previous cycles of activity and to recycle arguments without any explicit acknowledgement that they are being recycled. For those in the field who are old enough, the latest spurt of activity around any particular topic often engenders the feeling of watching a philosophical version of *Groundhog Day* and waiting yet again for Punxsutawney Phil to emerge from his burrow (for an example of extensive recycling outside of reproductive ethics see Holm 2017).

The first role of biological knowledge in bioethics is simply as straightforward empirical premises when a particular ethical argument needs an empirical premise of a particular kind. When arguing about the ethics of post-mortem sperm donation as a possible solution to the lack of sperm donors in some countries, you need empirical premises of both a sociological and biological kind. It is, for instance, important to know for how long after a man has died it is possible to successfully extract functional spermatozoa from his testicles (up to 48 hours if you really want to know) (Hodson & Parker 2020). This knowledge is important, because it plays a role in estimating how many of the potential donors who are able to become actual donors, if we implemented a post-mortem donation system. However, even when biological knowledge is used in this pure way, it never speaks entirely for itself (the cases where *res ipsa loquitur*<sup>1</sup> holds are generally rare when we talk about empirical evidence). The interpretation of the evidence will always depend to some extent on the over-

arching framing of the argument. This is, for instance, demonstrated in an interesting way in a recent book by the American historian, philosopher and bioethicist Robert (Bob) Baker (Baker 2019 Chapter 3 and 4). Baker analyses the processes that led to early abortions being labelled as immoral and subsequently criminalized in the USA in the 1860s, and the opposite development happening in the 1960s, eventually leading to the US Supreme Court legalizing abortion in its 1973 *Roe v Wade* decision. He shows convincingly that biological knowledge about the development of the human embryo played a large role in both processes and that the knowledge which was appealed to itself had not changed much. What had changed was how the knowledge was interpreted and what conclusions it could therefore support. In the 1860s, the development of the embryo was seen as ‘proving’ that there was an unbroken chain of continuity from fertilisation to birth and that killing an embryo or foetus at any stage was like killing a baby. 100 years later the same knowledge was interpreted as ‘proving’ that the early embryo and foetus were not yet sufficiently developed to have what mattered for moral status, i.e. brain function and some degree of sentience.

It is not uncommon that the philosopher will find it difficult to find evidence that is directly relevant to the empirical premise she needs to make the argument work. This leads us to the second role that biological knowledge plays. For new reproductive technologies, or reproductive technologies in development or contemplated there may, for instance, only be evidence from animal research. In such cases, philosophers will often use what we could call a quasi-empirical premise, i.e. taking the evidence from the animal study and using it as if it applied directly to humans. This is in itself problematic because of the underlying biological problems of extrapolating biological knowledge from animals to humans. The animals most commonly used in animal research are evolutionarily quite distant from humans. The evolutionary divergence time between humans and rodents is, for instance estimated to be approximately 96 million years (Nei et al 2001). Mice and humans are thus both mammals, but with quite different reproductive cycles. The issue of extrapolation to humans becomes even more complicated if the extrapolation is of evidence generated based on an animal model of a human disease. There are many human disease conditions that animals do not get and where researchers therefore develop methods to create a similar condition in animals. But this raises an interesting philosophical issue; how do we know that the disease model is truly isomorphic to the

human disease? This is a philosophical issue because it raises the question about what we mean when we say that M is a disease model; i.e. what are the criteria that justify the two related claims 1) M is a model of disease D, and 2) we can validly extrapolate from M to D. This also involves the even more fundamental philosophical analysis of what something being a model of something else means. A common way of cashing out criteria for a disease model being adequate is in terms of causal isomorphism. In cases where we have a complete understanding of the causal network underlying a human disease, and where this causal network is not too complex, we may be able to recreate a condition in animals where we are fairly certain that it is isomorphic to the human condition. We can induce the condition through a similar causal chain and later check that it develops along similar lines. But for complex diseases, or diseases for which we do not (yet?) know the causal network, we are often in the position that we cannot be even reasonably sure that our disease model really models the human condition. This is sometimes also relevant in the reproductive sphere. Humans are, for instance, some of the only mammals where females regularly live long after the menopause. As a species we share this characteristic with orcas, but with very few other animals (Croft et al 2017). So, an animal model of post-menopausal pregnancy can obviously be developed, but its validity will raise both empirical and philosophical questions about the validity criteria for disease models.

The third role or function of biological knowledge is as an indicator or a starting point of a future promissory, a vision of a future to come. The mere fact that something has been shown to be possible in the laboratory, or has had some success in animal experiments, can be enough to spark a new round of bioethical argument and publication. The current round of debates about the desirability and ethical and legal implications of ectogenesis (gestation of embryos and foetuses outside the womb) has, for instance, been ignited by new animal research and some very optimistic predictions of future success by the researchers involved (Roberts 2017 & 2019, Cavaliere 2019, Romanis 2019, MacKay 2020). A significant amount of the bioethical analysis is analysis of the implications of ‘complete ectogenesis’, i.e. a technology where an embryo and foetus can be gestated outside of the human body for the whole pregnancy from fertilisation to the ‘delivery’ of a term baby after 40 weeks of gestation. This has always been the ultimate technological promissory of the ectogenesis research programme, but we still do not actually know if it will ever become possible. Furthermore, the current research that

has sparked renewed bioethical interest is not even aimed at complete ectogenesis, but at creating a new treatment option for very preterm infants that cannot survive today even with the best neonatal intensive care treatments (below 22-24 weeks of gestation). Nevertheless, each new cycle of the bioethics debate has discussed this promissory in earnest as if we could be sure that it would happen soon, and each time the debate has abated for a little while when complete ectogenesis failed to materialize. Complete ectogenesis is not logically impossible, so it might one day be developed, but many technologies that are possible in this rather attenuated sense of 'not being impossible' are never developed. They either turn out to be practically impossible, too expensive to develop or use, or the problems they are supposed to solve are solved by another technology. So, there is an interesting question about why bioethicists again and again use time and effort on particular technologies that have previously dashed their dreams. This effort may even end up being almost completely wasted, at least in so far as an analysis of the ethics of introducing a technology that never materializes is of little practical use. It can be of philosophical importance even in such a case, but only if it advances philosophy in some way.

The fourth role of biological knowledge is as inspiration for philosophical thought experiments. Here we are not trying to answer an actual bioethical question, e.g. we are not trying to produce arguments for or against a certain cause of action. What we are doing is to use a piece of biological knowledge as the basis for a thought experiment that illuminates a philosophical question. The literature on thought experiments and their uses and misuses in philosophy is large, and I am not going to engage in detail with it here (but see Sorensen 1992 for a provocative analysis). In reproductive ethics the question of personal identity over time looms large. At what point does it make sense to say that the fertilised egg or embryo is identical to the baby, in the relevant sense? In this debate, the biological peculiarities of many different animals and other organisms and many human disease states have been used in thought experiment-based arguments about identity (see for example Liao 2006). These arguments go something like this:

'You claim I to be necessary in relation to the identity of human beings. But think about animal A (or disease condition C). In that case there is identity even though I is not the case, therefore I is not necessary.'

Or, even more straightforwardly:

'You claim I to be necessary in relation to the identity of human beings. But think if humans were like animal A,

then they would still preserve identity even though I is not the case, therefore I is not necessary.'

But human beings can never actually be like a hydra (not the Greek mythical creature, but the actual animal) or any of the other animals that are referred to in such thought experiments. So, although the argument seems to rely on biological knowledge, it is in reality a pure thought experiment. In this instance, there is no difference between referring to an actually existing species of animal, and referring to some fictional alien from the Star Trek series. The biological knowledge cited is just an embellishment of a 'what if' thought experiment.

### **A 'practical problem' in finding and using biological knowledge**

A final problem in the use of biological knowledge, and research knowledge in bioethics in general, is that philosophers are usually not trained in three important skills that are relevant when you need to substantiate an empirical premise from the scientific literature. Most philosophers are not trained in:

1. Searching the scientific literature systematically,
2. Evaluating the quality of scientific papers, or
3. Reviewing the literature when the evidence is not univocal

Being taught these skills are not part of the standard philosophy curriculum. However, lacking these skills may lead to inadvertent or deliberate cherry picking of evidence. The story goes something like this: To make my argument sound I need an empirical premise stating that X is the case. I enter my search words into Google Scholar (other good search engines are available). And, Hey Presto, I find a scientific paper which clearly substantiates my point that X and which I can reference in my article. I therefore feel justified in writing 'recent research show that X' with a reference to the article I have found.

The problem here is that finding one scientific paper that states something to be the case is not good evidence. There may be 100 papers that my (inadequate) search strategy has not found with the opposite conclusion, or the paper might be methodologically weak and not reliable. I don't have a good example to hand from the core area of reproductive ethics, but the point has been substantiated in other areas of bioethics. Hofmann and Magelssen have, for instance, analysed the use of empirical claims in an article about the ethics of prostitution published in the *Journal of Medical Ethics* (Hofmann & Magelssen 2018).

Another common approach is to simply circumvent the problem about a lack of evidence by making highly idealised assumptions, and basing the argument on those. In analyses of the ethics of human reproductive cloning, gene-editing or other reproductive technologies, it is not uncommon to find sentences like:

We assume that a safe and effective procedure will be developed that enables a man or a woman to produce a perfect genetic copy of himself or herself... (Posner & Posner 1998, 580)

In this way the author 'solves' a number of potential problems. First, knowledge about the scientific literature and the actual effectiveness of the technology is no longer needed; and secondly, the argument can proceed while ignoring the messy biological reality that very few bodily technologies are perfect or without side-effects. The argument that is therefore produced may be valid, but it is very unlikely to be sound since the idealized biological premise is highly likely to be false (see Holm 2019).

### Conclusion

This paper has outlined and discussed the use of biological knowledge as premises in bioethical arguments. It has outlined four main roles that biological knowledge-premises play and pointed out that none of these roles are completely philosophically innocent and unproblematic. Claims about biology in bioethics are rarely purely factual claims. They almost always require interpretation. And they very often have both an argumentative and a rhetorical function, i.e. they have been chosen among the many possible biological premises in order to make a particular point or lend a particular argumentative force to the argument. They therefore need to be treated with care and circumspection and not uncritically accepted.

### LITERATURE

- Baker, Robert. 2019. *The Structure of Moral Revolutions: Studies of Changes in the Morality of Abortion, Death, and the Bioethics Revolution*. Cambridge MA: MIT Press.
- BBC. 2019. "The world's first artificial womb for humans." October 16<sup>th</sup> 2019. <https://www.bbc.com/news/health-50056405/the-world-s-first-artificial-womb-for-humans> last accessed 23.01.2020.
- Cavaliere, Giulia. 2019. "Gestation, equality and freedom: ectogenesis as a political perspective." *Journal of medical ethics*. doi:10.1136/medethics-2019-10569.
- Croft, Darren P., Rufus A. Johnstone, Samuel Ellis, Stuart Nattrass, Daniel W. Franks, Lauren JN Brent, Sonia Mazzi, Kenneth C. Balcomb, John KB Ford, and Michael A. Cant. 2017. "Reproductive conflict and the evolution of menopause in killer whales." *Current Biology* 27 (2): 298-304.
- Fletcher, Joseph. "Ethical aspects of genetic controls: Designed genetic changes in man." *New England Journal of Medicine* 285 (14): 776-783.
- Hodson, Nathan, and Joshua Parker. 2020. "The ethical case for non-directed postmortem sperm donation." *Journal of Medical Ethics*. <http://dx.doi.org/10.1136/medethics-2019-105637>
- Hofmann, Bjørn, and Morten Magelssen. 2018. "In pursuit of goodness in bioethics: analysis of an exemplary article." *BMC medical ethics* 19 (1): 60.
- Holm, Søren. 2017. "The Bioethicist Who Cried 'Synthetic Biology': An Analysis of the Function of Bioterrorism Predictions in Bioethics." *Cambridge Quarterly of Healthcare Ethics* 26 (2): 230-238.
- Holm, Søren. 2019. "Let Us Assume That Gene Editing is Safe—The Role of Safety Arguments in the Gene Editing Debate." *Cambridge Quarterly of Healthcare Ethics* 28 (1): 100-111.
- Karp, Laurence E., and Roger P. Donahue. 1976. "Preimplantational Ectogenesis: Science and Speculation Concerning In Vitro Fertilization and Related Procedures." *Western Journal of Medicine* 124 (4): 282-298.
- Liao, S. Matthew. 2006. "The organism view defended." *The Monist* 89 (3): 334-350.
- MacKay, Kathryn. 2020. "The 'tyranny of reproduction': Could ectogenesis further women's liberation?." *Bioethics*. <https://doi.org/10.1111/bioe.12706>.
- Nei, Masatoshi, Ping Xu, and Galina Glazko. 2001. "Estimation of divergence times from multiprotein sequences for a few mammalian species and several distantly related organisms." *Proceedings of the National Academy of Sciences* 98 (5): 2497-2502.
- Posner, Eric A., and Richard A. Posner. 1998. "The demand for human cloning." *Hofstra Law Review* 27 (3): 579-608.
- Ramsey, Paul. 1970 *Fabricated man: the ethics of genetic control*. New Haven: Yale University Press.
- Roberts, Michelle. 2017. "Premature lambs kept alive in 'plastic bag' womb." *BBC*, April 25<sup>th</sup>, 2017. <https://www.bbc.com/news/health-39693851>. Last accessed 23.01.2020
- Romanis, Elizabeth Chloe. 2019. "Artificial Womb Technology and the Choice to Gestate Ex Utero: is Partial Ectogenesis the Business of the Criminal Law?." *Medical Law Review*. <https://doi.org/10.1093/medlaw/fwz037>.
- Sorensen, Roy A. 1992. *Thought experiments*. Oxford: Oxford University Press.

### NOTES

- <sup>1</sup> Latin for 'the thing speaks for itself'.