

Xenotransplantation, Human Reproductive Cloning, and Embryonic Stem Cell Research: Risk, Government Policy, and Conceptions of the Sacred

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ABSTRACT

The article provides background to and analysis of ethical objections, and policy responses to xenotransplantation, human reproductive cloning, and embryonic stem cell research. Consistency in moral reasoning is stressed as a prerequisite of sound government policy. Risk assessment of xenotransplantation is found wanting. The Asilomar Conference on rDNA research is an instructive comparison. A moratorium on human reproductive cloning is justified by predictable physical damage to cloned children, but is not wrong in principle. Policy governing research involving embryos requires consideration of the bounds of state intervention regarding matters of the sacred.

Keywords: biosciences, law-making, moral reasoning

INTRODUCTION

The aim of this article is to review, and evaluate ethical debates surrounding xenotransplantation, human reproductive cloning, and embryonic stem (ES) cell research. Although the author's position on all three will quickly become apparent, there is no intention *to convert* the readership — philosophy, after all, is a rather different business (and has rather different goals) to religion. The philosophers' credo, at the baseline, consists in the belief that reasoned debate is an essential ingredient of the search for true (or approximations of true) answers to the question: what is the right thing to do?

XENOTRANSPLANTATION

Xenotransplantation or xenografting refers to transplantation between different species. Xenotransplantation is a moral issue in the sense that the health and welfare of fellow beings is of concern to us all. The result of a critical shortage of human organs to meet transplantation needs is distress and death.¹ One strong candidate for animal to human transplants is the pig. Early optimism about sourcing

organs from the pig to address organ shortfalls was tempered by findings which suggested that the use of this animal's tissue may pose a health risk to public safety. Pigs, along with other animal species including humans, carry retroviral sequences in their genome. There is evidence from laboratory studies that these sequences in pig cells can give rise to infectious retroviruses (porcine endogenous retroviruses — PERVs) capable of infecting human cells. These self-replicating sequences of DNA are innocuous in the pig but may, when transplanted into an immunosuppressed recipient, be transferred to neighbouring human cells.^{2,3}

Based on precedents involving transmission of benign viruses from monkey to man, there is a possibility that such viruses may prove virulent to the human cells, with devastating consequences both to the patient and the surrounding human population. Experience with the severe acute respiratory syndrome (SARS) and bird flu in the region reminds us of what can happen when a virus jumps the species barrier. These particular animal-human transmissions have, in recent times, been containable. However, in 1918, the Spanish flu, which

scientific findings indicate originated from the chicken, killed over 20 million people globally.⁴ How might we evaluate whether possible viral infections associated with xenotransplantation constitute a risk worth taking?

The first port of call is the bench. How much reliable data are available to support the PERV-risk thesis? Most people working in the area agree that further investigation is required before any authoritative science-based risk assessment can be devised.⁵ In the absence of such an assessment, the precautionary principle is followed — when we do not even know what we know not, we tread with care. Endorsement of the precautionary principle by notable bodies, such as the Nuffield Council on Bioethics, was undoubtedly the correct ethical response.⁶ That said, the way in which ethical debates over xenotransplantation were carried out — importantly, what was not emphasised — had unfortunate consequences.

First, despite appearances to the contrary, the funding of xenotransplantation research is in fact a genuine moral issue. The ultimate target is the relief of human suffering. It is therefore appropriate to respond to the *risk of a risk*, by recommending generous financing of careful research. An emphasis on this point was conspicuously absent from the various ethical mission statements released when discussions about xenotransplantation figured prominently. Funding for further clarificatory studies of the original findings about PERVs, and for related research efforts, should have been pressed for. One promising line of research, for example, involves the removal of PERVs from donor pigs. If PERVs do reside in *well-defined* sets of gene sequences, this may be possible through a combination of genetic manipulation and selective breeding or through cloning. Since PERVs are the basis of the perceived risk posed by xenotransplantation, circumventing the problem is attractive. However, the fruits of such research are farther off than they might otherwise be. Funding was not deemed an ethical issue when it in fact was, and the scientists were left to fight the battle for research monies on their own.

Those who pushed the precautionary principle to the fore in discussions of the ethics of xenotransplantation also paid scant attention to a second important issue: how much risk society *should* be prepared to tolerate in the service of individuals who would die without a transplant. Perhaps the thought was that until the scientists come up with an answer to how safe xenotransplantation is, there is little point to mulling over this ethical dimension. Such a passive mentality is misguided. Ethicists have an important part to play in reminding individuals of the duty we all have to

make morally responsible judgments about risk when the good of others is at stake. Typically, scientists hope to devise objective accounts of perceived risk, both to safeguard research interests, and to serve the greater good. It is not, however, their role to decide on the extent of risk that a society should embrace. This decision falls to the millions of citizens who are, on a daily basis, risk managers. Of course many formal structures, including scientific bodies, may and do influence citizens' risk perceptions. The challenge is that the style of risk management displayed by individuals is subjective in the extreme, short-sighted and inconsistent, not to mention sometimes irrational.⁷ It is also, importantly, often focused on selfish preferences and motivations. Whereas scientists approaching the PERV-risk problem inquire into probabilities and magnitude of detriment with a view of the common good in mind, individuals' focus tends to be on whether *they themselves can derive benefit*.

In numerous cases, if there is a private benefit to be gained, people are prepared to overlook possible detriment. For example, we are not so exercised by the prospect of human deaths from animal-human virus transmissions that we will accept no risk of them. Yet, no one would welcome a government policy that mandated we all become vegetarians. But why not? No chickens, no Spanish-like flu. No civet cat, no SARS. No cows, no human-variant Creutzfeldt-Jakob disease. In spite of the fact that close proximity of these animals to humans poses some threat to health, few, if any, would take seriously a government which attempted to introduce this kind of policy. We are prepared to take risks to health posed by animals if benefit is involved, in this case, palate satisfaction. Should we not also be prepared to take at least similar or even greater risks with human health when innovations targeted at promoting health and well-being are at stake?

Although many people are aware of the pain and suffering associated with organ failure, if they themselves are not ill, they are far less inclined to think of any therapeutically-targeted scientific research in terms of the promised *benefits*. Moreover, whenever members of society derive no direct or significant benefit, they are more apt to focus on the negative aspects of the technology in their personal risk assessments of it. This is something that can be clearly observed in the debate over genetically modified crops.⁸ To meet responsibly the moral demand of providing additional means of assistance to patients suffering organ failure, efforts to shape citizens' attitudes towards certain risks are essential. More analysis of this topic is required than we can do justice

to here. But until the science fraternity delivers its own verdict on the risks associated with xenotransplantation, ethical discussion should concentrate on referencing risks to health that we have already tolerated for the common good. By unearthing structurally similar risks which have been accepted by society, and pressing analogies between these and the kind of risks talked about in relation to xenotransplantation, we might encourage the personal risk assessments of individuals to consider properly the interests of others. Recombinant DNA (rDNA) research is instructive to the proposed endeavour.

rDNA research stands as a precedent for risk-taking by society. In the early 1970s, a moratorium was imposed on gene therapy research involving the introduction of human rDNA into bacteria. The chief concerns at the time were health risks to researchers, the public at large, and to the environment.⁹ The main preoccupation was the possibility of normally innocuous microbes being transformed into human pathogens that would be resistant to antibiotics, produce dangerous toxins, and/or cause cancer.

In 1975, a group of notable scientists, including Sydney Brenner, convened a conference at Asilomar, California, to determine a process by which perceived but intangible risks posed by rDNA research could, in the face of divergent views, be evaluated and dealt with in a way that would enable rDNA research to proceed.¹⁰ The conference was deemed a success both at the time, and retrospectively. In the latter regard, it has now been demonstrated that rDNA research presents no unmanageable threat; recombinant microbial strains continue to be handled without mishap. Furthermore, there have been tremendous gains from this research. The case of rDNA research makes crystal clear that society has been prepared to accept risks posed by research on a par with those associated with xenotransplantation, even when no immediate benefits to them, indeed, only risks were perceived. This merits stress in ethical reflections on xenotransplantation.

Organised methods of assessment and decision-making regarding infectious risks to the public are crucial. The Asilomar conference stands as a model of such an organised method. Discussion steered clear at Asilomar of ethical issues, but the very facts that the scientists involved were quick to react to the possible risks of rDNA research and had self-imposed limits on research; that the process of decision-making was relatively transparent to the public and most importantly, that consensus was reached on how to proceed with research safely, made a great deal of

difference to how the risks of rDNA research were perceived by wider society.¹¹

Can any lessons from Asilomar be drawn to help resolve debates over risk in other controversial areas of research, such as human cloning or ES cell research? Nobel Prize winner Paul Berg, has registered doubts on the feasibility of this, in large part because compromise on issues that involve deep-seated ethical convictions concerning the sanctity of life, might only be possible in the form of a *political* compromise.¹¹

HUMAN REPRODUCTIVE CLONING

The technique of nuclear transfer (cloning) was first demonstrated in adult animals in 1997, with the birth of Dolly the sheep. The possibility of employing the same technique for human reproductive cloning has engendered much debate, and prompted a good deal of hastily drafted legislation. The latter appears to be an attempt to calm the public, doubtlessly hastened because most people are against it.

Why should an individual want to employ cloning as a method of procreation? Medically-related reasons include the avoidance of transmitting genetic-based disease, and overcoming infertility. Quasi-medical reasons include enabling same-sex couples, or people past child-bearing years to have closely genetically-related offspring. Finally, there are people who would seek access to cloning because they want for their child a specific genotype. For example, some parents who have tragically lost a small child or others dear to them, have expressed interest in using cloning as a means to resurrect their loved ones. Also, there may be others who would seek to clone themselves multiple times for spurious reasons.

It is a fact that cloning would only be of *marginal* medical benefit. Its use for what is labelled quasi-medical purposes might, of course, be more popular, given both the incidence of infertility and the increasing number of older parents and of homosexuals who wish to have closely genetically-related children. It is also a fact that genotype does not equal phenotype, and so it would be utterly fruitless to employ cloning to “bring someone back to life”. That the personalities of identical twins are different helps us to appreciate this last truth. There is no weighty reason, however, to deny individuals access to human reproductive cloning in virtue of any of the other aforementioned motivations (excepting the desire for resurrection, which would not meet the desired aim).

Objections to human cloning which reference societal issues are in vogue. Prominent among these is concern about the integrity of social relationships. It has been claimed that were cloning allowed, family relationships would break down because we would not longer be mentally capable of separating a clone from the individual s/he was a copy of. Is the possibility of such situations occurring a strong enough reason to ban cloning? If we are confident that the problem is real, it could be circumvented simply by disallowing people to choose the genetic donors of their offspring. Anyone who wishes to clone for medical or quasi-medical reasons should have little objection to this kind of regulation.

Lawyers, in particular, have highlighted the danger that cloning would pose to criminal investigations that employ DNA analysis. However, it can be replied that this objection is not weighty. Mitochondrial DNA might also be used in such tests: so long as the egg donor of the clone differs from non-clone to clone, or from clone to clone, then no identification problem should arise. It can be further noted that the fingerprints of clones would be different, just as those of identical twins are, hence it could be made a requirement that all clones were fingerprinted as a safeguard. Another law-based objection to cloning is the possibility of DNA theft for the purpose of making copies of beautiful or athletic individuals. Would not everyone be trailing distinguished individuals in the hopes of obtaining a sample of their DNA? This concern could also be checked by regulation. For example, the consent of the genetic donor could be demanded as a precondition of any clinical cloning procedure. In short, these kinds of objections to cloning lack both substance, and the requisite force required to institute a ban.

The most cogent objection to human cloning centres on concern for the welfare of the cloned child: physical, psychological and social.¹² Cloning attempts in animal models have low efficiency rates. In certain of these animal models, gross late-term foetal abnormalities have been observed, some of which appear to be uniquely generated by cloning manipulations.¹³ It is therefore morally defensible to disallow cloning in humans for the foreseeable future on the grounds of safety alone. We should, however, note that concern for the physical integrity of children conceived through natural methods is not deemed enough of a reason for government to interfere with natural procreation. Perhaps it should, be if we really are against attempts to conceive whenever it can be reasonably predicted that the resulting offspring will be afflicted by profound genetically-based or other

physical defects.¹⁴ This is something that we should think about more than we do. In pursuit of what is fundamentally the selfish preference to have a child, is it really morally permissible to impose a life that is not worth living on a newborn?

Another feature of the cloning debate that invites more thought is the issue of embryo wastage. Is the likely incidence of embryo wastage in cloning a strong reason to ban the technology? Embryo loss also occurs in natural procreation, and to a considerable degree. Statistically, for every one successful pregnancy out of four, three human conceptuses perish.^{15,16} We do not usually dwell on this fact. Presumably, the reason we do not can be explained by one or more of the following: embryo loss in the course of natural procreation is unintentional, it is Nature's/God's way of eliminating defects (otherwise put: "it is natural"), and relatedly, perpetuation of the human species necessarily involves these losses. However, at the very least, the people who oppose cloning on the grounds of embryo wastage ought to express *regret* about the prospect of very early life perishing in the context of natural procreation. Anyone who condemns artificial procreative methods because embryos die in the process cannot, without hypocrisy, abnegate moral responsibility for what happens in the course of natural procreation, simply because "it is natural". It is misguided to base one's moral code on what is natural: many things are natural which are quite unpleasant.

Another frequently voiced objection to human reproductive cloning centres on its possible psychosocial impact. Much has been made of the impact that awareness of his/her origins might have on a clone's mental well-being. Plenty of individuals' origins reside in "unusual" circumstances. Yet, concern for the psychological welfare of these children rarely, if ever, moves the State to intervene in procreation. The same can be said for social discrimination against cloned children. Clones might very well bear the brunt of merciless teasing and ostracism, but so do the children of mixed-raced unions, and the incidence of this last prejudice is not thought to be strong enough to ban such unions. To say that you cannot have a child by a certain means, or who looks a certain way because there are intolerant individuals in society, is to hand a victory to unthinking prejudice. In short, neither of these welfare-based objections (psychosocial) to cloning plausibly support State intervention.

Concern for the welfare of the cloned child only supports a moratorium on human reproductive cloning for as long as serious physical harm is a real possibility. That is to say, the risk of physical harm is not an *in*

principle objection to cloning. If research ever progresses to the point where we are confident that we can mimic in cloning the one in four success we have with natural procreation, the physical safety objection loses its punch.¹⁷

The preceding examination of the reproductive cloning debate has unearthed many shoddy arguments. There remains an important outstanding objection to cloning which commands our attention. This objection emanates from deep moral convictions about what gives meaning and value to life. In his elegantly titled essay *The Wisdom of Repugnance*, Leon Kass argues that the prospect of human reproductive cloning is morally repugnant to many of us because it offends a shared conception of the importance of the “natural” to human experience.¹⁸ Kass describes this conception with passion, and in flowery detail. What, however, his account misses out is that majority views about what in, and about life, should count as sacred are not appropriately legislated in liberal democracies. If the State has no compelling reason to impose a ban on cloning (which, as has been argued, for time being it does have), then it has no business enforcing majority views about, to use Kass’s words: “ontological meanings of bringing forth new life”, “the profundity of sex,” or the “soul elevating power of sexuality” rooted “in its strange connection to mortality”. Members of the conservative right, of course, would like to see political action, ultimately legislation, not only to promote their own particular conception of what in life has meaning and importance, but to *impose* that conception on others. This aspect of the cloning debate is also the key feature of the debate over human ES cell research.

HUMAN ES CELL RESEARCH

Human ES cell research involves the destruction of five-day old blastocysts. These are sourced in two ways: from fertility clinics — embryos supernumerary to the treatment of infertility — and by creating them specifically for research purposes. Stress has been placed on the merits of using embryos in research which would otherwise remain in deep freeze and ultimately perish, in preference to embryos deliberately created for research. People who oppose the destruction of any and all human life are not persuaded that the source makes a moral difference. Nor should they, given that they believe that as soon as human life begins, it should be afforded the same protection of security of the person that adult individuals enjoy. For others who are wedded to the view that human life assumes value incrementally, hence early life has little value or is at least less valuable than adult lives, the

source of the embryos does not matter much either. The fact is people are simply either in favour of the use of early life in research or they are opposed to it.

It is not possible to resolve entrenched disagreement over the moral status of early life through argument: nothing that people who support ES cell research say will persuade those who believe all lives have equal value of the rightness of the opposing view. Opponents of embryo research are not moved by the argument that in the absence of sentience, blastocysts and young foetuses have no interests. It is held by objectors to stem cell research that destroying embryos for the purposes of stem cell harvesting, and cultivation destroys a potential person. One reply is that if the embryo is created specifically for the purpose of research, then it is not correct to deem it a potential person. For blastocysts to become persons, the necessary conditions of environment and nurture must be satisfied. If these are neither provided, nor ever intended, then in what sense is the entity a potential person?

This begs the question of whether we should be allowed to deny environment and nurture to early life. Advocates of ES cell research argue that we can do this if we have good reason. What might count as a good reason? Saving human lives seems a robust one. May we sacrifice very early human life to aid actual persons? Consider the following thought experiment: there are two islands, a terrible typhoon is about to strike, and there is only one rescue boat. On one of the islands, there are 100 blastocysts in a freezer: on the second island, there are 100 adults. Which island population should we direct the captain to rescue? I think that the answer is clear: the boat should be deployed to rescue the adults. That the vast majority of us, probably almost all, would answer in this way suggests that even those who say that blastocysts have as much value as fully formed individuals who possess sentience, etc., do not really believe in what they say. Even so, conceptualising ES cell research as a kind of rescue of very sick adults stretches the previous conclusion. The fact is that the dispute over stem cell research permits very limited constructive exchange of views. This is because disagreements about when life assumes value have, what Ronald Dworkin has called, an “essentially religious” character.

What Dworkin means by the phrase is that beliefs about whether the lives of embryos matter morally, are akin to beliefs about what the true religious path is. Both are deep-seated moral convictions about *the sacred*. What is the appropriate response by government when it is confronted by this type of disagreement? Well,

think of religious worship. Would it be proper for government to dictate that citizens worship only one God, and embrace only one religion? In most parts of the modern world, the answer is no. It is a hallmark of modern society that freedom of religion is protected, that the State never seeks to enforce a faith or a style of religious worship. What we hold to be sacred is deeply personal, it is not a matter for the State or other individuals to decide on for us. Religious tolerance is possible because we recognise this. People go awry when they fail to make the connection between, for example, religious belief and other views that similarly concern life's sanctity, such as whether early life has moral value.

Once the dispute over ES cell research is recast in the way suggested, we need no longer argue about potentiality, or the point at which life begins, or whether, indeed, we are God's or the Blind Watchmaker's children. Government policy must be publicly justifiable. The right policy answer to the permissibility of embryo research is not that it is definitively right or wrong. Rather, the right answer is that given *reasonable* disagreement over the permissibility of embryo research, government has a duty not to legislate the rightness of one or the other understanding of the sacred. Instead, it is the duty of government to create conditions under which very different views of the sanctity of life may be acted on, with the caveat that that these views must be reasonable (no one reasonably could maintain that the killing of small children, for example, was ever justifiable in the cause of science). Far from being a wild conclusion, this position is foundational to good policy-making in any multi-cultural or in any free society where people's conceptions of the sacred differ.

CONCLUSION

The preceding discussion has covered rocky territory. The principal aims, however, of reviewing and evaluating the key ethical issues at stake, have been met. I conclude by urging the reader to consider that the risks associated with xenotransplantation may not be quite as intractable an issue as we have been invited to believe. Second, I hope to have made clear that many of the arguments against human cloning are effete. The most compelling is the reasonable prediction that a cloned child would suffer serious physical and/or mental harm. This supports a moratorium on cloning, but it does not stand as an *in principle* objection to the practice.

We are still some way off from governmental recognition of the fact that the only *in principle*

objection to cloning is that it offends some notions of the sacred. This very same objection lies at the heart of the debate over ES cell research. Differing views about the moral status of the embryo has led to an impasse in debate, which can only be resolved politically by insisting that we do not, as a matter of moral principle, accept that it is permissible for government to legislate views of the sacred. We all have a strong moral interest in ensuring that government does not take sides in debates over what the true religious path might be. The same principled rationale applies in relation to governmental promotion of all conceptions of the sacredness of life, including attitudes to early human life. Singapore's style of governance is an exemplar when it comes to accommodating the perspectives of different religious and ethnic groups. Great Britain is also noteworthy in this respect. It is no accident that these nations have the policies they do on ES cell research.

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