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## Dead Human Bodies and Embryos: Commonalities and Disparities in Ethical Debate

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### Introduction

In the context of this book, a chapter devoted to anatomy may appear anomalous, since the picture generally conveyed by anatomy is one of ‘deadness’. This is the picture conveyed by the traditional dissecting room, where deadness reigns supreme. A decidedly different picture is presented by reproductive technologies, centring on manipulation of the embryo. These technologies have spawned a plethora of ethical debates, with the biological and moral status of the embryo emerging as pivotal. These two areas are all too readily regarded as separate, when in practice the embryo is as much an object of interest for anatomists as the dead adult body. The aim of this chapter is to demonstrate that these two pictures need to be nuanced in order to understand how the anatomical sciences can contribute to a better appreciation of issues

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R.M. Shaw (ed.), *Bioethics Beyond Altruism*,

DOI 10.1007/978-3-319-55532-4\_2

around the donation of embryonic, foetal and adult human organs and tissues. The converse may also apply.

In exploring these dimensions, a number of debates spanning adult and embryonic themes will be assessed. The former touches on issues around the use of bequeathed (as opposed to unclaimed) human bodies for dissection, and those raised by the technique of the plastination of dissected human bodies, particularly when whole body plastinates are displayed in public. The embryonic themes concern the use of embryos for therapeutic and research purposes, including in vitro fertilization (IVF), while themes presented by embryos at a later stage of development touch on the use of foetal tissue in research and therapy. Although these matters are usually discussed in isolation of one another, they all concern human tissue, suggesting that they should share common thematic threads.

My aim is to explore the degree to which it is possible to bring these two areas together by assessing their commonalities and disparities. I shall propose one means of doing so, and that is by employing the concept of 'proto-cadaver', which aims to examine how elements of our approach to cadavers may be solicited to understand the living and yet not fully formed embryo/foetus.

## **Use of Bequeathed as Opposed to Unclaimed Bodies**

The world of twenty-first-century anatomy is far removed from that of the late eighteenth and early nineteenth centuries, and yet there is much to be learned from the activities of those early periods—including their range of questionable practices. From today's perspective, the ethical base from which modern anatomy has arisen was fragile. Bodies were required for teaching medical students the elements of anatomical structure, and this was a major problem. Where were they to come from? Questionable practices included use of the bodies of criminals, the poor, the marginalized and the outcasts of society. In short, the bodies were frequently those of the weak and defenceless.

From these dubious beginnings, the subsequent history of early anatomy was fraught with suspect practices, including a dependence upon illegal grave robbing. Once legislation intervened in the early part of the nineteenth century, the preeminent solution was the use of unclaimed bodies (Richardson 2001; MacDonald 2010). However, even this was ethically dubious, although it was the dominant source of bodies for many years and remains so in many societies (Jones and Whitaker 2012). The fact that this was regarded as the one institutionally recognized and legitimate source of bodies for dissection for many years speaks volumes about the lack of ethical enquiry on the part of anatomists and allied health professionals. While this is of little more than historic interest in many societies, it remains of pressing ethical concern in those societies still dependent upon the use of unclaimed bodies. It is also of concern for the wider anatomical community (Gunderman 2008; McHanwell et al. 2008; IFAA 2012; Riederer et al. 2012).

Unclaimed bodies are very often considered of little value to anyone other than anatomists, even though there may be estranged family who would have been interested had they been made aware of the death. Those whose bodies are made available in this manner have been stigmatized, whether they are poor, marginalized or disadvantaged on racial or cultural grounds. On occasion, this practice has provided justification for removing bodies from graves without permission, and in more extreme cases, murder (Dasgupta 2004). Frequently, the use of unclaimed bodies was justified financially, in that it saved state resources that would otherwise have been expended on proper burial. Elements of this historic situation still occur today in a number of countries, including South Africa, other African countries including Nigeria, Bangladesh, Brazil and India (for details, see Jones and Whitaker 2012).

It has been argued that anatomists should not continue to use unclaimed bodies (Jones and Whitaker 2012). Idealistic as this may seem to those in some societies, it protects the anatomy profession from unethical practices that have proved rampant in some countries and at various historical periods. It also flies in the face of ethical expectations across the health sciences and in clinical practice. As such, the use of bodies and body parts that have not been specifically donated for dissection sends a message to others that informed consent is of little significance at death. (Riederer 2016)

Arguments against the use of unclaimed bodies are important. Yet, by themselves, they fail to indicate with any precision the ethical values enshrined in the use of bequeathed bodies. One means of doing this is to point to the moral values governing organ donation (Vawter et al. 1990). These include autonomy, the interests of family members, altruism and their redemptive aspect. Of these, altruism is the value on which the greatest attention is routinely placed, the thrust of which is that it is preferable to give than receive, since the good of others is better than self-interest (May 1985). Central to this value is the notion of gift, whereby an organ or body is given to others for their benefit—whether health-related or educational.

These values were debated at length around the year 2000 in the UK when a number of scandals, arising mainly in pathological services, led to the establishment of formal committees of enquiry. These scandals were precipitated by a serious lack of ethical awareness as to why the human body and human tissue should be treated with dignity and respect (Jones and Whitaker 2009). Among the guidelines formulated at the time are the importance of treating the person who has died and their families with respect, the central value of informed consent and the significance of a gift relationship, in which the balance moves from ‘taking’ and ‘retaining’ of organs to ‘donation’ (Department of Health 2001; Retained Organs Commission 2002).

In various ways, these guidelines place the onus upon the interests of the deceased and their grieving families, rather than upon those wishing to make use of the tissue after death. This serves as a compelling rationale for the ethical superiority of bequeathed bodies in anatomy (Jones 1994a). Use of bequests acknowledges the dual importance of teaching and research alongside the place of informed consent and related ethical considerations (Jones 2002).

The end result of the establishment of a bequest ethos is a change in ethical trajectory, affecting all uses of human tissue. This needs to be borne in mind when attention is directed towards embryos and foetuses. However, there is an additional area to be considered in relation to adult bodies, and this is the dissection and subsequent plastination of human bodies and body parts.

## Whole Body Plastination and the Status of Plastinates

Encountered in a dissecting room or sterile laboratory environment, the lifelessness of the dead human body may appear forbidding. However, it can be made more welcoming by giving it an attractive façade. For example, what if it were to be displayed vertically as if it were still alive and functioning? What if it were to give the impression that it is playing a sport? These are the intentions of the major exhibitions of plastinated and dissected dead bodies open to the general public (von Hagens and Whalley 2000; King et al. 2014). The end result is a stunningly impressive display of life-like human remains. In this discussion, my emphasis is on the work of Gunther von Hagens and the *Body Worlds* public exhibitions, in which the bodies have been donated for public display (Institute for Plastination 2008).

In essence, plastination is a technique that replaces tissue fluids with plastics (Von Hagens 1979). By itself, this raises few queries or concerns; it is a teaching tool that can also be adapted to research ends (Riederer 2014). If that was the extent of its use, there would have been no wide-scale ethical or social debate. But by displaying whole bodies in a variety of poses, dissected to display bodily systems, organs and muscles in an attempt to replicate sporting and related activities, the essence of anatomical education has been transmuted. Does this have implications for an understanding of our treatment of the dead human body?

Whole body plastinates are ambiguous because they cannot readily be slotted into familiar human categories. They are neither human body nor human person, fitting uneasily between the two (as discussed in other contexts by Hoeyer 2013; Taussig et al. 2013). They look like us, but they also differ from us. Most disquieting is uncertainty over whether they are dead, since their apparent lifelikeness and ‘activity’ are characteristics of the living (Skulstad 2006). Lizama (2009: 21) thinks they project a ‘melancholic sadness over the loss of both life and death’. Contributing to this ambiguity is the physical indestructibility of plastinated remains, including plastinates. It is this that has led to claims that they have attained a form of post-mortem physical existence

(von Hagens 2001: 259; Von Hagens and Whalley 2000: 36); they are even thought of as ‘post-mortal’ (PRNewswire 2006). This takes discussions about their significance beyond the physical and into philosophical and theological realms. A number of writers have suggested that plastination is being used as a means of replacing religious notions of resurrection with a new kind of ‘fleshliness’ (Preuss 2008: 28; Linke 2005; Moore and Brown 2004; Fischer 2000). Regardless of the terms employed, ‘post-biological existence’ amounts to nothing more than ‘a synthetic afterlife, unable to ever attain organic death or incorporeal resurrection’ (Lizama 2009: 26); they are as static as any other dead bodies.

Do plastinates accurately represent the individuals who once lived? The answer is ‘yes’ and ‘no’. They do in the sense that it was real individuals who were dissected. However, the technicians who undertook the plastination modified them in order to make the plastinates appear life-like, and it is these interventions that distance the bodies from their natural state (Jones 2016).

The fundamental changes to the composition of the bodies ensure their presentability, structural integrity and longevity and are of major significance for anatomists studying these human remains. But they detract from their alleged ‘realness’, even though substantial elements of the individuality of the individual continue to be present. Some commentators argue that the intrusion of the artificial makes them ‘hyper-real’ (Stern 2006; Desmond 2010), and little more than representations of real bodies (van Dijk 2001).

This discussion of plastination has presumed that the bodies have been donated following fully informed consent (this is true of *Body Worlds* but of none of the other exhibitions). However, to what extent has the donation been altruistic in the sense that the bodies have been donated with the intention of benefitting others? In the case of *Body Worlds* exhibitions, the major beneficiary is the Institute for Plastination, a commercial venture aimed at taking anatomy to the general public. In this sense, there are those who benefit—the organization itself and the paying public, and this benefit has an educational rationale. The ethical challenge is to balance the extent of this benefit against the manner in which the donated bodies have been transformed to give an impression that they have abilities they never possessed. This concern

would not surface to the same degree if the exhibitions only contained plastinated body parts and organs. The crux of concern stems from the ‘post-mortal’ and ‘post-biological’ pretensions, suggesting that the plastinated remains are something they have never been: the office worker depicted as a basketball player or ballet dancer.

In surveying these aspects of the plastination process, we are introduced to the manner in which technology has impinged upon the dead human body. The goals of this procedure are not principally research-based, but they demonstrate what can be accomplished. This constitutes a surprising launch pad for investigating the research uses of foetal and embryonic tissues, since in their different ways they all depend upon the ability to manipulate human material.

## Use of Foetal Tissue in Research and Therapy

Foetal tissue research initially hit the headlines in the 1980s, although foetal tissue had been used in research as far back as the 1930s (Greely et al. 1989). However, it was proposals in the 1980s that elicited widespread debate against the background of the ongoing contentious debate around abortion (Mahowald et al. 1987; Jones 1991). The context in the 1980s was provided by the possibilities appearing at that time of grafting foetal neural tissue into the brains of patients with advanced Parkinson’s disease as a means of ameliorating some of the debilitating effects of the disease (Sladek and Shoulson 1988; for update see Barker et al. 2013).

Foetal tissue transplantation in the form of neural grafts that led to these guidelines has proved a disappointment and has been replaced in more recent years by an interest in the potential of stem cells (Ali et al. 2014). While the latter have a number of sources, the employment of embryonic stem cells (ESCs) derived from embryos has reignited ethical debate, this time casting embryos, as opposed to foetuses, into the spotlight (see Use of Embryos for Therapeutic and Research Purposes). Interestingly, the fundamental ethical dilemma encountered in the use of foetal tissue from abortuses is almost identical to that found in the use of stem cells from embryos. In both cases, early human forms are

being ‘sacrificed’ for medical research or treatment, and yet in both instances neither the embryos nor foetuses would have developed any further for reasons that have nothing to do with their research or therapeutic potential.

The use of foetal tissue would have remained quiescent in general public debate, had it not been for the accusations by the Center for Medical Progress and other pro-life groups in the USA on what they regard as the illicit activities of Planned Parenthood. Although the debate centred on the alleged sale of foetal tissue and profit making by Planned Parenthood, it has once again raised questions about the justification of using foetal tissue from abortions (Servick 2015).

In the wake of the antagonism to Planned Parenthood from some quarters in the USA, there have been concerted efforts by researchers to highlight the benefits of using foetal tissue in research on diseases and conditions as varied as AIDS and spinal cord injuries, macular degeneration and the development of a potential Ebola vaccine, to juvenile diabetes, Huntington’s disease, immune system defects and autism (Binkley and Johnson 2015; Charo 2015; Holt 2015). It has also been repeatedly pointed out that vaccines have been one of the chief public health benefits of this research.

Opposition to the use of foetal tissue from induced abortions is closely tied in with opposition to abortion (e.g. Rae 1991; Lee et al. 2015), a relationship that is particularly evident in the USA. However, the debate on the use of foetal tissue also entails how best to respond to the principle of moral complicity (see below), the potential medical benefits promised by research on the developing human and the best way of balancing these benefits against the perceived loss inherent within abortion.

Even though every attempt is made to isolate foetal research from abortion in practical terms (an ethical requirement), conceptually, the feasibility of the one (research) is dependent on the reality of the other (abortion). The foetuses that are available for use cannot develop any further for reasons originating in external factors—namely on the reasons for the abortion.

During the 1970s and 1980s, concerns were raised about the nature of the foetal research and therapy then underway. Committees and working groups examined the issues in the UK (Peel Committee 1972), the



USA (National Commission 1975) and Australia (National Health and Medical Research Council 1984). These concluded that experimentation on live, previable fetuses was permissible within certain limits, on the grounds that important biomedical knowledge could not be obtained by alternative means. In the wake of the developments regarding neural grafting in the 1980s, an NIH panel was established in the USA (Consultants 1988) and emerged with the following recommendations:

- The decision to terminate a pregnancy and the procedures of abortion should be kept independent from the retrieval and use of foetal tissue;
- Payments and other forms of remuneration and compensation associated with the procurement of foetal tissue should be prohibited, except payment for reasonable expenses;
- The decision and consent to abort must precede discussion of the possible use of the foetal tissue and any request for such consent;
- The pregnant woman should be prohibited from designating the transplant-recipient of the foetal tissue;
- Anonymity between donor and recipient should be maintained;
- The timing and method of abortion should not be influenced by the potential uses of foetal tissue for transplantation and medical research.

In the early discussions around neural grafting, a special report in the *New England Journal of Medicine* put forward a series of proposals (Greely et al. 1989). The one of direct relevance for the present chapter is that ‘human foetal tissue should generally be treated with the respect given cadavers’. These and subsequent guidelines (American Medical Association 1994) stem from a ‘good consequences’ stance, highlighting the anticipated benefits of potential value to medicine. Related to this is the stipulation that knowledge of this kind cannot be obtained using animal models.

The crux of the various guidelines is that, once it can be exposed to risk, the previable foetus has no future as a living individual, and any harm resulting from the research is of little consequence compared with the much greater harm caused by the abortion. And so, if abortion is allowable, so is research on the foetus: the one follows inexorably from the other.

Inherent within these guidelines is a particular stance on the status of the foetus, namely that it has an intermediate status between complete protection and no protection at all. These guidelines do not express the view that the human foetus is to be accorded the status of a person with the full moral value of a person, but neither do they view the foetus as a non-personal entity. None of the guidelines concludes that it legitimizes all research, but those who may benefit from foetal research are seen as having greater value than the relatively few foetuses on which research will be carried out. Since these foetuses will never be able to realize their potential as fully developed persons, it is ethical to use them for the good of medical science and therefore for the good of other foetuses that will realize this potential at some future time.

Four major positions have emerged in viewing non-therapeutic research on live previable foetuses before, during or after induced abortion (Walters 1975). These are (a) prohibition; (b) allowed with no restrictions; (c) allowed under precisely the same conditions as research permitted on children and on foetuses that will continue to term; (d) allowed with less restrictions than in (c).

Separation of the foetal tissue research from the abortion is the fundamental ethical requirement and can be accomplished ethically even if the abortion is considered to be unethical or morally problematic by reference to the concept of moral complicity. This contends that the evil of an action (abortion in this instance) carries over into any subsequent use of the material, no matter how beneficial it may be regarded (research). This concept can be accepted or rejected. If rejected, it is possible to separate the subsequent good action from the original problematic action, on the condition that there is total separation of the two in practice. Strong (1991) contends: 'transplantation and research involving human foetal tissue appear ethically justifiable because the degree of wrongness that might be involved seems relatively low, no right would be violated [assuming consent has been given], at least some benefit is reasonably expected, and great benefits are possible'.

Throughout this debate, the relationship between how foetal tissue is treated and how adult tissue is treated is a close one, with the latter being used as a model for the former. Nevertheless, they are not identical, since foetal tissue is far more dependent upon decisions made by

others—the pregnant woman and her decision to have an abortion, and the needs of researchers for foetal tissue. This duality points to the social, cultural and research contexts within which foetal tissue becomes available for study.

These issues are magnified when attention is directed at embryos, with the manifold possibilities they present for research into developmental biology and for therapeutic applications of this research.

## Use of Embryos for Therapeutic and Research Purposes

The ability to isolate embryos in the laboratory has ushered in rich prospects for manipulation. Over the past 30 years, this has led societies to elaborate ethical principles to guide their treatment of human embryos. In the light of the early successes of IVF in the clinic and the research laboratory in the UK, the Warnock Committee Report (1984) arrived at a number of principles that subsequently served as the basis of the 1990 Human Fertilisation and Embryology Act, and have guided approaches to embryo research in many other societies. These are:

- The embryo of the human species has a special status, but not the same status as a living child or adult.
- The human embryo is entitled to a measure of respect beyond that accorded to an embryo of other species.
- Such respect is not absolute and may be weighed against the benefits arising from proposed research.
- The embryo of the human species should be afforded some protection in law.

These principles lead to the view that a collection of four or sixteen cells is so different from a full human being, a newborn baby or an advanced foetus, that it might legitimately be treated differently (Warnock 1985). This is a moral judgment, dependent upon the value ascribed to very early human embryos, which the Committee defined as those up to 14-days gestation. In the Committee's view, such embryos could be

used for research purposes if the resulting benefits were considered to be substantial.

The Report contended that research should be embryo-related, including applied research with direct diagnostic or therapeutic benefits for the human embryo. The 14-day limit for research was chosen on the basis of the appearance of the primitive streak at around 15 days, which in the Committee's view marks the beginning of individual development of the embryo; it also corresponds to the end of the implantation stage. While this point is far from definitive, it has proved a useful landmark from many perspectives (see McLaren 1984, 1986).

The solidity of the 14-day limit has remained unscathed, in spite of questions regarding the assurance of its ethical and scientific credentials. In large part, this has been due to the lack of demand to extend the time period on account of the difficulties in maintaining embryos in culture beyond around 9 days. All this changed with the publications by Deglincerti et al. (2016) and Shahbazi et al. (2016) of their success in growing human embryos in the laboratory for up to 13 days. This has raised the possibility of culturing embryos beyond the 14-day limit. The prospects for understanding the later stages of early human development with a previously unknown degree of precision are tantalizing for developmental biologists and have led to calls to revisit the 14-day rule (Hyun et al. 2016; Rossant 2016). To do this would question the alleged significance of the appearance of the primitive streak, the concept of individuation and the ethical arguments based on these. It will also raise the question of what limit would replace 14 days. Is it to be 21 days, and what criteria will be provided to justify this?

The more recent debate on stem cell research started from the legal position enshrined in the 1990 Act (see the reports by the Nuffield Council on Bioethics 2000, and the Department of Health 2000). A significant extension has been to allow research into potential therapies on the basis that each form of research involves using the embryo as a means to an end (Nuffield Council on Bioethics 2000). As in the case of foetal research, a balance is to be attained between any potential health benefits for others and any negatives associated with using embryos at an early stage of their development.

Throughout these discussions, the notion of respect is never far from the surface (Jones 2006), although its vagueness means that the way in which it is applied can be readily adjusted. For instance, when surplus embryos (from IVF programmes) that would otherwise have been allowed to perish are used for research purposes, some argue that this does not indicate lack of respect for those embryos or for embryos in general (Nuffield Council on Bioethics 2000). By contrast, the deliberate creation (and by implication destruction) of embryos for research may be seen as demonstrating a lack of respect for them. However, in the UK, the latter stipulation was later removed (see HFEA 2012), demonstrating the flexible nature of the related concepts of respect and status. The boundaries in both instances are unclear and hence capable of being moved with relative ease (Jones 2006).

## Developmental Considerations

By 5–7 days, the developing embryo has an internal cavity, the *blastocyst*. The outer cells form a surface layer, the trophectoderm, which becomes the trophoblast when implantation occurs into the wall of the mother's uterus (completed by 14 days). These trophoblastic cells eventually give rise to the placenta. By contrast, the inner cells within the blastocyst constitute the inner cell mass (ICM) and are still undifferentiated, and it is from a small number of these cells that the future individual arises. It is from some of these cells at 4–5 days that human embryonic stem cells (hESCs) can be isolated and cultured, demonstrating that individual cells from the ICM of the human blastocyst are capable of forming any cell type in the body.

In advancing the debate on what can and cannot be done with and to embryos, scientific pointers such as these become crucial. The first of these alludes to the initial appearance of a nervous system, since prior to this point the developing entity lacks a means for functioning as an independent entity or for responding to its environment (Jones and Telfer 1995). The quest for a neurological marker of the first events of human life owes its impetus to the perceived symmetry between processes at the beginning and end of life: *brain birth* in contrast to *brain death*.

Unfortunately, this approach does not prove helpful in dealing with the early embryo. This is because the timing of brain birth is probably not until as late as 24–36 weeks (Gertler 1986; Burgess and Tawia 1996) in terms of the presence of an integrated neural organization to serve as the substratum from which self-consciousness and personal life subsequently emerge (Jones 1998). Consequently, the notion of brain birth provides little guidance on how early human embryos should be treated.

The first 14 days of embryonic development have traditionally been set apart from subsequent stages, on account of their pre-implantation status and on the possibility of twinning. However, these embryological features were not generally considered sufficiently distinctive to bestow a separate classification upon this 14-day period. This situation changed when the term *pre-embryo* was derived to designate ‘the entire product of the fertilized egg up to the end of the implantation stage’; and the term *embryo* for ‘that small part of the pre-embryo or conceptus, first distinguishable at the primitive streak stage, that later develops into the foetus’ (McLaren 1986). McLaren’s view is a reductionist one that pays too little attention to the role of the support tissues, which are as essential for biological development of the early embryo as they are for the later foetus (Jones and Telfer 1995). It also overlooks the potential of ICM cells to produce stem cells and significant features of the future individual.

It has generally been considered that the blastocyst has moral value and should be treated with respect. However, it is generally assumed that such blastocysts are in utero, whereas the blastocysts on which research is conducted are in vitro—in the laboratory. Consequently, the 4–6-day-old in vitro blastocyst is in an environment in which it cannot develop further, unless it is implanted in a woman’s uterus (Jones 2005).

This suggests there may be a distinction to be drawn between ‘blastocysts within an environment congenial to further development’ as against ‘blastocysts within an environment hostile to further development’ (Jones 2005, 2006). The first situation has the potential of producing a human individual; the second has no such potential, especially since research beyond 14 days is currently forbidden. This means that all blastocysts are not equal biologically when maintained in a

laboratory environment. Does this have implications for their moral status (McGee and Caplan 1999)?

Another factor that may influence the way in which blastocysts are viewed is the manner in which they are brought into existence. Somatic cell nuclear transfer (SCNT) demonstrates that the full genetic complement of an adult cell can be reactivated well into the chronological life of the cell (Wilmut et al. 1997). Central to this is the ability of differentiated cells to revert to totipotency, involving the reprogramming of one cell type to produce all the other cell types necessary for the development of a complete organism. The product would appear to be an embryo, theoretically capable of developing into a new individual, even in the absence of sperm and egg. The prospects appear to be endless, especially with the emergence of induced pluripotent stem cells (IPSCs) derived from differentiated cells and potentially capable of producing gametes (Takahashi et al. 2007).

The purpose of referring to these possibilities is not to trace them any further, but to hint at the prospects opening up for utilizing developmental techniques to bypass conventional perspectives, and in so doing raise a Pandora's box of novel ethical questions. Even though this scheme does not commence with a conventional embryo, a transient blastocyst with its ICM is created (as opposed to a fertilized blastocyst). The lack of any potential for survival reflects the decision to stimulate cell differentiation in certain ways, along with the allied decision to refrain from implanting the developing blastocyst in a woman's uterus. The development being stopped is that of a nuclear-transplant blastocyst, produced with the specific intention of providing tissues to alleviate disease processes in patients. This is an artificially produced blastocyst in an artificial environment, brought into existence specifically to replace damaged tissues and organs in existing human beings. There appears to be a major ethical distinction between this highly specialized type of blastocyst and one generated from egg and sperm.

Where does this speculation leave us? In approaching (fertilized) embryos, our commitment to them can be at two levels: at a general level, to the population of embryos as a whole, or at a specific level, to individual embryos (Jones 1994b). The only realistic commitment is towards early embryos at a general level. Individual embryos cannot be

equated with individual people, since the chances of individual embryos maturing into adults are relatively small, and early embryos cannot be 'known' in the way in which later fetuses and certainly infants and children can be known. The parallelism between embryos and living adults is, therefore, tenuous at best. Consequently, our commitment to very early embryos is of a weak variety, although it is not negligible. Any research procedures require justification, and should only be undertaken when the priorities accorded to the proposed studies outweigh the ambiguous priorities of early embryos, and when the projected benefits to substantial numbers of people outweigh the disadvantages to the early embryonic population.

What then of nuclear-transplant blastocysts, produced to serve as the starting-point for tissue production and related research? These represent a step away from fertilized embryos in utero. They are not future members of the human community and were never intended to be so. This does not justify their production, but it does tell us that, once produced, the determining factor becomes the uses to which they are to be put.

It might still be objected that we should never embark on projects like these. What is wrong are control and manipulation of this order, since it is these that threaten our human nature by denying human embryos the chance to emerge as members of the human moral community. Is there any sense in which we can respect embryos produced specifically for research purposes and therefore for human use? While the notion of respect is usually recognized as elevating status, it remains to be determined whether this characterizes the production of embryos of whatever variety solely as a means to an end.

## **Commonalities and Disparities Between the Debates**

This chapter has covered three separate debates, centred on cadavers, fetuses and embryos, each with its own areas of challenges and ethical quandaries. In attempting to address these three debates within a cohesive whole, it may be that I am muddying the waters rather than



clarifying them. However, they all deal with human tissue and all exist on borders between science and ethics, borders that are far from assured or static. Indeed, it is the flexibility of these borders that is one of the common themes. No matter what ethical guidelines are drawn up, they cannot be separated from the current state of the science—the questions raised by the relevant science, the avenues that the scientists would like to pursue and the prospects opened up for medicine and health care more generally.

The current debates around the use of foetal material and embryos give the impression that the movement is in only one direction, that is, from the science to the ethics, with the state of the science determining the nature of the ethical constraints imposed by society. However, this has not been the case for cadavers, where ethical consensus has driven legislation and determined what is and is not acceptable. The major difference comes down to the state of the science and the demands of the scientists to explore enticing new territory and address questions formerly not amenable to scientific analysis. For anatomists using cadavers, many of these drivers (although not all of them) were satisfactorily answered many years ago, although the ethical guidelines impose limits that have had a significant impact on the range of procedures undertaken. When these guidelines are abrogated, the detrimental consequences are recognized and acted upon (Department of Health 2000; Retained Organs Commission 2002; Hildebrandt 2016).

In approaching these issues, I have utilized the notion of the embryo (and foetus) as a 'proto-cadaver' (Jones 2006). This notion places emphasis on the close relationship that exists between embryos/foetuses and living developed humans, similar to the manner in which cadavers also have a close relationship with living humans (Jones and Whitaker 2000). Hence, human embryos and foetuses have value in the same way as human cadavers do, leading to the stipulation that consent is essential before embryos and foetuses can be used for research or therapeutic purposes. But there are differences. Unlike adult cadavers, embryos and foetuses do not bring with them memories of what they once were and of how they related to others. Instead of memories, those close to embryos and foetuses will have expectations for what they will become or how they will contribute to others: as a new individual, as tissues of therapeutic value, as cells with research possibilities.

This is where viewing blastocysts, pre-embryos, embryos and fetuses as proto-cadavers comes to the fore. Viewing human embryos and fetuses as untouchable sets them apart from all other human tissue. On the other hand, they are also set apart when treated as of less interest than any other human tissue. The dignity and respect accorded human cadavers suggests that dignity and respect should be accorded early human embryos in the laboratory, and fetuses following abortions. Treating embryos and fetuses as proto-cadavers does not automatically justify all studies carried out on them, but it does allow serious assessment of how best to approach the scientific impetus and clinical imperative implicit in obtaining knowledge of embryonic and foetal development (Jones 2006).

The advantage of comparing embryos and fetuses in the laboratory to cadavers is that in both cases there is an element of being borderline entities, with distinct human characteristics. They have sufficient human characteristics, either actual or potential, to require interested parties to provide informed consent, before they are used for research or teaching purposes. Procedures conducted on them are to be undertaken with respect, taking note of the role of altruism and the centrality of giving as opposed to self-interest, and the potential of the therapy or research to usher in significant benefit. Inherent within these values is protection of the vulnerable.

For instance, the problem in using unclaimed cadavers stems from an abrogation of these values and in so doing places them outside the scope of acceptable ethical practice. This problem crops up in the realm of embryos and fetuses for the same reason, for instance when abortions are carried out in order to obtain tissue for research thereby negating the separation between the two procedures, or when embryos are produced specifically for research purposes. The argument in this chapter has been that the interests of unclaimed bodies cannot be protected, since their prior interests have been neglected. The same does not apply to embryos surplus to the requirements of a clinical programme, or fetuses resulting from an abortion, since their prior interests can be protected. These comments do not apply to research embryos since they are denied any future interests of their own.

In much of the discussion, I have moved from what we know about how to treat cadavers to insights that might be gained for our view of research projects using embryos and fetuses. However, this is not

a one-way path. For instance, the notion of pre-embryo that appeared in the early years of the debate on embryo research was provided with a quasi-scientific rationale in order to lay the foundation for the ethical acceptability of research on embryos up to 14 days post-fertilization. It will be interesting to see in what ways this may be modified in future debate on a 21-day limit, as opposed to 14-day limit. The tenuous nature of the science-ethics link need not have become an object of debate, since there were other ethical grounds for supporting research during this period. This should serve as a salutary reminder for those who make far-reaching claims regarding the post-mortal status of plastinates, since there is no evidence that they have transcended their cadaveric status and assumed a different ethical category from that of cadavers. The concept, therefore, appears to be a dubious one.

The proto-cadaver designation of embryos and foetuses is a reminder that we are moving in ambiguous territory (Hoeyer 2013). This concept draws attention to the manner in which we move between scientific drivers and ethical imperatives in all these domains, the former seeking to explore new territories and the latter aiming to protect those from whom the human tissue has come or whose potential for future development is being hindered. The ambiguity lies in the borderline character of both the scientific designations and the assurance of the ethical guidelines. Both are open to change, both *do* change, and each influences the other. At these boundaries, plastinated and transformed cadavers, pre-embryos and aborted foetuses can be regarded as proto-cadavers, with much in common and yet with discernible differences.

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Bioethics Beyond Altruism

Donating and Transforming Human Biological Materials

Shaw, R. (Ed.)

2017, XII, 356 p., Hardcover

ISBN: 978-3-319-55531-7