The College of the Holy Cross

Concerning the Moral Status of the Early Human Embryo:

Do Twinning and Fusion Have a Place in the Argument?

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RELS230-01 (Theological Perspectives/Medical Ethics)

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3 May 2013

Abstract:

Today with the incredible advances in the areas of biotechnology and genetics, biomedical research has the capacity to produce new technologies that could intervene in human health in ways unthinkable just decades ago. With the production of new gene therapies and treatments, the future of human health seems to hold much promise. However, many of these possible treatments would be the product of embryonic stem cell research and would come at the cost of the destruction of countless human embryos. Thus, the possible healing power of embryonic stem cell therapies must be weighed against the potential harm that would come to these embryos. Is there a restrain on what can be done to human organisms? The phenomenon of embryonic stem cell research calls into question the moral status of the human embryo. Today, with a much broader understanding of the development of the human embryo, many professionals, among them Thomas A. Shannon Ph.D. of Worcester Polytechnic Institute, argue that because the early human embryo is subject to twinning and fusion, it cannot hold any strong moral standing. I argue that the claims to twinning and fusion fail to provide us with any credible reasons for denying the strong moral status of the early human embryo. I will first present in a very Thomistic disputational style the arguments against the moral status of the early human embryo using those of Shannon as a guide. I then hope to show that many absurd implications arise from the twinning/fusion argument and will attempt to present a reformulation of the argument that is in favor of and reasserts the moral standing of the early human embryo.

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A moral status is a universal concept and its meaning is well known to the various cultures of the world. To have a moral status is to be seen as something that has value, as something that deserves respect, and as something that is to be protected. With a moral status comes a sense of worth as well as a sense of importance. Though all may be in agreement as to the meaning of the concept, there has always been much dispute over what criteria are necessary in order for something or someone to be worthy of a moral status. Today with the rise of embryonic stem cell research, the moral status of the early human embryo is being called into question now more than ever. The possible treatments that could come from embryonic stem cell research would have the potential to save lives and alleviate much suffering. However, embryonic stem cell research comes at the cost of destroying countless human embryos and thus its potential healing powers must be weighed against the harm that would come to these embryos.

Many proponents of embryonic stem cell research argue that since the embryo being cultured for stem cells has the possibility of twinning, i.e. division into two separate embryos, or fusion, i.e. rejoining into a single embryo, it is precluded from holding any moral status. Among the proponents of the twinning/fusion argument is Professor Thomas A. Shannon Ph.D. of Worcester Polytechnic Institute. He argues that because of its possibility for twinning and fusion, “there is no reasonable basis for arguing that the pre-embryo is morally equivalent to a

person…"[1] I argue, however, that the claims to twinning and fusion fail to provide us with any credible reasons for denying the strong moral status of the early human embryo. Perhaps to Shannon's dismay, there are in fact both biological and philosophical arguments that appear to devalue the twinning/fusion argument. I also hope to show that there are many absurd conclusions that arise from the twinning/fusion argument that are inconsistent with other established beliefs and which have the potential to threaten the moral status of other entities as well.

I have found that arguments against the moral status of the early human embryo can generally be grouped into three broad categories, namely, 1) arguments based on dignity, 2) arguments based on singleness or individuality, and 3) arguments based on the biological development of the embryo. I will begin by first introducing the arguments based on dignity, for they are the most fundamental and one cannot talk about twinning or fusion without first talking about dignity. There are various definitions of human dignity, and Shannon gives us just a few of the most common ones. One argument is that human dignity is found in "our capacity for union with God." Another is that human dignity is found in "our reconciliation of opposites", namely our reconciliation between matter and spirit. Shannon, however, is most in line with the argument that human dignity is based on "sentience and autonomy".[2] Regardless, he believes that dignity is irrelevant to any talk of the moral status of the early human embryo, for he believes that the term should be reserved for persons only. Since it is ambiguous as to whether the early human embryo is a person or not, he believes that we cannot therefore talk about any dignity of the embryo. Thus, instead of using the word dignity, he shifts to talking about the

[1] Shannon, Thomas A., and Allan Bernard Wolter. "Reflections on the Moral Status of the Pre-Embryo." Theological Studies 51.4 (1990): 625. ATLA Religion Database. Web. 23 Apr. 2013.
[2] Shannon, Thomas A. "Grounding Human Dignity." Dialog 43.2 (2004): 114-117. ATLA Religion Database. Web. 24 Apr. 2013.

human value of the embryo, dodging any talk of dignity at all. His overall conclusion is stated well: "The embryo, which has human value, does not demand the same level of protection as a human person, which has human dignity…"[3]

Having prohibited any discussion on dignity, Shannon moves on to the arguments against the moral status of the early human embryo based on its singleness and individuality, or rather its lack thereof. These arguments are the cornerstone of the twinning/fusion debate and are crucial to understanding its perspective. Shannon starts by admitting that the early human embryo is undeniably alive. He states that life and newness confer at least some sense of value on the embryo. Shannon also acknowledges that the early human embryo has its own unique genome, one which is distinct from either of its parents. However, he argues that although the early human embryo is genetically unique, it is not yet individualized. Since the cells of the early embryo are totipotent, i.e. not yet differentiated with a specific direction of development, they can be split by twinning or embryo division. Shannon believes that this suggests that the early human embryo lacks a critical ontological level of organization. Because of this, Shannon argues that the early human embryo cannot be considered as an individual and is in fact "a deeply [and] perhaps irretrievably ambiguous entity, one that defies classification and slips seamlessly between moral and biological categories."[4]

Shannon furthers his argument against the individuality of the early human embryo by calling to mind the philosophy of the medieval Scottish philosopher John Duns Scotus. One of the main focuses of Scotus's writings is the epistemological basis for individuality. Scotus talks of a "common nature" or a nature which is shared by all members of a particular class. However, Scotus asserts that a common nature is indifferent between an individual member and all other

[3] Grounding Human Dignity. 117

[4] Ramsay, Marc. "Twinning and Fusion as Arguments against the Moral Standing of the Early Human Embryo." Utilitas 23.2 (2011): 191. ProQuest. Web. 24 Apr. 2013.

members of that class. Thus for Scotus, in order for something to be considered an individual it must share this common nature, but also possess what he refers to as an "individualizing principle", which makes it a single entity.[5] Thus, Shannon believes that due to the totipotency of its cells and its possibility for twinning and fusion, the early human embryo lacks a basic individualizing principle and thus cannot be considered as an individual entity. Because of this, Shannon believes that the embryo can only be thought of as "a biological expression of the common human nature."[6] It is undeniably human, yet according to Shannon it is not individual. For him, an embryo would have to possess both of these characteristics in order to be worthy of a moral status.

Finally, Shannon moves on to talk about some of the biological arguments which he sees as consistent with the twinning and fusion argument. These arguments are equally important in that they give us a basic picture of the biological mechanisms of twinning, fusion, and embryo development, which must be understood in order for there to be any sensible debate on the moral status of the early human embryo. The Catholic Church teaches that life begins at the moment of conception. However, with modern biology it seems that conception is less of a moment than it is a process: a process which can take up to 24 hours to complete. The process of fertilization begins with the penetration of the outer layer of the egg by the sperm and concludes with the formation of the diploid set of chromosomes. Although penetration is often talked about as if it is an instantaneous phenomenon, it is much more of a gradual process. The sperm must slowly penetrate multiple layers of the egg before fertilization can occur. Up until roughly the fourteen day mark of the embryo's life, which sees cell differentiation (restriction) and the formation of

[5] Grounding Human Dignity. 116.
[6] Ibid. 116.

the primitive streak (the beginnings of the spinal cord), twinning and embryo division remain possible.

Much like Shannon, Pro-Choice activists Peter Singer and Helga Kuhse believe that these biological facts disprove the individuality of the early human embryo and therefore eradicate any possible claim that it may have to a moral status. They give the example of a particular embryo that is named Tom. If this embryo undergoes twinning and divides into two genetically identical embryos, how would we be able to tell which of the resulting embryos is Tom? "There is no reason to privilege one over the other."[7] Additionally, these two split embryos can recombine to form a single embryo once again, which complicates the matter. Because of this, Shannon argues that one cannot speak of the human embryo as an individual until after the restriction process has taken place, and the earliest that this can happen is two to three weeks after fertilization. Thus, Shannon concludes that since the pre-restriction human embryo is not an individual, it does not deserve the same level of protection as one.

Now that I have presented the main arguments of Shannon and the twinning/fusion side of the debate on the moral status of the early human embryo, I will respond to each of the three categories of arguments and will attempt to bring to light important information they miss as well as flaws in their logic. I will begin by first taking on the arguments based on dignity. Shannon states that because the early human embryo is not a person, it does not deserve dignity. However, I say that regardless of whether the early human embryo is a person or not, it does deserve some sense of dignity. To supplement my argument I will use the writings of American philosopher Don Marquis. Marquis, much like Shannon, also does not consider whether the early human embryo is a person or not. However, he does so with a completely different goal in mind. Rather than focusing on whether the embryo is a person or not, he instead focuses on what makes

[7] Twinning and Fusion. 190.

the killing of a young child or young adult so morally objectable. He concludes that the moral wrongness of killing springs from depriving an individual of a "future like ours".[8] If we agree with Shannon that the early human embryo is indeed not an individual due to its possibility for twinning or fusion, than we cannot grant it any dignity for these reasons alone. However, whether the embryo can be considered an individual or not, no one can deny that the embryo has an intrinsic drive towards developing into a human being. A human embryo is the only biological entity that has the natural potential to grow into a human person, so to destroy it for its stem cells would be to deprive it of a future like ours.

Some critics of this "future like ours" argument might say that it depends too heavily on what could potentially be. To that, however, I would remind them that the entire twinning/fusion argument is based on a potential: that the early human embryo does not have a moral status because it may have the *potential* to twin or fuse. I would argue that the intrinsic drive towards developing into a human being confers on the early human embryo some sense of dignity, and if not dignity itself, then at least something more than the vague "human value" that Shannon refers to. I thus conclude that since the destruction of an early human embryo deprives it of a future like ours, it is morally objectionable and comparable to the moral wrongness of an abortion..

As I stated before, I believe that the twinning/fusion argument can be shown to carry absurd implications that are inconsistent with other established beliefs and that may pose a threat to the moral status of other entities. I will introduce some of these implications and inconsistencies as I respond to the second group of arguments, those that are based on singleness and individuality. The early human embryo is indeed characterized by its plasticity, for it can divide at any moment up until the point of restriction. However, I do not see why this potential to divide should deny the early human embryo the ability to be characterized as an individual. I

[8] Twinning and Fusion. 186.

would agree with Australian philosopher John Finnis when he states "[t]hat an entity can undergo division is no reason to think that it is not a unique individual. It is no reason to think that an amoeba is not an individual amoeba, that it can divide, or that any other cell is not a unique individual object because it can undergo fission."[9] Finnis raises a good point here: how is it that an amoeba, a microbial blob which will divide into a great number of progeny in its lifetime, is considered by biologists to be an individual organism, whereas the early human embryo is not. Shannon argues that the early human embryo is "a deeply ambiguous entity." I argue, however that this is not the case. If we want to be consistent with our beliefs on the individuality of amoebas, sponges, and the thousands of other organisms that reproduce asexually, then it would follow that we must also consider the early human embryo to be an individual. If we accept this, then saying that the early human embryo can twin into two embryos should be no different than saying that it can twin into two individuals. This appears to me to be all the more reason to advocate for its protection, for we are now talking about multiple potential lives at stake. However, I would imagine that many proponents of the twinning/fusion argument would return to the dilemma raised by Peter Singer and Helga Kuhse, which I will address next.

To review, Peter Singer and Helga Kuhse introduced the case of the embryo Tom. In their scenario, an embryo known as Tom undergoes twinning and divides into two genetically identical embryos. The moral dilemma in this case is that we cannot say whether Tom continues to exist in one or both of the resulting embryos. Singer and Kuhse would point to this as evidence that the original embryo was in fact not an individual to begin with. However, it seems impossible to say that Tom has ceased to exist or has died. It would be difficult to explain how an individual that was alive has suddenly ceased to exist when nothing has been lost, but has only been separated into two bodies. Singer and Kuhse seem to suggest that twinning results in

[9] Twinning and Fusion. 191.

the death of the original embryo, but can the embryo have perished if there is no dead biological material left over? The same is true of fusion; we are left with one rather than two, but again there is no dead material. As Acadia University professor Marc Ramsay states, "that [the] identity does not continue does not imply that there never was a distinct individual in the first place."[10] Based on this information , it would seem that the twinning/fusion argument continues to fall short of denying the early human embryo a moral status.

However, let's assume for the time being that the twinning/fusion argument is valid. According to Shannon , in order for something to have a moral status it must be both human and individual. Thus, because of its possibility of twinning or fusion, the early human embryo cannot have a moral status. It then seems that the possibility for twinning and fusion can alone negate the moral status of any human entity. If this is truly the case, then we should even be able to extend this definition to sentient human beings. As Ramsay states, "Of course, no known sentient beings are capable of twinning or fusion, but such beings are possible, at least in principle."[11] Australian philosopher David Oderberg raises a possible scenario in which such beings could potentially arise.

Assume that a person is fatally injured, and that this person has two identical twins that have been brain dead for almost a year. This individual's brain is thus divided and transplanted into each of the identical twins. After implantation, it is found that both individuals believe themselves to be the individual who was fatally injured, share his behavior traits, and are mentally continuous with him on every level.[12] Now no technology exists today in which this type of operation would be possible, but perhaps it will be someday. Could we then say that the fatally injured patient was lacking of a moral status because he had the possibility to "twin". I

[10] Twinning and Fusion. 193
[11] Ibid. 192.
[12] Ibid. 192.

believe few would be willing to make such a claim. Additionally, a similar scenario could be thought of for fusion as well. In both cases, we can't deny that the twinned or fused individuals are deserving of a moral status, so the same logic should also be applied to the early human embryo.

In responding to the third group of arguments, I would like to begin by stating that contrary to popular belief, there are in fact a great number of biological facts that support the individuality of the early human embryo. Shannon argues that the early human embryo lacks a critical ontological level of organization, and thus cannot be thought of as individual. However, it has been shown that even at the two cell stage of the early human embryo, there is already some cellular organization. Already at the two cell stage, one cell is more apt to give rise to the animal pole, or the group of cells that are likely to form the basis of the nervous system, while the other is more apt to give rise to the vegetal pole, or the group of cells that are likely to generate the precursor of the lower organs.

Additionally, at the four cell stage, all cells are surrounded by what is known as the zona pellucida: a glycoprotein membrane surrounding the individual plasma membranes of each cell. To the chagrin of the twinning/embryo proponents, the zona pellucida is more than just a wall encasing the individual cells. Rather, it is a major unifying unit in the early human embryo, transferring chemical signals and nutrients from one group of cells to another. Such biological facts do not suggest the presence of a mere lump of independent and noncommunicating cells, but rather an interdependent biological system that is clearly developing into a human individual. If this was not the case, than there would be nothing stopping each individual cell of the embryo from developing into its own organism. [13] Even if it is prone to the possibility of twinning, there is no doubt that the early human embryo is developing towards its fulfillment in a human person.

[13] Twinning and Fusion. 196.

For this reason, I argue we must regard the early human embryo as an entity with a moral status, and thus an entity that should be respected and protected.

Now that I have responded to each of the central groups of arguments in the twinning/fusion debate, what I hope I have made the most clear is the necessity for great caution when dealing with the early human embryo. I believe that I have shown why the early human embryo is indeed worthy of a moral status, but if I have not, then at least I have shown that the twinning/fusion argument is flawed. If we cannot know for certainty that the early human embryo is lacking of a moral status, then there is a chance that those conducting and facilitating embryonic stem cell research are participating in a seriously grave immoral act. In order to avoid this, researchers must assume that the early human embryo possesses a moral status and thus cannot compromise it by harvesting its stem cells for their possible healing powers. I suggest that researchers refocus their efforts to adult stem cell research, for embryonic stem cell research is for reasons I have shown morally jeopardizing.

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