

# Can We Consider Embryos Solely as Biological Material?

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## Abstract

Traditionally, bioethical discussions about embryo research tend to resort to moral status arguments. Bioethicists arguing in favor of embryo research who embrace what we call the “none-approach” use psychological or physiological arguments to claim that embryos do not have any moral status. On the other hand, major participants in the debate arguing against embryo research usually adopt what we call the “all-approach,” using development-based and metaphysical moral arguments to defend the claim that embryos have a moral status. This paper firstly presents these moral approaches briefly, maintaining that neither of the approaches resorting to the concept of “moral status” is satisfactory in practice, especially regarding interventions in preimplantation-stage embryos in the laboratory. While embracing and respecting great moral diversity of beliefs about the embryo, this paper suggests that there should be a practice-focused and less counter-intuitive moral stance somewhere in between “embryos are complete humans who have full moral status” and “embryos are nothing but accumulations of cells.” Secondly, we will argue that although embryos are not entitled to full moral status as much as a “paradigm human” is, they are still worthy of moral respect and cannot be considered solely as biological material because (i) they have inherent potential to become “one of us”; (ii) they are human organisms in a biological sense, and (iii) they will be considered as patients in the near future, rather than only as biological research entities, at a time when Nobel-winning CRISPR/Cas9-based germline genetic intervention is waiting at the doors of reproductive clinics. Finally, we will maintain that the statement “embryos are worthy of moral respect” does not predicate anything about the post-implantation stage, especially regarding abortion. All it contends is that because embryos are worthy of moral respect and will soon be considered patients who are subjected to genetic intervention in a petri dish, they should be handled by a physician/a specialist trained in microsurgery to deal with embryos: a clinical embryologist.

**Keywords:** *Embryo Research; Moral Status; Moral Respect; Bioethics.*

## Introduction

Before the end of the first quarter of the 21<sup>st</sup> century, scientific advances are emerging at an unprecedented pace, challenging our traditional approaches to pregnancy, parenthood, and life itself. Since IVF was incorporated into reproductive clinics, it has been possible to create an embryo in a petri dish, implant it in the womb, freeze it in a nitrogen tank, discard it, or use it for scientific research (Cameron & Williamson, 2005). These applications, while pushing the limits of our imagination, bring up new moral questions within the discipline of bioethics regarding the embryo.

Before delving into the bioethical debate about the embryo, it is important to decide how this paper defines the embryo. We do not follow the definition of Merriam-Webster’s Dictionary of English stating that an embryo is “the developing human individual from the time of implantation

to the end of the eighth week after conception.” (Merriam-Webster, n.d.), as we only focus on preimplantation-stage embryos to be used or to undergo interventions in the lab. It rather favors a definition of the embryo as “a totipotent single-cell [sic], group of contiguous cells, or a multicellular organism which has the inherent actual potential to continue species-specific i.e. typical, human development, given a suitable environment.” (Ford, 2008, p. 56). Moreover, because this paper exclusively deals with preimplantation-stage embryos (i.e. 14 days of legally permitted research), we choose not to use “germinal stage embryos” or “pre-embryos,” terms that sound ambiguous with regard to the location of the embryo, while our paper focuses on “preimplantation-stage embryos” in the lab, not inside reproductive organs such as the Fallopian tubes or the uterus.

## 1. Traditional Bioethical Debate on Embryo Research

While some countries do not allow any research activity on embryos, there are 12 countries where embryo research is legally permitted until the embryo is 14 days old. The 14-days rule in embryo research was suggested both by the US Department of Health, Education, and Welfare (DHEW) report released in 1979 and in the Warnock report in the UK published in 1984 (DHWE, 1979; Warnock, 1984; Matthews & Morali, 2020). The “14-day rule” was first legally established in the UK in 1990, with guidance from the Warnock Report, under the Human Fertilization Act (Cavaliere, 2017). Although many authors consider the Warnock Report as an optimal statement of compromise between pro- and anti-embryo research views; others contest that the 14-day rule has been lacking “a coherent philosophical basis.” These authors challenge the rule and suggest prolonging the permitted experimentation period beyond 14 days in the light of recent scientific advances, in the interest of reaching a better understanding of early human development (Cavaliere, 2017; Koplin & Gyngell, 2020).

Experimentation on human embryos and human embryonic stem cells (hESCs) can be carried out either using surplus embryos generated in IVF procedures, or embryos (and/or embryoids<sup>1</sup>) may be created for research purposes in the lab (Devolder, 2005). Theoretically, if hESCs are still totipotent, then they could be called “embryos” as well, since they can be induced to form an autonomous organism. That is why the anti-embryo research view is generally against hESCs experimentation as well. For the reader’s convenience, in this paper we will refer to both research categories as “embryo research/experimentation.”

Bioethicists who support research on embryos maintain that such an endeavor may help scientists understand the early stages of human embryonic development (stem cell growth, and differentiation), thus allowing them to study the pharmacological effects of certain therapies on differentiated cell lines and cellular models, research human diseases on embryonic models, learn about the functions and interactions of certain genes, proteins, and regulatory molecules, create in vitro tissues and organs for transplantation, understand causes of early and recurrent miscarriages, and alleviate the impact of degenerative diseases by supporting degenerating cells and tissues via hESCs (Devolder, 2005; Douglas & Savulescu, 2009; Steinbock, 2009; Cavaliere, 2017). For these and other reasons, many authors within the field of bioethics defend the extension of the 14-day rule to 21–28 days. However, there has been a long debate regarding embryo intervention and embryonic microsurgery concentrated on the moral status of the embryo. While some authors entirely oppose embryo experimentation because they believe embryos have full moral status (which we call the “all-approach” below), others fully support it because they consider embryos as being devoid of any moral status (which we will call the “none-approach”).<sup>2</sup> To understand the

<sup>1</sup>Embryoids are human embryo models derived from stem cells. Scientists use embryoids to study the early stages of human development, thus reducing the need to experiment on actual human embryos (Piotrowska, 2021).

<sup>2</sup> In between these two poles, a range of “intermediate positions” can be found. For instance, one of the most common of these positions accepts research on surplus embryos and those that otherwise would be discarded anyway but strongly disapproves of *de novo* creation of embryos solely

opposing moral standpoints in the discussion of embryo experimentation, the “moral status” debate should be summarized briefly.

Traditionally, bioethical discussions about embryo research and embryonic manipulations tend to resort to moral status arguments. The pro-embryo intervention position in bioethics tends to embrace what we call the “none-approach,” using psychological or physiological arguments to claim that embryos do not have any moral status. On the other hand, major opponents of embryo intervention usually adopt what we call the “all-approach,” using development-based moral arguments and metaphysical moral arguments to defend the view that embryos have a moral status. A detailed exploration of these arguments is beyond the scope of this paper. Nevertheless, it is essential to understand both the all- and the none-approach to the moral status debate about the embryo. Besides, we contend that it is important to elaborate not individual arguments but their common point of origin: moral status. For this reason, this paper will (i) elaborate the im/practicality of the all-or-none approach to moral status in the lab; (ii) support the unequal consideration of moral status approach developed by David DeGrazia (2006) with the notion of “moral respect” borrowed from Bonnie Steinbock (2009); and (iii) outline what moral respect for embryos entails in practice.

The all-or-none approach to the moral status of the embryo includes two poles. The first one, which we call the *all-approach*, claims that “embryos are complete humans who have full moral status.” By contrast, the second position, which we call the *none-approach*, asserts that “embryos are nothing but accumulations of cells, and do not have any moral status.” Next, we will scrutinize these two viewpoints and then challenge the alleged practicality of these two major, polarized traditional approaches to the embryo debate.

### 1.1. The All-Approach: “Embryos are complete humans who have full moral status”

The *all-approach* contends that embryos are morally significant beings on which no experimentation should be performed. It may resort either to development-based arguments (fertilization, gastrulation, etc.) or to metaphysical arguments (potentiality, human dignity, etc.) to defend the view that embryos have moral status as a paradigm human does (Lee, 1990; George & Lee, 2009; Marquis, 2007; Tollefsen, 2001). Development-based moral arguments focus on the developmental stages of the embryo such as in the *fertilization argument* (the embryo is morally significant once fertilization has taken place), the *implantation argument* (the embryo becomes morally significant once it is implanted in the uterus), the *gastrulation argument* (the embryo becomes morally significant once the neural crest is formed), or the *graduality argument* (the embryo’s moral significance increases proportionately with its embryological development). Metaphysical moral arguments, from a different viewpoint, focus on the intrinsic value of the human embryo such as with the *potentiality argument* (the embryo has the intrinsic potential to become a moral agent, so it is a morally significant being), the *identity argument* (the embryo is numerically identical to the postnatal human person, so it is morally significant), the *human dignity argument* (the embryo has the inherent human dignity, so it cannot be instrumentalized in a petri dish), the *playing God argument* (the embryo is God’s creation, not an instrument or commodity; therefore, no one can experiment on it). As indicated above, further detailed elaboration of these singular arguments is not necessary for our purpose in this paper, as we want to focus on a common starting point: the moral status of the embryo.

The *all-approach* argues that embryos have moral status and are morally significant the way all other paradigm humans are, due to one of the development-based or metaphysical reasons mentioned above. However, such an argument is quite hard to defend and sustain. Two widespread thought experiments along with two scientific facts demonstrate that embryos cannot be

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for research purposes, a position Devolder calls (and criticizes as) “discarded-created-distinction” (Devolder, 2005). However, this paper will focus only on all- and none- approaches.

considered as morally equal to paradigm human persons. Firstly, in a modified lifeboat case, let us imagine Billy, the captain of a tiny boat, along with Tommy and the embryo (in a petri dish of course) are traveling on the high sea. Suddenly, the lifeboat emits an emergency alert that necessitates tossing one of the passengers overboard. According to the *all-approach*, Billy cannot decide whom to throw out and continue his journey with because both Tommy and the embryo are morally equal beings. Secondly, in a modified fire rescue case, let us imagine there is a burning building in which Billy, Tommy, and the embryo are sharing a room. Billy suddenly wakes up and notices that he can only save one of his roommates (for whatever reason) while leaving the building. According to the *all-approach*, Billy cannot decide whom to rescue because both Tommy and the embryo are morally equal beings. These two examples demonstrate how the *all-approach* can be quite counter-intuitive in practice. Anyone of us should give up the embryo to rescue Tommy without any hesitation, although we may, understandably, have different reasons to do so (DeGrazia, 2006).

Furthermore, it is difficult to maintain an *all-approach* from a scientific point of view as well, because thirdly, if embryos were considered as morally important beings, just like a paradigm human, as the *all-approach* claims, it would be a moral obligation to prevent the quarter-million embryo losses occurring each year due to spontaneous abortion. Such a moral obligation would entail that the reasons for these abortions should be investigated and therapeutics should be developed to prevent the loss of embryos as a “scientific and medical priority” (Piotrowska, 2021). Additionally, fourthly, before gastrulation, which takes place about 14 days after fertilization, “the embryo hasn’t yet decided how many people it is going to be,” according to Mary Warnock (Steinbock, 2009), meaning that until gastrulation, theoretically, twinning might occur, or conversely, four embryos can fuse into one. Thus, if one adopts the *all-approach*, one needs to defend early embryo intervention to avoid twinning into two (or four) or fusing into one to protect those beings considered moral equals of paradigm humans (Devolder & Harris, 2007). However, as we may easily see, this conclusion will lead to an *all-approach* that contradicts its inherent position against intervention in the embryo. Therefore, it is not philosophically sustainable to defend the view that embryos to be used in labs while in the preimplantation stage are moral equals of paradigm humans. The four reasons stated above imply that preimplantation-stage embryos do not have the same moral status as any ordinary person, but does that allow us to conclude that they are of no significance at all? We will return to this point later.

## **1.2. The None-Approach: “Embryos are nothing but accumulations of cells, and do not have any moral status.”**

The *none-approach* maintains that embryos are not morally significant beings; hence, any experimentation can be performed on them. This position may resort either to psychological (conscience, self-conscience, etc.) or physiological (sentience, development of neural system) criteria to exclude embryos from the morally significant entities (Warren, 1977; Singer, 2009; Tooley, 1972). The *none-approach*, like the *all-approach*, can also be problematic because depriving embryos of moral status and significance is not as helpful in practice as its defenders claim. On the contrary, we maintain that such an approach may prevent many people from arguing for the necessity of embryo intervention in order for them not to be on the same side as the counter-intuitive claims of the *none-approach*. Moreover, as Steinbock argues, the question “When does human life begin?” is indeterminate and not “a bio-scientific question but more like a metaphysical and ontological question” (Steinbock 2009). Thus, trying to answer such a question based on merely scientific facts, to many authors wanting to engage in the embryo debate will appear to be an inconclusive effort.

Now, we shall turn back to our initial question: If embryos in the preimplantation stage lack the moral status of a paradigm human, can we consider them solely as biological material to

experiment on in the lab? We oppose this proposition and will now show that we are not alone in rejecting it.

## 2. A Quest for Common Understanding in the Morality of Embryo Manipulations

To recapitulate what this paper has so far covered, the argumentative scale delineating the moral status of the embryo is quite varied, lying between two polar points, namely, the *all-approach* (claiming that “embryos are complete humans who have full moral status”) and the *none-approach* (claiming that “embryos are nothing but accumulations of cells”). While embracing and respecting such a great moral diversity of beliefs about the embryo, this paper suggests that there should be a practice-focused and less counter-intuitive moral stance in between these two extremes.

As noted by several authors, “Bioethics has a longstanding fascination with issues of moral status” (Koplin & Gyngell, 2020). In the bioethical context, to say that a being has moral status is to say that it carries moral importance, making it matter from a moral standpoint how other moral agents treat that being. Furthermore, theoretically, moral status is expected to determine whether the being in question has any morally relevant interest in being treated as morally important (DeGrazia, 2008). However, between inanimate rocks and the authors of this paper, there exists a range of beings, “non-paradigm humans,” as DeGrazia calls them. Non-paradigm humans, unlike a paradigm human (e.g., you, me, or Anthony Hopkins), include organisms that are “unquestionably human but lack many or all of the emotional, experiential, and cognitive capacities of human adults” (Koplin & Gyngell, 2020). In this sense, embryos and most fetuses can be considered as non-paradigm humans whose moral status is not clear when compared to paradigm humans, eliciting bioethical debates (DeGrazia, 2008; Baldwin, 2009; Steinbock, 2009).

Although resorting to moral status arguments provides a theoretically useful shorthand to determine our moral obligations to different beings, it sometimes obscures the way in practice, such as when experiments use preimplantation-stage embryos for lab experiments. This is why some authors, notably DeGrazia (2008), proposed that instead of talking about an all-or-none moral status of embryos, bioethics should adopt an approach considering “moral status as a matter of degree”, arguing that “...not all sentient animals have the same moral status as human persons, suggesting that moral status can vary between the poles of full and none.” In a similar vein, these authors also argue that non-paradigm humans such as embryos should not be considered as moral equals of paradigm humans (DeGrazia, 2008).

The embryo is a highly ambiguous entity in both moral and biological context (Devolder & Harris, 2007). For this reason, bioethical debates over embryos seem never to reach a common conclusion from a theoretical point of view. Yet, embryo manipulations need to be regulated more clearly, given that embryos are expected to become part of reproductive clinics once genetic intervention finds a way to overcome moral, theological, and legal obstacles. It is thus significant to find a practically viable common ground in between all- and none-approaches. As an indication of the practical need for such a common ground, many authors with different moral views about the embryo offer various thoughts on the different versions of compromise in their stance towards moral acceptance regarding embryo intervention. For example, while some proponents of the all-approach contend that although surplus embryos (or those to be discarded) can be used for research purposes, *de novo* creation of embryos for research is not morally acceptable (President’s Council on Bioethics, 2005). Likewise, many authors who support embryo research suggest that a *laissez-faire* approach to embryo research should not be considered acceptable. These authors, who do not think that embryos have any moral status but still suggest that they deserve respect, while arguing that to value embryos does not mean that we cannot use them at all, insist that we need to do so properly (Robertson, 1990; Steinbock, 2009). Along a parallel line, Devolder also suggests that “[e]arly embryonic tissue or cells are respected by ensuring that they are used with care in research that incorporates substantive values such as the alleviation of human suffering” (Devolder, 2005).

These authors respect our intuition that embryos should not be treated merely as any other type of body tissues and there should be some limits to the uses of human embryos. As is stated persuasively by Stanton & Harris:

Those who, on religious grounds, consider life has moral significance from the first development of an embryo, will consider the embryo should be accorded the respect a person should receive. Others, who attribute moral status only to human beings able to value their own existence, may still accord embryo respect, although perhaps neither the level, nor the form of respect they would accord a rational human being (2005).

In a way similar to this commonly shared intuition of moral respect, we argue that (i) we cannot consider preimplantation-stage embryos as complete human organisms having full moral status—because then we could never throw a human being overboard instead of an embryo as in the lifeboat/fire rescue examples, while at the same time, (ii) we cannot consider embryos solely as biological materials that have no moral status because they are ontologically different from other somatic cells and tissues in our bodies. As Baldwin clearly points out: Human embryos do have some intrinsic value by virtue of their inherent potential—which is different from that of stem cells and gametes—but it is a good deal less than that of an infant or indeed a 24-week-old fetus who already has some mental capacities (2009).

### **2.1. The Embryo Deserves Moral Respect, Not Full Moral Status**

Consequently, we claim that embryos deserve moral respect, not full moral status. Moral respect is a concept different from moral status. According to Steinbock, the notion of moral status necessitates the presence of interests or welfare concerns, while moral respect does not. Therefore, Steinbock, who thinks that embryos do not have moral status, argues that embryos certainly deserve moral respect that imposes certain constraints on how we treat them (Steinbock, 2009:435–6). We also argue that the notion of moral respect for embryos provides practically valuable solutions for commonly shared moral intuitions like those mentioned above and can act as a mediator in resolving the impractical conflict between all- and none-approaches.

This paper argues that embryos are entitled to moral respect for three main reasons. Firstly, human embryos deserve moral respect because they have inherent potential to become “one of us.” Although several authors who share this intuition (including one of us) might have certain religious ideas about the moral significance of the embryo, others think that “[t]reating the early embryo with special respect as a thing of unique value does not depend on metaphysical assumptions or religious belief...” (Robertson, 1990, p. 447). Just like we respect human corpses that have no moral status “anymore,” we owe moral respect to human embryos which have no moral status “yet” because they have the potential to become “one of us.” We respect human bodies not because they have any interests that grant them moral status but because they had once been a living human being. Likewise, human embryos deserve moral respect not because they have any interests that grant them moral status but because they may become a living human. In this case, embryos are worthy of moral respect not because of their present “...potentialities, but future outcomes.” (Devolder, 2005) For that reason, most people—except proponents of the all-approach—deem embryos worthy of respect, but up to a certain limit. For instance, couples who undergo IVF procedures and create surplus embryos to increase the chance of their parenthood, can consent to freezing or disposing of them. However, they will never consent to freezing or disposing of an actual child (Devolder, 2005). In a similar vein, Steinbock argues that:

Dead bodies are owed respect both because what they are—the remains of the once-living human organism—and because of what they symbolize—the human person who is no more. Human embryos deserve respect for similar reasons: they are a developing form of human life, and a symbol of human existence (2009, p. 436).

Steinbock also states that “a human embryo is something special, and a source of awe...” and deserves moral respect that imposes some restrictions on our use and disposal of embryos. She argues that the notion of moral respect is different from a moral status approach insofar as it recognizes the moral value of non-paradigm humans as well as of sentient non-humans (Steinbock, 2009, pp. 436-437). Steinbock agrees with Sandel who states that “as one who supports embryonic stem cell research, I do not regard the early embryo as inviolable. But neither do I regard it as disposable, open to any use we may desire or devise” (President’s Council 2005: 91). Although Steinbock departs from Sandel in her suggestion that respecting embryos does not mean we can treat them as inviolable or we should prohibit embryo experimentation (as the *all-approach* suggests), we should still put in place some regulations and restrictions for the embryo manipulations and embryonic microsurgery that will help alleviate a wide range of human sufferings (Steinbock, 2009, pp. 436-437). Piotrowska (2021) also states that:

Embryos have a special moral value when they are a part of a plan to form or extend a family. When [embryos] are not part of a plan to form or extend a family, they can still have a special moral value: as a means of extending knowledge and saving or improving the lives of people. We also argue that, while embracing diverse moral thoughts and religious beliefs about the embryo, we can use the potential of embryo manipulations to help human beings (Devolder & Harris, 2007).

Secondly, human embryos, unlike other diploid somatic human cells, are considered a complete biological organism, not solely groups of cells like the goblet cells of the small intestine or squamous cells of the epithelium. Organisms are, following Silver, “...characterized by internal complexity featuring the interdependence of different subsystems and the drawing of energy from the environment to maintain internal order and resist entropy” (Silver, 1998). An organism can be a single cell like a bacterium or consist of multi-billion cells like a human adult. One may ask, “Do we owe moral respect just because a being is an organism?” Of course, we do not. We do not owe any moral respect to bacteria when we flush them into the sink, using detergents or antiseptics. However, we owe moral respect to human embryos because they are biological precursors of human organisms rather than to a bovine or avian organism, which makes them worthy of moral respect, although less than you or me (DeGrazia, 2006, 2008). From a different point of view, Piotrowska argues that “even if embryos are not persons, we could have significant moral reasons not to kill them, just as we might have significant reasons not to kill higher animals” (2021).

Thirdly, human embryos deserve moral respect because soon they may become part of clinical procedures in reproductive clinics, starting with germline genetic intervention for severe monogenic diseases. Thus, to adopt such a significant future application, we need to use the transitory time period we are currently in to discuss and regulate such interventions in advance.

To recapitulate, along with many other authors, we argue that embryos do not have as considerable a moral status as a paradigm human does, but they still deserve moral respect because (i) they have an inherent potential to become a morally important human being, (ii) they are human organisms, not just a cluster of variegated cells and (iii) they will soon need to be considered patients being subjected to genetic intervention in a petri dish. These possible explanations for the moral respect that the embryo deserves suggest, in line with what we argue in this paper, that there should be a practice-focused and less counter-intuitive moral stance in between the two poles of all- and none-approaches to moral status. The concept of “moral respect for embryos” was introduced suggesting that to respect the embryo does not necessarily mean prohibiting embryo research and manipulations, but requires regulating it wisely (Steinbock, 2009). Thus, the concept of “moral respect” may help us reach a practically valuable moral understanding to be adopted in research settings. But how can we transform the notion of moral respect into the practice of embryo research? We will now offer one important suggestion to clarify what moral respect for embryos entails.

## 2.2. What Does Moral Respect for The Embryo Entail?

After emphasizing that embryos cannot be considered solely biological material, we have defended the claim that embryos are worthy of moral respect. Steinbock suggests moral respect for embryos to mean that wise regulations should be placed on the embryo experimentation (Steinbock, 2009). While agreeing with her, we want to make her suggestion more tangible with a practical suggestion. According to our proposition, the notion of moral respect entails that embryos should be handled by a specialist trained in embryology. If we argue that respect to embryos can be shown by leaving their handling to embryologists, a reform in postgraduate medical education may actually become necessary. To our knowledge, clinical embryology training as a postgraduate medical specialty for medical doctors exists only in a few countries such as Turkey and France (Uslu, personal communication). However, the notion of moral respect requires the status quo to be changed in order to adapt future medical practices: Just like only a cardiologist deals with the heart and heart-related problems, only an embryologist should handle any embryo-related procedure.

## Conclusion

Throughout this paper, we defend the view that preimplantation embryos used in the lab deserve moral respect, not necessarily full or no moral status, because (i) they have an inherent potential to become “one of us”; (ii) they are human organisms in a biological sense, and (iii) they will soon be considered as patients in reproductive clinics. We also suggest that if embryos in the near future are to be considered as patients being subjected to genetic intervention in a petri dish, then they need to be handled by a specialist trained to deal with embryos: a clinical embryologist. This is the least that moral respect entails in practice. The ethical relevance of this role will be elaborated in a forthcoming paper.

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## Conflict of interests

The Authors declare no conflict of interest.

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