# Philosophical Considerations About the Beginning of Humana Life and Their Clinical Implications

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## Introduction

Philosophical considerations about the beginnings of human life have important clinical implications for obstetricians and gynecologists not only for daily clinical applications but also for basic science and clinical research in reproductive medicine.

Obstetrician and gynecologists already are familiar with ethical considerations, especially about the moral status of the embryo and the fetus but are less familiar with philosophical considerations that underlie these familiar ethical considerations.

Metaphysics is the branch of philosophy that studies the fundamental nature of reality, the first principles of being, identity and change, space and time, causality, necessity, and possibility.

Understanding philosophical and metaphysical considerations and their connections to the ethical considerations is essential for obstetricians and gynecologists but also other specialties concerning professionally responsible clinical practice and research. Here, we provide a concise and accessible introduction to the metaphysics of human reproduction, its philosophical reasoning, and metaphysics and its implications for ethical reasoning. We also will discuss the connections to the ethics of human reproduction and then to the implications of these philosophical considerations for the professional ethics of research and clinical practice in obstetrics and gynecology.

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## Philosophical Reasoning

**Any philosophical reasoning comprises of at least two steps [1]:**

1. The first step comprises the effort to become as clear as possible about concepts pertinent to the topic at hand.
2. The second step is to identify the implications of these concepts for the topic at hand.

## Essential Concept

The first type of concept is known as an *essential concept*. *An essential concept* can be stated as a set of criteria for the invocation of the concept, more precisely, the individually necessary and jointly sufficient conditions for the invocation of a concept. The individually necessary conditions are:

(a) A justified claim, a claim for which reasons can be given that others are intellectually obligated to accept.
(b) Treatment by others, what they should or should not do to the rights-bearer.
(c) The specific behavior that counts as acceptable treatment by others.

That each of these three is an individually necessary condition means that, if any one of them is not satisfied, the concept of a right cannot justifiably be invoked. That these three are jointly sufficient conditions means that, if all three are satisfied, then the concept of a right can justifiably be invoked.

## Cluster Concept

The second type of concept is more complex and is known as a *cluster concept*. A cluster concept differs from an essential concept in that not all of the sufficient conditions have to apply in every case; some are sufficient to invoke the concept. For a cluster concept, different groupings of criteria can serve as sufficient conditions. When they are satisfied, the cluster concept can be invoked. These groupings can differ in different contexts, which puts cluster concepts at risk of becoming unclear. The antidote to this risk is the clear statement of the pertinent sufficient conditions and why they are satisfied.

Obstetrician–gynecologists, other physicians, and biologists are already well acquainted with a cluster concept, which is the focus of this article: life. Britannica (better known as the Encyclopedia Britannica) defines life: “Life, living matter and, as such, matter that shows certain attributes that include responsiveness, growth, metabolism, energy transformation, and reproduction” [2]. The Oxford English Dictionary provides the following definition of life: “The condition that distinguishes animals and plants from inorganic matter, including the capacity for growth, reproduction, functional activity, and continual change preceding death” [3]. Other sources provide similar definitions. These definitions and others demonstrate that the concept of life is a cluster concept.

Inorganic matter is not considered "life" as it meets none of the criteria in any definition of life: the criteria specified in a definition of life are jointly necessary conditions for the invocation of the concept. Inorganic matter is lifeless, although its antecedents may have been alive, as in the case of fossils.

Life can exist by satisfying some criteria but not necessarily all. For example, life can exist without reproduction. When a post-menopausal patient is not capable of reproduction, she can still be very much alive. The patient retains the capacities for functional activity, energy transformation, growth, and continued change. But when none of the necessary conditions for being alive are satisfied, then there is no life but absence of life or death.

Life can display variation in complexity, from single-cell organisms to bodily organs, to the body as a whole, and in large eco-systems. There are also borderline, challenging cases, including viruses and prions.

This brief review of the cluster concept of life underscores a point we made above: when a cluster concept is deployed, the criteria deployed to invoke the concept must be clearly stated and justified as pertinent and biologically grounded. Failure to do so will always result in a paralyzing lack of clarity, in which circumstance philosophical reasoning is impossible.

## Particulars and Individuals

Metaphysics can be a dense subject to study, sometimes impenetrably dense, which is not acceptable in philosophy and therefore not acceptable in professional ethics in obstetrics and gynecology. The word "metaphysics" originated in the need for a title to an early edition of the works of Aristotle for a text that had no title but appeared after his text, "Physics" [4]. The untitled text became known as "Metaphysics" or, from the Ancient Greek, "After the Physics." In the history of Western philosophy, metaphysics has become to be understood as the study of the most fundamental aspects of being or reality.

An important subset of metaphysics is known as ontology or the classification of entities or a typology of entities. Ontology is a branch of metaphysics concerned with the nature and relations of being. Aristotle's text, *Categories*, for example, is one of the earliest works in ontology in the history of Western philosophy. For Aristotle, there are two basic categories: substances or individuals of various natural kinds and their properties, which Aristotle called "accidents" to indicate that, while the nature of a substance does not change, its properties do [5]. Like Aristotle, for reproductive medicine and research, we need an account of two types of entities, particulars and individuals, which have precise meanings in ontology.

### Particulars

The concept of a particular is an essential concept and contains a single criterion that functions therefore as both the necessary and the sufficient condition for invoking the concept: the entity in question can be distinguished from other

entities. For example, a cell in one petri dish in a laboratory can be distinguished from a cell in another petri dish. This is known as spatial difference. One cell can divide into two, with the latter coming after the former in time. This is known as temporal difference. Spatial and temporal differences are the most common form of differences invoked in metaphysics to distinguish particulars. The criterion of distinguishability is known in the history of metaphysics as the criterion of distinction [6–9].

### Individuals

The concept of an individual is an essential concept that comprises two criteria: distinction and indivisibility into two entities of the same kind [6–9]. A patient in an obstetrician–gynecologist's clinic is an individual. She can be distinguished spatially from the patients in the other examination rooms. She can be distinguished temporally from patients who preceded and who will follow her in the examination room. She is also indivisible: she is not capable of dividing into two human beings. If it becomes clinically justified to amputate one of her lower extremities to surgically manage gangrene, the result is not two human beings but one human being now without a portion of one of her lower extremities and the severed extremity. The severed extremity can be divided, so it is a particular not an individual.

In the history of Western metaphysics in the Aristotelian tradition, the source of both distinction (spatially or temporally distinguished) and indivisibility is known as the principle of individuation. This is a constitutive component of individuals. There are differing accounts of the principle of individuation, but this need not concern us for present purposes. The key point is that all accounts agree that the principle of individuation generates both distinction and indivisibility [6–9].

## Ethical Reasoning About Particulars and Individuals

Ethical reasoning is defined as a form of reasoning whose behavior is right and good. In the history of moral philosophy, many differing ethical theories exist about what should count as right and good. There is agreement, however, that when we have an obligation to protect and promote the interests of an entity, then that entity has what is called "moral status."

### Moral Status

Moral status means that there are good reasons, a justification, for such obligations which are called ethical obligations or sometimes also moral obligations [1]. There are two kinds of moral status [1]: the "dependent moral status" and the "independent moral status."

## Dependent Moral Status

The first moral status, the dependent moral status, is a moral status that we attribute to an entity because we have an interest in it or a stake in its present and future existence. For example, a couple hoping to initiate a pregnancy using embryos produced by in vitro fertilization have a stake in the present and future existence of the in vitro embryos, especially those that have been evaluated to be good candidates for transfer. Dependent moral status is given by others to an entity and does not originate in some aspect of that entity.

## Independent Moral Status

The second kind of moral status is called independent moral status. This means that we have obligations to an entity because it has the capacity to generate its own moral status independent of the interests of others. In other words, independent moral status is an essential concept in which the capacity to generate moral status functions as the necessary and sufficient condition for such generation. An entity has independent moral status if (the sufficient condition) and only if (the necessary condition) it has the capacity.

There are competing accounts in the history of Western philosophy and also in other global philosophical traditions about what capacity is required as the criterion for self-generated moral status. Some accounts emphasize that the independent moral status of a human being is a function of having a central nervous system that supports consciousness that includes both sensory awareness and self-awareness. Other accounts emphasize that sensory awareness and consciousness sufficient to experience pain (a report in the central nervous system of tissue damage or threat of tissue damage accompanied by awareness) generates independent moral status. In the more than 2500-year history of Western philosophy, there is no agreement in the global history of philosophy about which account of independent moral status must be accepted by all. Any claim, therefore, to have established *the authoritative* account of independent moral status lacks philosophical validity [1].

Metaphysical reasoning and ethical reasoning about particular and individuals and their moral status have two major implications for the ethics of reproductive medicine and research:

1. *Only biological individuals have the capacity that generates independent moral status, whatever that capacity may be according to a particular ethical theory.*
2. *Biological particulars are not capable of having the capacity to generate independent moral status.*

Biologic individuals with independent moral status have this status independently of the interests of others. This has the important ethical implication that everyone must acknowledge independent moral status. Biologic particulars do not have this capacity because they can divide or twin. Particulars, therefore, can only

have dependent moral status. Biologic particulars with dependent moral status have this status solely as a function of the interests of others. Being a particular organism *and* being the object of the interests of others are the individually necessary and jointly sufficient conditions for having dependent moral status.

## The Metaphysics of Human Reproduction

Gametes or sex cells are an organism's reproductive cells. There are usually female and male gametes. Ova or egg cells are female gametes, and sperms or spermatozoa are male gametes. Gametes are haploid cells, which means that each cell or gamete carries only one copy of each chromosome.

Fertilization begins when an egg or ovum joins with one or more sperm, leading to cell division and eventually creating an embryo. Gametes thus have the capacity to fuse to become an embryo. Because individual cells can divide, the constituent cells of an embryo are particulars. These blastomeres form a coherent group of cells known as a morula. The morula has the capacity to twin, so it is also a particular. Even as the morula becomes progressively complex in its organization, it remains a particular. The embryo that retains the potential to divide into twins does not satisfy the criterion of indivisibility but only the criterion of distinction. Such embryos are not individuals but particulars. It follows that the in vitro embryo is a particular not an individual. This is also the case for the in vivo embryo before it implants in the uterine wall and no longer has the capacity for twinning. When this capacity is lost, the implanted embryo and the fetus that it becomes are now individuals because they satisfy the two criteria of distinction and indivisibility.

Hurlbut has taken the view that embryos are indeed individuals in virtue of "an unbroken continuity in the differentiation and organization of the emerging individual life," and he is almost alone in taking on the metaphysical challenges of early human life forms [10, 11]. The problem for Hurlbut's assumption is that the most that "unbroken continuity" of a coherent set of dividing cells can establish is distinction. Hurlbut is aware of the challenge of twining just described but attempts to sidestep this challenge by claiming that twinning is the result of "a disruption of normal development by a mechanical or biochemical disturbance of fragile cell relationships" [10]. Such a disruption would not be possible for an organism that had achieved indivisibility, a metaphysical constraint on scientific explanation that Hurlbut does not acknowledge. He then claims that, before twinning, there exists a "crucial relational dynamics of position and intercellular communication are already at work establishing the unified pattern of the emerging individual" [10]. The concept of an emerging individual is left unexplained, which is not consistent with the requirement of clarity in philosophical reasoning. The claim that there is somehow an emerging individual in the coherent collection of cells does not defeat the metaphysical analysis that, before twinning becomes impossible, this collection is a particular and not an individual.

As the Human Embryo Research Panel of the US National Institutes of Health put it, "developmental individuation" is only achieved after twining becomes

impossible [12]. Before this occurs, embryological development is not, as Hurlbut would have it, "unified" but, instead, highly coherent. The highly coherent nature of the pre-implantation embryo is a source of its distinction from other embryos, e.g., in a petri dish in a reproductive embryology laboratory. In addition, on Hurlbut's account of the embryo as a unified organism, obtaining a single cell for pre-implantation genetic/genomic diagnosis would result routinely in destruction of the embryo, which turns out not to be the case. This scientific reality confirms that the pre-implantation embryo is a particular, not an individual.

## Implications of the Metaphysics of Human Reproductions for the Ethics of Human Reproduction

Because they are particulars and not individuals, gametes, in vitro embryos, and in vivo embryos before implantation do not have independent moral status, but they have only dependent moral status. Any claim that organisms that are particulars, but not individuals, possess independent moral status is philosophically invalid.

In vivo embryos that have implanted in the uterine wall and are growing as well as fetuses are individuals. However, being an individual is not enough to establish that they have independent moral status. In other words, being an individual is a necessary condition for having independent moral status: being an individual in and by itself is not a sufficient condition for having independent moral status. To have independent moral status, biologic individuals, organisms that are distinct and indivisible, must also satisfy an additional necessary and sufficient condition: the capacity to generate moral status independently of the interests of others, as explained above. In other words, when an individual organism has the capacity to generate its own moral status, it fulfills the sufficient condition for having independent moral status. Being an individual organism and having the capacity to generate moral status are the individually necessary and jointly sufficient conditions for having independent moral status.

The fetus does not have independent moral status because that would require a central nervous system that supports consciousness that includes both sensory awareness and self-awareness, which a fetus doesn't have [13]. The achievement of independent moral status comes only after birth, and there is disagreement in ethical theories about when after birth the central nervous system capacity to generate moral status exists.

## Implications for Professionally Responsible Research and Practice in Reproductive Medicine

Gametes, embryos, and fetuses are continuums of life forms. They satisfy some of the sufficient conditions in the cluster concept of life, including responsiveness, growth, metabolism, energy transformation, and reproduction (in the form of cellular replication). The destruction of a living gamete, embryo, or fetus introduces a

life-taking pathology not previously present and not interfering with that pathology as it runs its course to death.

That a biological entity was previously alive does not establish, by itself, whether its termination is permissible (shown in ethical reasoning to be acceptable) or impermissible (shown in ethical reasoning to be unacceptable). This ethical judgment can be made only on the basis of the moral status of a biologic organism. The current criteria for the cluster concept of life do not include the capacity to generate moral status (however it is understood in competing ethical theories). This is because the cluster concept of life in the science of evolutionary biology needs to be comprehensive, to include the full range of organisms, from the single-celled, particular organism to the complex, multi-celled, individual organism. That a biologic organism is alive cannot therefore *by itself* establish that that organism has either dependent or independent moral status.

It is well accepted globally that basic science and clinical research are required for the improvement of the safety and efficacy of patient care in obstetrics and gynecology and all other specialties [14]. Research into the beginnings of human life requires the use of gametes and pre-implantation embryos. In order for public policy (and consequently legislation) about the beginnings of life to have intellectual and moral authority in modern, pluralistic societies, public policy should be consistent with the requirements of philosophical reasoning about the beginnings of life as set out above. Public policy and legislation, specifically legislation that does not satisfy this requirement, will justifiably be considered arbitrary because it lacks intellectual and moral authority. Such public policy should not command respect but be expected to encourage cynicism and non-cooperation. These outcomes are perilous for the professional integrity of research on the beginnings of human life.

The requirement that public policy be consistent with philosophical reasoning has an important implication. The objection that such research is ethically impermissible on the grounds that gametes and pre-implantation embryos have independent moral status is philosophically invalid. Public policy about the regulation of such research should therefore not be based on any claim that gametes or embryos possess independent moral status. In particular, the claim that a pre-implantation embryo has independent moral status and therefore a right to life is philosophically invalid because the pre-implantation embryo does not satisfy the necessary condition of being a biological individual.

Many individuals and communities, especially faith communities, have an interest in the human organisms that constitute the beginnings of human life. This means that gametes and, especially, pre-implantation embryos are candidates for having dependent moral status because they are particulars not individuals. Policy makers immediately confront a problem: faith communities do not have the same interests in gametes and pre-implantation embryos. Some faith communities will find research on gametes and embryos objectionable or even impermissible, while other faith communities will find such research not only permissible but also obligatory.

The first step is to recognize that individuals and faith communities who object to this research experience the real moral burden of allowing such research to occur and to use public funds to pay for it. The incidence of infertility is not based on a

patient's beliefs about the moral status of gametes and pre-implantation of embryos. This clinical reality means that those who object to basic science and clinical research to mitigate infertility might become candidates for clinical interventions based on such research. This means that individuals or groups in a pluralistic society must acknowledge that the moral burden they experience can be offset by the benefits of mitigations of infertility that might result from basic science and clinical research [15].

It follows that ethically justified public policy is to permit basic science and clinical research on gametes and pre-implantation embryos. Priority should be given to investigation into the mechanisms of infertility and how these might be safely altered to mitigate infertility.

## Implications for the Professional Ethics of Clinical Practice of Reproductive Medicine

In the professional ethics of obstetrics and gynecology, practicing obstetrician–gynecologists have the professional responsibility to improve the safety and efficacy of clinical practice, including reproductive medicine. They can readily meet this ethical requirement by referring eligible patients to clinical research that has undergone prospective review and is approved by the legally designated entity. This is known in most institutions as an Institutional Review Board in the United States or Research Ethics Committee in other countries [14]. Such approved research will be normally based on sound science and ethical justification and will include an ethically appropriate informed consent process that respects science and the autonomy of their patients.

Some patients may decline the referral to this research and explain that they do so on moral grounds, especially moral grounds related to the moral status of gametes and pre-implantation embryos. To respect the autonomy of these patients and to show respect for them as persons, the obstetrician–gynecologist should share some thoughts that the patient may find worth considering before refusing the referral altogether. For patients who accept this offer, the obstetrician–gynecologist should set out the reasoning just above and its key point: the potential clinical benefits of mitigating infertility may offset the moral burden of research using gametes or pre-implantation embryos. The goal should be to fulfill the basic requirement of the ethical principle of respect for autonomy, empowering the patient to make an informed decision about whether to accept referral to a clinical trial [1].

## Conclusion

Metaphysics may at first appear far removed from research and practice in reproductive medicine. In this article, we have shown that the latter and the former are intimately connected. A basic knowledge of the metaphysics of particulars and

individuals helps to elucidate the concept of dependent and independent moral status and therefore the professional responsibilities of obstetrician–gynecologists regarding research and practice in reproductive medicine.

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