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The Camouflaged Metaphysics of Embryos

BY JANE MAIENSCHEIN

Scientized discussions on how to interpret the beginning of life are not productive.

In the United States, diverging interpretations of what constitutes life coexist across public, policy, and legal environments. Many draw on what I call a *hypothetical embryo*, an entity that is almost entirely imagined rather than observed. The result is "scientized" political discussions that cloak metaphysical beliefs and disallow nuance for different stages of human development. This was abundantly clear in the arguments laid out when the Supreme Court decided *Dobbs v. Jackson Women's Health Organization*in June 2022, leaving decisions about abortion to legislatures and states rather than the courts.

The ramifications of that decision, and metaphysical arguments masquerading as scientific fact, continue to play out across interpretations of the whole human reproductive process, including in health care and technology. Yet from my perspective as a historian and philosopher of science and science policy, I see opportunities for thoughtful reflection and crafting of better informed, more nuanced policies.

The hypothetical or imagined embryo derives from the metaphysical beliefs of previous millennia, before it became possible to observe embryos and study their development with sophisticated imaging tools. Because the embryo remained unseen, it invited debate about when the individual begins. Many pointed to a time of *quickening*, when the mother becomes aware of the fetus, thought to be around four months of pregnancy, as the starting point for a new life. Improvements to the microscope and other advances in the nineteenth century brought a wealth of theories on how egg and semen interact for fecundity. Then in 1869, in the context of reform, Pope Pius IX changed the Church's excommunication policy to reflect his conviction that life can begin at conception. Only in the twentieth century, in an attempt to posit a bright-line rule leaving little room for interpretation, have legislation and lawsbegun pointing to conception as the starting point for a new life. Even so, "conception" is sometimes used in competing ways to mean the moment of fertilization, the moment at which an embryo is implanted in a woman's uterus, or the point at which cells begin differentiating rather than simply dividing.

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In the late 1990s, amidst debates on stem cells and cloning, I presented all-day educational seminars through the Federal Judicial Center about how science understands human development from fertilization to birth. Federal judges, their staffers, and I had lively discussions about what an embryo is biologically, its developmental stages, and how to interpret that legally. We started with accepted scientific facts

about developing humans, acknowledged gray areas where science continues to untangle questions, and explored many competing social, political, and legal claims that purport to be grounded in "the science" but are instead matters of metaphysical conviction and belief.

That experience made clear to me that well-intentioned people with disparate views on abortion access can sometimes draw on partial or misinformation. In a respectful, open environment, many will revise those views. Thus, though scientific fact does not determine policy, scientific evidence surely provides a useful place to start establishing solid and consistent definitions.

SCIENTIZED LEGAL ARGUMENTS

Though my analysis below dissects scientization in legal arguments by abortion opponents, I want to be clear that all positions in this debate should strive to be honest and accurate in their definitions. Referring to a developing embryo as "just a clump of cells" without also acknowledging its potential is a bit akin to describing a symphony as just a bunch of notes on a page or a birthday cake as a bowl full of ingredients. Similarly, the description of a fertilized egg as a baby is inaccurate because the raw materials are not the same as the product, and development and differentiation is what turns the raw materials gradually into an entity with form and function.

So let's start with some clear definitions. The biological beginning occurs when a sperm cell and egg cell join in fertilization, and the cells merge to produce a zygote. Whether it happens inside a body or in a glass dish, these early stages of development see the zygote grow into a hollow ball of cells that is often referred to as the blastocyst or pre-implantation embryo. Within, the "inner cell mass" is a clump of undifferentiated cells dividing to make more cells. In a textbook pregnancy, this implants in the uterus between 5 and 14 days post-fertilization. Only after implantation does the gradual process of cell differentiation begin. Implantation is a biologically and medically significant point, because now the embryo is attached to a uterus.

Technically, an early developing human is defined as an embryo until after eight weeks, when the developing human is then called a fetus until it is born. In law, the time of development is sometimes given from the last menstrual cycle because that can be more easily documented. In biology, the time more often given is from fertilization.

The science is clear on another socially important point that is missing in legal and metaphysical discussions: most fertilized eggs do not survive to the point of implantation. It is estimated that, under natural circumstances, fewer than half of fertilized eggs go on to survive through the entire pregnancy to birth. This fact complicates political reasoning that seeks to assign some version of personhood to all embryos.

Further confusion arises from the fact that biologically, *conception* doesn't have a meaning. Fertilization is the start, leading to a zygote. But popular discussions point to conception, which seems like the thing that can happen after sex, as "starting the embryo." My books *Whose View of Life? Embryos, Cloning, and Stem Cells* and *Embryos Under the Microscope* discuss changing understandings of *embryo*—while IVF clinics routinely refer to a fertilized egg as an embryo, other scientific descriptions of development reserve the term until after implantation.

From a biological standpoint, it does not make sense to consider the developing human as legally, metaphysically, or socially equivalent at all stages. For example: two fertilized eggs can fuse and produce a single baby that started as two zygotes. Did one kill the other? Further, one fertilized egg can split into two, producing identical twins, which raises questions about how many persons are involved. Fertilization and subsequent development can be a messy process, and clarity in definitions and biology would go far to ensure policy and legal actions are capable of being interpreted consistently and coherently. By referring decisions back to the states, *Dobbs* forces legislators to take positions on when life is taken as beginning. In the ensuing debates, lawmakers draw from their own entangled concoctions of metaphysical beliefs, theological convictions, and scientific evidence (or claims offered as scientific even when they are not). What this points to is a severe lack of common understanding. It is worth looking at how *Dobbs* does this.

DOBBS AND LIFE IN THE LAW

When *Dobbs v. Jackson Women's Health Organization* quotes the text of the Mississippi law being considered, it demonstrates how legal statements cast scientific language in metaphysical contexts: "To support this Act," the text reads, "the legislature made a series of factual findings." Let's consider these in turn.

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First, the claim that "at 5 or 6 weeks' gestational age an 'unborn human being's heart begins beating.'" Set aside the confusing language of "gestational age," which would be measured from the last day of the menstrual cycle and so not aligned with the length of development. The statement's intent seems clear: the "unborn human being" (actually still an embryo) is presented as having a "heart" that "begins beating." The implied assumption is that heartbeat is important for defining life. It is true that tissue—which will, in the future, become the heart—is pumping fluid around the fifth week. But by conventional definition, a human heart is a four-chambered organ that pumps blood throughout the body, which does not actually form in a human fetus until about 20 weeks. Ultrasound technology can show spontaneous movement of some pre-cardiac cells at this early point, but, despite how some simplified descriptions refer to early structures, there is no fully formed heart to do the beating. (In fact, cells cultured outside the body can also contract spontaneously, without any potential to form a heart, let alone pump blood.) Doctors have called the phrase *fetal heartbeat* misleading, and an artifact of the ultrasound machine. This description of a heartbeat is grounded in metaphysical interpretation rather than a functional organ. Note that functions that assume their roles at birth—such as the lungs breathing air or the digestive system gaining nutrition—go unmentioned.

The Mississippi legislation also states that at eight weeks the "unborn human being begins to move about in the womb," with the implication that it initiates its own movement. But this early form has no brain (or even many organized nerve cells) that can have intentions or move by desire. There is considerable evidence that it is essentially floating in amniotic fluid and responding to surrounding mechanical rather than sensory stimuli.

At nine weeks, according to the legislation, "all basic physiological functions are present." This is very imprecise. What would be on a list of "all basic physiological functions"? Neither breathing nor digestion is yet possible. Nor are there pain receptors or anything approaching cognition. Vital functions emerge gradually as an embryo and fetus develops, yet the text of the law implies that these processes are complete. In effect, the Mississippi law dresses its metaphysical assumptions in purported scientific understanding without incorporating the best available scientific knowledge.

BEYOND *DOBBS*

Many have asked me what the *Dobbs* ruling, with its reliance on metaphysical assumptions and muddled science, means for regulation of related technologies. This confusion illustrates the implications of not defining terms clearly.

Scientized discussions often ascribe metaphysical conceptions of *ensoulment* to the point of fertilization. This has implications for technologies such as in vitro fertilization (IVF). If fertilization happens in a lab in a glass dish, then according to this view, the result is dishes full of ensouled embryos—rather than clumps of as-yet undifferentiated cells in a dish. Those who seek to regulate the fertility business or advocate that frozen embryos have a "right" to be born are often acting on this belief. These ideas often explicitly invoke an idea of personhood for the embryo. A separate argument starts with the idea that a human embryo should be handled with respect even without ascribing personhood status. Although both of these arguments are based in metaphysics, they are often worded as if they are based in science.

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In Texas, and more recently in Indiana and Minnesota, legislatures have enacted bills to govern the handling of fetal remains produced by abortions and miscarriages. In Texas, the language explicitly includes both embryos and fetuses, so all stages of development. The term "remains" invokes the idea of human remains, or remains of something that was once a human individual, and this idea emerged in legislative discussions of the bills. The reasoning suggests that embryos and fetuses are de facto individuals entitled to the protections due to human persons. These embryos and fetuses, the law states, must be treated with "dignity" and therefore must be either cremated or buried, as with all humans. They must not, the law declares, be treated as medical waste and discarded in a landfill, which has been the standard of practice for decades.

Around the time these laws were being debated, I spoke with a journalist who was horrified to learn about this law. He explained that he and his wife had worked through numerous courses of IVF treatments over three years. They had a miscarriage, which he characterized as the "worst time of our lives." He said it made him furious even to hear about such laws. "How could they pretend that they know what is good for me and my family?" he asked. "I'm Jewish, and to say that this miscarried material is somehow a person outrageously violates my religious views." To be sure, others who have suffered miscarriages may find meaning or catharsis in caring about how a dead fetus is treated. The problem comes from assumptions about what matters, made without consensus or debate across all of society.

Widely diverging views of life coexist in the United States, and I don't believe that society will progress toward sustainable policy and law by demanding that one or another minority view must prevail because of metaphysical assumptions, protectionist instincts, and the use of scientized language.

BETTER WORDS

How can we debate issues of reproductive care and technology using language that is respectful and accurate? Many lawmakers appear to want to be seen as protecting the innocent, or perhaps as standing up for "what is right and natural" in a fraught world of expanding technological possibility. Others resort to language that makes them sound like they support abortions on demand and under any circumstances with no restrictions. Yet these are extreme views that few accept, even though many feel that pregnant individuals and their physicians are better placed to assess individual circumstances than blanket legislation.

When is abortion acceptable, and when is it not? What, precisely, is the developing human when it is not yet a born baby? What do we mean by justice, and justice for whom?

The language used now forces debate into binary extremes of "no moral worth" versus "personhood." Americans are not having thoughtful and nuanced discussions about where the boundaries should lie. When is abortion acceptable, and when is it not? What, precisely, is the developing human when it is not yet a born baby? What do we mean by justice, and justice for whom? These are difficult questions with many different negotiated answers and definitions to guide discussion. It will be important to navigate the conflicts and controversies that arise when different groups adopt different sets of assumptions and impose different definitions that then compete for authority in policy.

In the reset of the post-*Roe v. Wade* world, I invite anyone reading this to take an opportunity to do some hard work and insist on terms that serve meaning, not rhetoric. We can make a pluralistic society work, embracing difference by understanding what each other thinks and working through differences with mutual respect. We can begin by committing to clear definitions.

Jane Maienschein *is a professor and director at the Center of Biology and Society at Arizona State University and a fellow at the Marine Biological Laboratory in Woods Hole, Massachusetts.*

RECOMMENDED READING

Maienschein, Jane. *Whose View of Life? Embryos, Cloning, and Stem Cells.* (Harvard University Press, 2005)
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