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Embryos, microscopes, and society

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ABSTRACT

Embryos have different meanings for different people and in different contexts. Seen under the microscope, the biological embryo starts out as one cell and then becomes a bunch of cells. Gradually these divide and differentiate to make up the embryo, which in humans becomes a fetus at eight weeks, and then eventually a baby. At least, that happens in those cases that carry through normally and successfully. Yet a popular public perception imagines the embryo as already a little person in the very earliest stages of development, as if it were predictably to become an adult. In actuality, cells can combine, pull apart, and recombine in a variety of ways and still produce embryos, whereas most embryos never develop into adults at all. Biological embryos and popular imaginations of embryos diverge. This paper looks at some of the historical reasons for and social implications of that divergence.

This essay takes embryos as its subject, and human embryos in particular. An assumption in understanding human embryos holds that they are very much like embryos in closely related organisms, and that we can therefore learn about humans by studying other animal embryos. The "media" to be explored, therefore, includes the embryos of humans and other animals, and also interpretations of those embryos. The "instruments" include imagination, observation, and experimentation, with quite different results in each case. In fact, study of embryos as they appear in society reveals distinct understandings that reflect underlying divergent interpretations of life.

Although there are various versions within each of these understandings, discussion here will look at one cluster of ideas representing the public embryo, and at a different cluster of ideas representing biological embryos. These two ideas about embryos are not the same, nor are they even obviously converging, so it is worth examining the reasons for the differences and relationships while being clear about each understanding in itself. These ideas receive much more extensive presentation in a larger context with a different focus in my *Embryos Under The Microscope: Diverging Meanings of Life* published with Harvard University Press, 2014. I benefitted from discussions of the ideas at York University in the seminar series organized by Joan Steigerwald, which forms the basis of this set of essays. She urged participants to write these as essays, pointing liberally to other published works of our own, which I have done. More detail and additional references reside in those longer works, as well as in those of others whose contributions are only mentioned here.

1. Public embryos

By public embryos, I mean those that exist in the public and political arenas. Of course there are public leaders who embrace biological understandings as well, but the publicly imagined embryo is the one most often invoked in public and policy discussions. This embryo seems familiar. It starts as an egg cell that undergoes "conception" as it is fertilized and becomes the very first stages of an individual's life. This is largely an imagined rather than an observed embryo. Then the embryo becomes implanted into a woman's uterus and begins to grow and undergo differentiation, and at this point it becomes even more an imagined entity since it

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cannot be directly observed. In our imagination this is all a continuous process that defines the life of an individual human.

Indeed, this description is biologically accurate as well—to a point and at a general level. We'll get to the differences in the next section. At this point, this public understanding of the embryo is not directly in opposition to our scientific knowledge. But it adds a great deal of imagination to the biological facts we know. And it is those imagined properties that matter in public discussions; we imagine that the embryo is alive, a "life" that is essentially the same at all developmental stages. In this case, we might be tempted to invoke claims about the meaning at all developmental stages of the embryo that go beyond what we can see and what we can know. We might, for example, invoke something like the "personhood" movement does. Supporters of this movement argue that the embryo starting at fertilization has personhood and deserves the same rights and protections of any other person (For example, see the websites for personhoodusa.com, personhood.net, and those of other related organizations with similar names.). The Catholic Church and many others share the assumption that with fertilization, or conception, comes personhood.

This is not the place for a philosophical or political discussion about personhood, though there are certainly many things to say about that subject. It is, however, the place to acknowledge that this publicly imagined embryo-as-little-person exists in the public arena. As we will see, this public version is importantly different from the understanding of an embryo we get from putting it under the microscope and watching it carefully as it unfolds and changes during a series of developmental stages.

For most of history, some people cared about embryos but they were not of central importance politically or culturally. Pregnancy, reproduction, and babies were important, but the process leading to them remained largely in the background. That changed for a number of reasons in the later twentieth century. Human embryonic stem cell research, first publicly announced in 1998, caused some of the most widely discussed and complicated debates about embryos, with newspaper and television images widely distributed. The public experienced heated debate about stem cells, cloning, and embryos as a result of scientific innovation, and embryos became a more public object than they had been. The scientific ability to work with human embryonic stem cells raised new questions about how we understand embryos and their social as well as scientific importance.

The resulting discussions depended on a simplified and often distorted public imagination of what an embryo is, despite efforts by serious news media and scholars to explain the biological intricacies. To many, it seemed a question of whether to take human embryos at the stage just before they become implanted into a uterus and to kill them in order to harvest the pluripotent stem cells inside. This meant fertilizing eggs and allowing them to divide in vitro, in glass dishes. It meant fertilizing a number of eggs and hoping that some would develop, and it meant being able to watch them divide from one cell into more and more, up to a couple hundred cells that make up the late blastocyst stage.

For some, the embryos in their earliest stages are already tiny persons. They are not quite like the older imagined homunculus invoked by Nicolas Hartsoeker and others, which was thought to be an actual tiny man or woman already formed inside a spermatozoon or perhaps inside an ovum (See discussion, Maienschein, 2003, pp. 26–29.). Rather, they are continuous with and simply the earliest stages of an individual human and therefore seem to have some special status as a sort of little person. To kill them therefore seems morally wrong to the strongest proponents of this view. Even to those who are less sure about the moral status, destroying these tiny embryos by choice makes them feel queasy.

A background consideration that has undoubtedly influenced the way people envision embryos comes from the international popularity of Swedish photographer and journalist Lennart Nilsson's work. Nilsson's fascination with microscopes and cameras led him to explore what could be seen with the medical approach, laparoscopy and then further what he could do using an endoscope to capture images from inside pregnant women. His first images actually depicted dead fetuses, but were so beautifully composed that they seemed to present the very essence of life. In 1965 he published *A Child is Born* and in the same year his images graced the cover of the widely read *Life* magazine. Nilsson's images appeared everywhere, and they shaped or probably more nearly reinforced the public perception of how humans develop. What were mostly fully formed later stage fetuses were often referred to in the media as "embryos," though Nilsson never sought to deceive about their nature or their status. These images, whether of dead or live specimens, seemed to present little people resting peacefully and waiting to be born. His documentaries such as *The Miracle of Life* in 1983 reinforced the impression (Nilsson, 1967, 1983).

Yet as public discussion about stem cell research has made clear, the fact is that ever since we have been able to carry out in vitro fertilization for fertility treatments, we have been destroying tiny embryos. (See the American Society for Reproductive Medicine website for more information about IVF clinics and policies.) Lots of them. On purpose. And without worrying about them very much. In fertility clinics, people provide eggs or sperm, sperm fertilize eggs, and embryos result. There are too many embryos to be implanted into a prospective mother. Some are frozen, others discarded. Many would never continue to develop further anyway, for a variety of biological and medical reasons. Again, this is routine standard of care for embryos, as it were. The difference with embryonic stem cell research is simply that the embryos are actually used, in this case to harvest pluripotent cells and to culture them for possible research or therapeutic use.

Why did stem cell research ignite such a firestorm of controversy, then? If the fertility business had been generating and destroying embryos for decades, why would stem cell research be any different? Did the goal of actually putting the cells to use, as well as fulfilling the hopes for treating infertility in those who could afford to pay for the rather expensive process justify the means of embryo destruction? For some, yes. For others, no. In part this was because a mix of opinions already existed, but the fertility business had remained largely unregulated, undiscussed, and completely unfamiliar to most Americans in particular. Embryonic stem cell research brought the destruction of embryos into the public sphere and in fact made the embryo public in a way it had not been before.

With the embryo out in the open, in effect, advocates of various political positions could imagine the embryo in various ways and assign their preferred meanings to it. Anti-abortionists invoked an image of the embryo as if it were the equivalent of a late stage fetus or even of an infant, as we have seen (and websites at the time even featured many such fetuses labeled as embryos, with the suggestion that stem cell research would involve killing such humans). Those opposed to fertility research and treatments could incant, only more loudly than before perhaps, that embryos are persons and deserve protection. Those in favor of abortion rights and/or embryo research continued to maintain that the early embryonic stages are in fact not yet persons and do not deserve to be treated or imagined as such.

All such debates have taken place in the context of reproduction politics and preferences (For example, see Franklin, 2007 and Thompson, 2007, 2014.). We see a wide diversity of competing opinions about several different overlapping and intersecting issues, which leads to lively discussion but considerable lack of clarity at times. Many feminists have worried about the abuse of