Making Sense of Bioethics
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Pondering the Implications of Three-Parent Embryos

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An ethical Rubicon was crossed when the first *in vitro* fertilization (IVF)-conceived baby came into the world in 1978. With human reproduction no longer limited to the embrace of a man and a woman, people felt empowered to take their own sperm and eggs, or those of others, and create their much desired children bit-by-cellular-bit. As they mixed and matched these cells, they soon were drawn into other twists and turns of the advancing technology, including screening the genes of their test-tube offspring and eugenically weeding out any undesired embryonic children by freezing them in liquid nitrogen or simply discarding them as laboratory refuse.

Recent developments have exacerbated this situation by offering additional options and choices for generating children, recasting human embryos as modular constructs to be assembled through cloning or through the creation of three-parent embryos. While cloning involves swapping out the nucleus of a woman's egg with a replacement nucleus to create an embryo, three-parent embryos are made by swapping out additional cellular parts known as mitochondria through the recombination of eggs from two different women. Even more baroque approaches to making three parent embryos rely on destroying one embryo (instead of an egg) and cannibalizing its parts so as to build another embryo by nuclear transfer.

We risk trivializing our human procreative faculties and diminishing our offspring by sanctioning these kinds of "eggs-as-Lego-pieces" or "embryos-as-Lego-pieces" approaches. Ultimately there is a steep price to be paid for the ever-expanding project of upending our own beginnings and rupturing the origins of our children.

Part of that price includes the significant health problems that have come to light in children born from IVF and other assisted reproduction techniques. Researchers have found an overall doubling in the risk of birth defects for children born by these technologies when compared with rates for children conceived in the normal fashion.

For retinoblastoma, a childhood eye cancer, a six-fold elevated risk has been reported. Assisted reproduction techniques are also associated with heightened risks for a number of rare and serious genetic disorders, including Beckwith-Wiedmann syndrome, Angelman's syndrome, and various developmental disor-

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ders like atrial septal and ventricular septal defects of the heart, cleft lip with or without cleft palate, esophageal atresia and anorectal atresia.

Considering the various harsh and unnatural steps involved in moving human reproduction from the marital embrace into the petri dish, it should perhaps come as little surprise that elevated rates of birth defects have been observed, even when certain genetic defects may have been previously screened out.

As children born by assisted reproductive techniques become adults, they are starting to be tracked and studied for various psychiatric issues as well. A growing number of young adults are vocalizing their strong personal concerns about the way they were brought into the world through techniques like anonymous sperm donations, because they find themselves feeling psychologically adrift and deprived of any connection to their biological father.

It should be obvious how any approach that weakens or casts into question the integral connection between parents and their offspring will raise grave ethical concerns. Whether it be three-parent embryos, anonymous sperm donations, or surrogacy, we need to protect children from the harmful psychological stressors that arise when they are subjected to uncertainties about their own origins. As one fertility specialist bluntly commented,

> "As a nation, we need to get a conscience about what we are doing here. Yes, it's nice when an infertile couple is able to build a family, but what about the children? Shouldn't their needs be in the mix from the very beginning too? I think it is ridiculous that a donor-conceived child would need to 'research' to find out their genetic origins. Give me a break. What if you had to do that? Is it fair?"

Beyond these immediate concerns about the wellbeing and health of our progeny, we face further serious concerns about our human future in the face of these burgeoning technologies. As procreation becomes reduced to just another commercial transaction, and our children become projects to be assembled piecemeal in the pursuit of parental desires, we invariably set the stage to cross another significant ethical line.

That bright ethical line involves the creation of humans that have inheritable genetic modifications (changes that are passed on to future generations). When the first three-parent baby is born, which will likely take place in the next year or two, we will have stepped right into the middle of that hubris-filled brave new world of manipulating the genetic traits of future children. We will have transitioned to a paradigm where biomedical experimentation on future generations is seen as acceptable and justifiable. Now is the time to ponder carefully the implications of our rushed reproductive choices, and to stand firm against the preventable injustices that inexorably flow from assisted reproductive technologies.

Rev. Tadeusz Pacholczyk, Ph.D. earned his doctorate in neuroscience from Yale and did post-doctoral work at Harvard. He is a priest of the diocese of Fall River, MA, and serves as the Director of Education at The National Catholic Bioethics Center in Philadelphia. Father Tad writes a monthly column on timely life issues. From stem cell research to organ donation, abortion to euthanasia, he offers a clear and compelling analysis of modern bioethical questions, addressing issues we may confront at one time or another in our daily living. His column, entitled "Making Sense of Bioethics" is nationally syndicated in the U.S. to numerous diocesan newspapers, and has been reprinted by newspapers in England, Canada, Poland and Australia.