Three Parent Human Embryos

CMDA affirms that all children—including those who are biologically flawed—are gifts from God, a heritage of their mother and father to be cherished, nurtured, and guided. Parents' obligation to protect their children's health extends also to healthcare professionals.

Reproductive biotechnologies have introduced novel methods for correcting certain harmful genotypes by intervening near the time of conception. One of these methods involves starting with maternal egg and paternal sperm and transferring to the developing embryo genetic or cellular components from a third progenitorial donor with the aim of producing a healthy child. Depending on the specific technology, the added genetic component might be derived from chromosomal or mitochondrial DNA,[1] or it might be an egg or enucleated embryo derived from a third contributor. Reproductive scenarios involving more than three parental genetic or cellular contributions are also foreseeable.

Whereas preventing genetic disease is a laudable goal, the means by which that goal is achieved and the far-reaching consequences of developing such technology are also relevant to the ethical evaluation. Novel biotechnologies that create human embryos having more than two biological parents raise a number of ethical concerns, which fall into three broad categories:

1. *The threshold of germline intervention would be violated*. These biotechnologies could introduce permanent changes into the human germline that, if passed on, would affect countless future generations. Whereas the simple editing out of the germline a single harmful gene causing a disease would itself be ethically praiseworthy, current technology cannot do this without causing a cascade of inadvertent consequences, which could be disproportionately greater. The genetic basis of most diseases is complex, and the repercussions of germline interventions, both beneficial and adverse, could be irreversible for succeeding generations. Once the ethical threshold of human germline editing were crossed, ethical limits on further and more far-reaching germline editing might be unsustainable as an initial attitude of caution gives way to a progressive technological imperative, whereby what is no longer impossible is viewed as irresistible, and what has become possible is viewed as necessary. Abuses would be difficult to detect or prevent. Further enabling of the development of germline intervention biotechnology would open the door to the threat of eugenics, potentially with more dreadful exercise of power over others than has heretofore been seen in history.

2. *Nascent life is destroyed.* Some of these reproductive technologies entail a process whereby more than one human embryo must be created in order to combine components to produce one healthy embryo, resulting in the destruction of the other human embryos.

3. *Biological parentage may be redefined.* These biotechnologies expand the gametal contributions to the child's conception beyond the natural two, to include three or more biologic progenitors. They also raise dilemmas for parents, offspring, and society to consider:

a) Disagreements are likely to occur over deciding what type or quantity of biological contribution is sufficient to define parentage in regard to moral, social, and legal responsibility or proprietary rights.
b) Knowledge of additional parental contributions may confuse the offspring's sense of identity and relatedness.
c) Further development of these and related biotechnologies and their normalization could make it possible for male-male and female-female couples to conceive children. This fundamental alteration of the biological definition of the human family would have unforeseeable consequences. It could be seen as a positive development ensuring equality of fertility, or it could be seen as disrupting the natural order of the family to the detriment of offspring and society.

In response, CMDA affirms the obligation of Christian healthcare professionals to care competently and compassionately for parents and children, including those with, or concerned about, inherited mitochondrial and other genetic disease. However, CMDA also believes that, whereas parental responsibility includes the right to make a wide range of decisions on behalf of their children, this authority is not absolute and does not extend to proprietary control of their children's genetic make-up. CMDA's position is based on the following considerations:

A. Biblical

1. Every person is created by God and bears His image (Genesis 1:26-27; Psalm 139:13-16).
2. God has instituted the unique marital bond between one husband and one wife joined together as one flesh (Genesis 2:21-25; Ephesians 5:22-33).
3. Children are a gift from God, a blessing and the fruit of marriage (Psalm 127:3-5; Psalm 128). Human procreation is a mystery only partly explained by biological science.
4. Marriage is an exclusive covenant ordained by God (Mark 10:6-9), affirmed (Matthew 19:4-6) and blessed (John 2:1-11) by Jesus, and for Christians a symbol of Christ's special union with His bride, the church (Ephesians 5:21-33; Revelation 19:7-8; Revelation 21:9-10).
5. The incorporation of a third person in the marital relationship in an attempt to conceive children historically has produced strife and fractured relationships (Genesis 16; Genesis 21:1-21; Genesis 29:30-30:24).

B. Biological

1. Human beings are sexually dimorphic, and nature requires contributions from both female (mother) and male (father) for procreation.
2. Producing human embryos through novel combinations of three or more parents does not occur in nature but requires technological manipulation beyond in vitro fertilization (see CMDA statement on Assisted Reproductive Technology).
3. The long-term consequences of germline manipulation are unknown.

C. Social

1. Children have a need to know and understand their identity and ancestry, including their direct progenitors.[1-8] Children also have a need to know their siblings, both relationally and as a means to avoid consanguinity later as adults.[9,10] Considering that gamete donor-conceived offspring tend to view the donor as a whole person rather than just a source of

genetic material,[11] children conceived through three-parent biotechnologies would bear a potentially burdensome sense of self identity, whether or not they know the identity of the third parent.

2. These children might also be perceived by other children, including their siblings conceived naturally, as different and suffer discrimination.
3. The psychological effects on children who are conceived utilizing an additional parent outside of the marriage bond have been insufficiently studied to conclude that these children are not harmed by depriving them of natural relatedness to their parents and siblings.[12]

D. Medical

1. Hormonal manipulation and egg retrieval procedures provide no direct medical benefit to egg donors, but do subject them to medical risks, such as ovarian hyperstimulation syndrome.[13]
2. Micromanipulations of gametes may not have the intended results.[14] They may introduce birth defects as well as genetic diseases that become evident during childhood or that may not become manifest until later in adulthood or even generations later. The degree of risk for novel interventions cannot be known prior to experimenting with them, although the risk is known to be increased for technologies such as intracytoplasmic sperm injection of eggs to accomplish fertilization.[15-17]
3. Some genetic manipulations of gametes may potentially introduce new unforeseen harmful mutations. The use of assisted reproductive technology is associated with a disproportionate number of infants with low-birth-weight,[18,19] as well as a variety of chromosomal alterations, genetic and epigenetic defects.[20,21]

E. Ethical

1. Producing children through the genetic manipulation of mitochondrial or nuclear DNA, such as “three-parent embryo” biotechnologies, are inherently experimental on a vulnerable human population—nascent human beings—who lack the capacity to consent to such experimentation. Furthermore, truly informed consent by the parents is impossible because the enduring outcome of germline manipulations cannot be known.
2. Three-parent embryo technology is ethically distinct from treatment. Genetic manipulation to determine the genotype of children not yet born is not equivalent to the treatment of persons with illness. The genetic manipulation of mitochondrial or nuclear DNA in a human embryo potentially alters innumerable succeeding generations of human progeny. Developing the ability to alter the human germline at will opens the door to eugenic manipulations, such as “designer babies” in whom desired traits are enhanced or selected out. Eugenic manipulations commodify human beings and, as history teaches, dangerously set the stage for genetic discrimination, societal divisions, and persecution (see CMDA statement on Eugenics).
3. Perfection and implementation of three-parent biotechnologies are very likely to result in unintended genetic or developmental errors along the way, creating the additional ethical dilemma of whether to raise and care for the resulting genetically impaired disabled children or to terminate their lives at some point during development.
4. Three-parent reproductive technologies entail unacceptable harm to nascent human life. Destruction of extra human embryos created during the process of three-parent embryo

procedures causes their deaths. Human beings at all sizes of life and stages of development are much more than assemblages of molecules. To deny moral value to the human embryo, who is fully alive, has a unique genome, and possesses the intrinsic capacity to develop into a fully conscious human, would be to believe incorrectly that not all human lives count as members of the human community (see CMDA statement on the Beginning of Human Life).

Conclusion

1. Because human procreation is a mystery only partly explained by biological science, CMDA believes that caution and great humility are needed in regard to proposals to intervene in this special natural order. Human beings, not the novel biotechnologies used to assist with their conception, are sacred.
2. CMDA affirms human procreation as the fruit of marriage between one male and one female. CMDA opposes the use of technologies that would create children having more (or less) than two biological parents.
3. CMDA believes that the stewardship mandate to subdue the earth (Genesis 1:28) entails moral responsibility that does not extend to absolute control over human procreation. Altering the conditions of human procreation to incorporate more than two biological genetic contributors to edit the germline would exceed the boundaries of moral prudence.
4. CMDA opposes the creation of human embryos destined for destruction as raw material for reproductive or research programs. Even if we are not answerable directly to those lives who are not allowed to develop the capacity to protest their destruction, we are still answerable to God, who created us all and knew us all as persons when we were but embryos (Psalm 139).
5. CMDA affirms that children are not products to be manufactured, commodified, or controlled, but are blessings to be cared for and cherished.
6. Recognizing that children may come to be born through three-parent procreative biotechnologies, CMDA affirms that such children, whether healthy or genetically impaired, nonetheless bear the image of God and deserve full inclusion in the human community.
7. CMDA affirms that biotechnology and medical care directed toward treating children and adults living with mitochondrial and other genetic diseases are ethically praiseworthy.
8. Even if the biological, medical, and social difficulties were to be resolved, CMDA nevertheless has grave reservations on theological grounds concerning the procreation of human lives through biotechnologies involving genetic contributions substantial enough to constitute triple parentage, because these disrupt the biblical ideal of human procreation through the uniting of one mother and one father, which for the created order is normative and for Christians holds special value as the visible representation of Christ and His church.

Unanimously approved by the House of Representatives
May 4, 2017
Ridgecrest, North Carolina

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