



Artificial Wombs: A Theological-Ethical Analysis about Partial Ectogenesis

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Editor's Note: An earlier version of this article was submitted for consideration in CBHD's 2021 Student Paper Competition.

Introduction

Ectogenesis or the use of artificial womb technologies (AWT) is defined by Webster's as "development of a mammalian embryo in an artificial environment."¹ In 2019, a team of researchers claimed that their prototype *ex-vivo* uterine environment therapy, designed to reduce the risk of morbidity and mortality for extremely preterm infants born at the border of viability, represents a feasible therapy in late preterm human babies.² Neonatal technology defines complete ectogenesis as the creation of a human child without any period of gestation in a woman's body.³ Full ectogenesis requires *in vitro* techniques and the resulting embryo must be placed in an artificial uterus.⁴ Partial ectogenesis would mean some part of the gestational period is spent outside the maternal womb.⁵ Such a womb could serve

as incubator for preterm babies, specifically those who are delivered before approximately 24 weeks of gestation, the minimum for viability with current incubators.⁶

AWT are designed to replicate the conditions and function of the human uterus so that the developing human person is able to continue to gestate. The emerging technologies related to AWT require that the fetus be submerged in artificial amniotic fluid in a sealed plastic bag. In an artificial uterus, circulation is maintained by the newborn's own heartbeat assisted by an oxygenator and catheters imitating umbilical cord access. In other words, AWT assists the human fetus with the bodily functions necessary for survival in the external environment. AWT attempts to continue the process of gestation *ex utero*.⁷ Scientists predict that safe, reliable, and even complete ectogenesis will be available within thirty years.⁸

Under special circumstances, such as when abortion might be suggested to save the life

of the mother, *partial* ectogenesis might represent a viable solution to save the baby's and mother's lives by transferring the fetus to an artificial womb.⁹ The emerging reproductive technologies raise a host of moral and theological questions. Such questions have been highlighted through a call for papers in the academic journal, *Christian Bioethics*: "How should AWT be used (if at all)?" "How should we understand human subjects in artificial wombs?" "How should they be regarded?" "In what way, if any, should we regard them differently from how we regard fetuses in utero, and why?" "What are some moral issues associated with complete ectogenesis and partial ectogenesis?"¹⁰

In this essay, I argue that partial ectogenesis to allow a woman who might otherwise have to continue a pregnancy¹¹ experiencing imminent gestational risks or considering a conventional abortion, should be morally permissible from a Christian perspective. AWT could represent a powerful choice for some women experiencing dangerous yet wanted pregnancies. Artificial wombs could be useful when women are unable to carry the babies safely.¹² To that end, I will first

discuss the personal status of the ectogenetic preborn child. In this section I compare two opposing views related to the moral status of the unborn. The secular view is represented by the utilitarian theory as presented in the writings of Peter Singer and Joseph Fletcher. Then, I will present a biblical view of the embryo/fetus by arguing that every human being is created in the image of God and that there is a continuity from before to after birth. This second part will construct a brief theological-ethical framework concerning partial ectogenesis. This section will thus put into perspective the issues related to the artificial womb by appealing to the sovereignty of God. Furthermore, some benefits and challenges are discussed that might be implied in the *ex utero* reproductive technology.

The Personal Status of the Ectogenetic Preborn Child

The morality of partial ectogenesis concerns the personhood of the preborn child. If the child is safely extracted from the mother, would he be considered a person or a mere human being with potential to become a person? The modern view, argues Megan Best, is that the status of personhood is not automatically given to any human being, but only to those who can perform certain functions.¹³

The Secular View

One of the most accepted ethical theories concerning the personhood of a fetus regards the concept of utilitarianism. The utilitarian mantra is the greatest good for the greatest number and the good is calculated not on the basis of a moral virtue but on the basis of the nonmoral good of happiness or pleasure.¹⁴ The hedonistic utilitarian calculus is that human pleasure in any given set of circumstances may be quantified and calculated by summing up the pleasure to be realized by each in any proposed action.¹⁵

One of the proponents of this utilitarian view is Peter Singer. A controversial thinker,

Singer made his philosophical reputation by defending the well-being of animals. Moreover, his interest concerns not only animal liberation, but moral issues related to human conception, birth, life, and death.¹⁶ For Singer, moral beliefs have an evolutionary explanation; thus, he concludes that any moral beliefs are unjustified.¹⁷ Singer also appears to reject the sanctity of human life “as [a] prejudiced, invidious claim to human specialness” based on ridiculous (in Singer’s view) Christian theological ideas.¹⁸

A similar position is held by Joseph Fletcher. He argues that a fetus is an object, not a subject: a nonpersonal organism. The personhood of a fetus is a matter of religious or metaphysical belief, without any possibility to scientifically prove it or show it. The fetus is not a patient, because a patient must be a person.¹⁹ Thus, as John Mahoney puts it, the destruction of such biologically human “nodes” such as an embryo does not entail the destruction of a human person.²⁰

However, there are problems with such an understanding of a human being. For example, Peter Colosi argues that Singer cannot discover within persons any intrinsic values that are capable of grounding the equality of worth attributed to persons in ethical discourse except those intrinsic sources that are both communicable and alienable such as intelligence or musical ability.²¹ Ethicist Janet Smith correctly observes that Peter Singer’s promotion of infanticide can be traced to the legalization of abortion. Singer defends the legalization of abortion on the basis of non-personhood of the fetus and uses that Archimedean point to argue that fetuses should have no greater rights than other entities, such as animals, that we kill so freely.²²

Furthermore, the current utilitarian age adopted by Peter Singer and Joseph Fletcher evaluates both things and actions in respect to their usefulness for achieving goals determined by interest or preferences.²³ Consequently, Best considers that Fletcher’s

view of fetal life is driven less by scientific discovery and more by the political debate around abortion. As a result, if the embryo was not a fully human person, then abortion would be much easier to justify.²⁴

These secular views, as observed by Nigel Cameron, reflect the growing tendency to abandon the central conviction of our medical tradition as seen in the Hippocratic Oath. This central conviction is that there is such a thing as “human life” with dignity which is intrinsic and, therefore, with an inalienable moral standing.²⁵ Albert Johnsen observes that the Oath is a striking example of deontology where the doctor is summoned to use his knowledge to help the sick and never to misuse the medical skills as accomplices of murder.²⁶ Therefore, the personhood theory as proposed by Singer and Fletcher appears to be a threat to the Hippocratic Oath. The Oath has been used throughout the ages as a guide to moral medical conduct in order to protect health and preserve life. Based on a utilitarian calculus as proposed by Singer and Fletcher, an ectogenetic preborn child could be aborted without any regard for the fundamental goals of medicine, namely protecting health and preserving life, as described by the Oath.

A Biblical View

The Bible presupposes that the unborn baby is fully human with full personhood from the moment of conception. Psalm 51:5 clearly argues that a sinful nature and guilt are part of the human being at the moment of conception and birth.²⁷ The Bible’s teaching is that every human being is made in the image of God, and this is the basis on which we are all to be treated equally and with dignity.²⁸ The dignity of human beings is derived from God himself. In fact, theologian Carl Henry argues that man’s created dignity consists in knowledgeable and responsible relationships to the supernatural world and to fellow humans. Therefore, human life was intended to consist of intelligible and dutiful devotion to God.²⁹





Moreover, Psalm 139:13–16 teaches that the unborn is formed by God. The psalmist invokes the idea that God was involved in the shaping of the person. These verses provide a vivid image for the process of creation. God made the heart, or literally the kidneys, alluding to the physical insides of the person, rather than to the emotions or will.³⁰ The Psalmist acknowledges that human creation, from its beginning, is a mystery and a wonder known only to God.³¹

Not only does the image of God include both “male and female” according to Genesis 1:27, but it is also a scientific fact that maleness or femaleness is determined at the moment of conception.³² Modern genetics demonstrates that the DNA formed at conception is the bedrock of biological identity.³³ The embryonic life is a human life that has all the potential, all the unique DNA it needs, for its natural development.³⁴ There is extrabiblical evidence that genetic data determines later physical development. This evidence concerns some critical events, such as giving the new life a complete set of 46 chromosomes; determination of chromosomal sex; the establishment of genetic variability; and the initiation of cleavage, the cell division of the baby.³⁵ The embryonic stem cells developed in the course of the first five days of life represent the source of all the tissues in the body, and through the process of development they organize themselves to take the form of the body.³⁶

Consequently, Genesis 1 emphasizes that sexual identity and function are part of God’s will for his image-bearers. As a result, sexuality is not an accident of evolution or a mere social construction. Scripture reasons that gender is a very good thing to be embraced (Gen 1:31). Gender differentiation is also not something arbitrary and self-defined but a characteristic with corresponding roles (Gen 2:18, Ps 30:10) for each biological sex.³⁷ Based on God’s creative

work in Genesis 1 and 2, it seems evident that human beings are capable of receiving and carrying out commands from God in relation to creation. Thus, the act of procreation appears to be a biological precondition for ruling the earth existent in the preborn baby.³⁸ Male and female human members are image-bearers of God who are both responsible for governing the world. Being human means being a sexual person clearly defined in God’s creative act. Therefore, there is no place in God’s good order for unisexuality or for any diminishing or confusion of sexual identity.³⁹ The image of God is a fundamental feature of humanity according to Genesis 1. Humans are like other living things in being created by God, but also unlike them in being made in God’s image and owing him obedience.⁴⁰

Second, the Bible argues for continuity from before to after birth. The continuity of a child’s life can be seen, for instance, in Exodus 21:22–25, where the Bible makes an unambiguous claim that the harmed unborn child is to be punished in the same manner as a born human. The difficult phrase “her children come out” (Ex 21:22) speaks about the child; whether miscarried or merely born prematurely, the law of retaliation goes into effect.⁴¹ The wording there establishes a general principle for dealing with various permanent injury for the unborn or for the pregnant woman.⁴² As a result, whether in the womb, in an artificial uterus, or outside of the womb, it seems fair to argue that there is the same person who needs to be protected by law. Furthermore, from Matthew 1:20–21, it is implied that the same person who is in Mary’s womb is going to be the child who will be born. While in the womb, the unborn child will have a very special role once born; a task concerning the salvation of God’s people.⁴³ The unborn child is the same agent of salvation who later will make an atonement for the sins of God’s elect.⁴⁴

Thus, the Bible presupposes that the unborn baby Jesus present in Mary’s womb is the same Jesus once born. Likewise, Job 10:8–12 teaches that God knows the unborn person, thus implying a continuity before and after birth. Every human is molded by God and every human returns to dust.⁴⁵ After God has breathed the breath of life into each person, he guards and protects that life by his providence, which means God directs the course of events that befall a person.⁴⁶

The embryonic phase is a stage in the development of a determinate and enduring human entity who deserves full moral respect. Robert George and Christopher Tollefsen argue that human embryos are, from the very beginning, human beings, sharing an identity with, though younger than, the older human beings they will grow up to become. A human embryo comes into existence as a single-celled organism and develops into adulthood many years later.⁴⁷ Similarly, Owen Strachan argues that “a baby growing in the womb is not refuse to be cast off, but a child to be warmly welcomed into life.”⁴⁸ Even more, Gareth Jones considers that “fetuses throughout development are important, and it is fitting that we who are able to ascribe significance and dignity to fetuses” and “an unborn human has the potential to become a fully developed, mature human being, and therefore we ought to treat all fetuses with seriousness and concern.”⁴⁹

Based on this cursory glance at the above biblical texts, it can be argued that the ectogenetic preborn has the same moral status as a fully human adult since human life and human personhood begin at fertilization. No matter where the gestational phase takes place, whether in a woman’s or in an artificial uterus, the preborn is worthy of full moral respect. In other words, the ectogenetic preborn is not just a potential person, but rather a person with potentials.

A Theological-Ethical Framework Concerning Partial Ectogenesis

In what follows, an arguably feasible theological-ethical framework is presented based on the aforementioned biblical view about the humanness and personhood of the ectogenetic baby. Reproductive technologies present some of the most difficult ethical dilemmas facing today's society. The world of biomedical technologies can be seen in general as part of God's provision to human beings in enabling them to exercise dominion over creation more effectively, particularly when it comes to confronting the effects of the Fall.⁵⁰

Divine Sovereignty

According to a biblical worldview, God is sovereign, implying that God is the giver and sustainer of life as he pleases. Psalm 139:13–14 emphasizes that no amount of biotechnology can produce life because that belongs to God alone to give. Children are a gift from God, not a laboratory-designed creation.⁵¹ For example, Revelation 4:11 teaches that God not only brought all things into existence, but he keeps them in existence. The Bible declares that God is in complete control of everything that happens in the whole course of history.⁵² God's plan is all-inclusive, argues Millard Erickson. That is to say that God is now at work carrying out his plan, which is from all eternity and includes everything that occurs.⁵³ Consequently, it appears that everything that there is, including a living being in an artificial uterus, derives his existence from God. Moreover, Christian faith points humans toward a God who is beyond this world and a promise of eschatological hope that lies beyond the power of human science and technology.⁵⁴

Part of God's sovereignty over human life is his decree giving humanity the tasks of dominion over and stewardship of creation. God sustains the life of all creation and has the ultimate authority in every matter. Nevertheless, God gave dominion to humankind, which implies that people have the duty to encourage ethical scientific enterprise, including medical care, research, and the development of medical technology. Medical technology is one of the means of God's common grace to human beings. Medical technology also implies capabilities that are meant to be developed and utilized

as part of God's command for humanity to exercise dominion over the created world. People have the possibility to shape their conduct in this world, but must do so under definite constraints that God imposed through creation. Thus, there are limits beyond which people are not to go.⁵⁵ As Robert Orr observes, stewardship implies that people are responsible and accountable for how they use their knowledge and technology. In other words, people have liberty, but within the moral boundaries established by the Divine.⁵⁶

The whole human being belongs to God, whom believers must learn to love even more than they love father or mother. Every person is made for God, and thus people are more themselves when they seek not to direct and control their destiny but when they realize and admit that their lives are grounded in and sustained by God.⁵⁷ Trusting in God's sovereignty is a source of comfort and contentment for the believer. Reproductive technologies such as AWT can be seen as part of God's eternal plan to provide for human beings to enable them to more effectively exercise dominion over creation, particularly when confronting the effect of the entrance of sin into the world.⁵⁸

Benefits

One of the most obvious benefits of partial ectogenesis would be the ability to save the lives of unborn children at extremely early gestational stages. People, as God's image-bearers, are expected to willfully protect life. The biblical-theological background for protecting human life at the earliest developmental stages concerns the fact that God is the Lord of life and the one who offers life. John Frame states that, since the Bible basically says that life and death are God's business based on the sixth commandment, people must respect life because it is in the image of God and that image grounds the first prohibition of bloodshed in Scripture.⁵⁹

Furthermore, David Reiber reasons that since modern neonatal life-support technology is considered morally good when used in a proportionate manner, it should be reasonable to conclude that AWT, when used in such a way, would not be morally problematic. Since one of the purposes of partial ectogenesis is to improve the survival of prematurely delivered infants, the technology itself would not be considered intrinsically

unethical. In fact, it would be morally licit and commendable, so that the technology is worthy of serious efforts toward realization.⁶⁰

A second benefit would be the deliberate transfer of a healthy baby from its mother's womb to an artificial womb in case of serious medical risks. Both lives, the mother's and baby's, are valuable because they are made in the image of God, for the glory of God.⁶¹ Thus, by opting for partial ectogenesis, there might be a viable option for keeping both the mother and the baby alive. Artificial wombs would be helpful especially to those women who have suffered multiple miscarriages due to problems with embryo implantation, or women who have had hysterectomies due to uterine cancer. There is also the possibility for women with multiple pregnancies, that artificial wombs could provide temporary quarters for one or two fetuses toward the end of gestation, when a woman's womb becomes more crowded and the risks of complication to herself and her children are greater.⁶²

Third, AWT might help prevent unwanted pregnancies from being aborted. On this point we can agree with Peter Singer and Deane Wells who maintain that pro-lifers could welcome the development of ectogenesis, at least in so far as it can be developed without deliberately risking the lives of embryos in experimental work. Singer and Wells also claim that pro-choice advocates "should welcome it for the simple reason that it promises to defuse the whole abortion issue."⁶³

Challenges

In spite of the benefits provided by the AWT, there are some challenges that the new reproductive technologies may bring about in terms of potential abuses against the unborn. First, the availability of a morally unrestrained ectogenesis could offer the potential for keeping alive unborn babies to serve as "donor" body parts.⁶⁴ Since the basic problem of a transplant surgeon is not having enough corpses, AWT could provide the solution to organ donations and transplantation. Corpses are currently the only source for lungs, hearts and livers, and for all but 8% of kidneys.⁶⁵ Singer and Wells mention the idea that embryos and fetuses could be used as a means of growing organs as spare parts. They admit that,

especially for someone who holds that from the moment of conception a human being exists with the same right to life as any other human being, farming human beings is the most grotesque violation of human rights imaginable. Moreover, it would represent a form of slavery in which even the life of a slave is not spared. Therefore, it would be the deliberate and institutionalized violation of the most fundamental of all human rights.⁶⁶ Furthermore, donating embryos for use in destructive research will be an unethical choice for biblically minded Christians. As Best emphasizes, all human beings are made in God's image and should be treated with respect, and thus it is wrong to kill innocent people.⁶⁷

We can also infer from the above explication that zygotes, embryos, fetuses, and for that matter children, are not commodities to be bought and sold—they are God's precious gifts, to be accepted, protected, and cared for without discrimination on the basis of sex or size, or developmental phase.⁶⁸ The technology to produce stem cells taken from the inner cell mass of a human blastocyst already exists. However, with the potential aid of AWT to make embryos and fetuses more accessible and with the promises of cures for vicious disease, expanded life spans, and even the improvement of the human species, the new biotechnologies have the potential to capture the imagination of many who have not looked closely enough at what these procedures entail. George and Tollefsen likewise note that is utterly immoral to treat the youngest and most vulnerable members of the human family as disposable objects to be produced and destroyed to benefit others.⁶⁹

Secondly, AWT may offer an attractive opportunity for direct nontherapeutic research into the embryo's developmental processes, a research invariably resulting in their death. The reasoning behind nontherapeutic research is based on the claim that since artificial wombs gives the fetus a measure of life that it would not otherwise have, the fetus is no worse off when it is sacrificed in the experiment.⁷⁰ George and Tollefsen argue that it is morally wrong and unjust to kill an embryo, even if the goal of the embryo killing is the advancement of science or the development of therapeutic products or treatments.⁷¹ Prenatal life is valuable and needs to be protected. Against George and Tollefsen's view stands the evolutionary perspective for which nontherapeutic research makes perfect sense. An embryo, while still at an incipient stage prior to individuation, and *a fortiori* to hominization, may be considered as at the service of human life itself and of his biological amelioration in fully formed individuals of the species.⁷² Nevertheless, an embryo—whether *ex vivo* or *in vivo*—is of equal moral status to any other human being. Therefore, stem cell harvesting from a blastocyst is akin to abortion. The reason is that the intrinsic value of a blastocyst is that of a living human person; thus, its destruction in scientific experimentation constitutes murder.⁷³

Thirdly, artificial wombs may be used by women who wish to have a baby but without the natural burdens of a pregnancy. In fact, a well-known feminist Shulamith Firestone considers pregnancy as barbaric.⁷⁴ However, it is also worth mentioning that not all feminist share Firestone's view that the new reproductive technologies would be a means

of liberating women or barbaric. For example, Robin Rowland affirms that

For the history of "mankind" women have been seen in terms of their value as child-bearers. We have to ask, if that last power is taken and controlled by men, what role is envisaged for women in the new world? Will women become obsolete? Will we be fighting to retain or reclaim the right to bear children—has patriarchy conned us once again? I urge you sisters to be vigilant.⁷⁵

Childbirth and pregnancy have long been considered a limited state: a space and time in which the woman is making a transition to her status as a mother. As Dena Davis notes, everyone changes status with the birth of a baby. A first child changes the family most dramatically.⁷⁶ Furthermore, by dissociating pregnancy from being an essential part of womanhood, AWT could imply a biased attitude against women. For instance, Diane Moriarty, citing *The Guardian's* Eleanor Robertson, notes that artificial wombs would very likely serve trans women and male same-sex couples instead of women.⁷⁷ Moreover, women could be forced to use AWT by their employers to avoid lost time at work. In addition, insurance companies could exert coercive power against women by mandating AWT over pregnancy if it is found to result in fewer health problems such as high blood pressure, gestational diabetes, or automobile accidents.⁷⁸ According to the Bible, God in his sovereignty decided that motherhood is part of God's image in women. The pain or hard labor in childbearing is the penalty for sin, according to Genesis 3:16. Nevertheless,



a Christian perspective about the burdens of pregnancy emphasizes that the vehicle of Eve's vindication (painful childbirth) supercedes her need for the deliverance she bears. Thus, bearing children signals hope and also serves as a perpetual reminder of sin and the woman's part in it.⁷⁹

Furthermore, God set the framework for true sexual morality at creation. God transcends the space-time-material universe, and the standards he sets for the role of sexes in family are transcendent as well. Therefore, God defines true sexual morality, and people have no say in what his standards should be. Daniel Heimbach argues that "as far as God is concerned, we have only two choices: obey, or face the consequences."⁸⁰ One of the purposes of marriage regards bearing children. The standard for the family to procreate resides in God's standards established at creation. There is nothing more natural for a Christian view of sexuality than for women to bear children. Not only that, but sexuality according to the Bible is always linked to the development of a relationship between two people.⁸¹

Lastly, the use of artificial wombs risks undermining the understanding of motherhood and, by extension, parenthood, warns Christopher White.⁸² White argues that the natural maternal-child bonding is affirmed by medical experts as essential to promoting the health of mother and child. The maternal bond is permanent and is felt in both the mother and child for the rest of their lives. As a result, White believes that the use of artificial wombs would sever this bond and the consequences of such a radical activity

would be impossible to foretell. Ectogenesis would aid in the social quest to reduce the importance of the two-parent, mother-and-father tie to their child and in some cases could introduce multiple parties into the parenting process. The natural consequence is that ectogenesis risks rendering biological ties unnecessary.⁸³ Thus, the womb may be rendered as nonessential to nurturing gestational life. Pregnancy might become unnecessary when technologically possible. As a result, biological motherhood would become technically obsolete, argues Debra Evans.⁸⁴ In the same line, by undermining the biblical understandings of marriage and family, AWT could ease the access of homosexual couples to adoption. The Bible sees marriage as a covenant created by God with boundaries, structure, obligations, and rights established by him.⁸⁵ A child can be deprived during his/her formative years of the opposite sex parent, i.e., of a mother or a father figure. Moreover, the adopted child can grow with the wrong norm of human sexuality. Children reared in same-sex unions can suffer deprivations of security and love.⁸⁶ Thus, the use of AWT as an external gestational carrier might sever the connection between the pregnant woman and the baby she is carrying and reduces the importance of a distinctly Christian understanding of marriage and family.⁸⁷

Conclusion

The essay attempts to show that the use of some artificial womb technology, especially in the form of partial ectogenesis to allow a woman who might otherwise have to continue a pregnancy experiencing imminent

gestational risks or considering a conventional abortion, should be morally permissible from the Christian perspective. AWT would not be intrinsically evil and could have limited ethical applications despite its vast potential for abuse and misuse.⁸⁸ Partial ectogenesis could also have benefits in certain situations such as risky medical conditions both for the mother and the baby and also, when abortive actions are considered. However, medical research is not value-free. It must always be conducted within the bounds of reason and objective moral truth informed by the Bible.⁸⁹

Nevertheless, Scott Rae advises us to tread carefully against the attitude that suggests that a technology must be used simply because it can be used. The advancement of biomedical sciences does not imply that society is obligated to make every new technology available.⁹⁰ As Ben Mitchell observes in discussing the Human Genome Project, "We are realistic in our view of the propensity of human beings to use good things for bad purposes (evangelical Christians call this propensity the sin nature)."⁹¹ Thus, if biomedical technology is used for therapeutic/good purposes either for the unborn baby or for the pregnant woman, then each specific technology should be carefully weighed and used as possible treatment for patients when technologically feasible. Further research is needed to establish definitively the morality of AWT use concerning partial ectogenesis. Until such evidence is available, AWT represents a form of medical reproductive technology that might be used only in clearly defined circumstances. 🌱

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