

International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)

International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal

Volume 4, Issue 1, January 2024

# Ectogenesis: Artificial Womb Technology – A Women's Beyond Choice

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Abstract: In 2017, a Philadelphia research team revealed the closest thing to an artificial womb (AW) the world had ever seen. The 'biobag', if as successful as early animal testing suggests, will change the face of neonatal intensive care. At present, premature neonates born earlier than 22 weeks have no hope of survival. For some time, there have been no significant improvements in mortality rates or incidences of long-term complications for preterms at the viability threshold. Artificial womb technology (AWT), that might change these odds, is eagerly anticipated for clinical application. We need to understand whether AWT is an extension of current intensive care or something entirely new. This question is central to determining when and how the biobag should be used on human subjects. This paper examines the science behind AWT and advances two principal claims. First, AWT is conceptually different from conventional intensive care. Identifying why AWT should be understood as distinct demonstrates how it raises different ethico-legal questions. Second, these questions should be formulated without the 'human being growing in the AW' being described with inherently value laden terminology. The 'human being in an AW' is neither a fetus nor a baby, and the ethical tethers associated with these terms could perpetuate misunderstanding and confusion. Thus, the term 'gestateling' should be adopted to refer to this new product of human reproduction: a developing human being gestating ex utero. While this paper does not attempt to solve all the ethical problems associated with AWT, it makes important clarifications that will enable better formulation of relevant ethical questions for future exploration. This is an open access article distributed in accordance with the Creative Commons Attribution 4.0 Unported (CC BY 4.0) license, which permits others to copy, redistribute, remix, transform and build upon this work for any purpose, provided the original work is properly cited, a link to the licence is given, and indication of whether changes were made.

Keywords: Infertility, Ectogenesis, Artificial womb technology (AWT)

## REFERENCES

- [1]. Bird SD. Artificial placenta: analysis of recent progress. Eur J Obstet Gynecol Reprod Biol. 2017;208:61–70.
- [2]. Hornick MA, Davey MG, Partridge EA, Mejaddam AY, McGovern PE, Olive AM, et al. Umbilical cannulation optimizes circuit flows in premature lambs supported by the EXTra-uterine Environment for Neonatal Devel-opment (EXTEND). J Physiol. 2018;596(9):1575–85.
- [3]. Kading JC, Langley MW, Lautner G, Jeakle MMP, Toomasian JM, Fegan TL, et al. Tidal flow perfusion for the artificial placenta: a paradigm shift. ASAIO J. 2020;66:796–802.
- [4]. Partridge EA, Davey MG, Hornick MA, McGovern PE, Mejaddam AY, Vrecenak JD, et al. An extra-uterine system to physiologically support the extreme premature lamb. Nat Commun. 2017;8:15112.
- [5]. Usuda H, Watanabe S, Saito M, Sato S, Musk GC, Fee ME, et al. Successful use of an artificial placenta to support extremely preterm ovine fetusesat the border of viability. Am J Obstet Gynecol. 2019;221:69.e1-.e17.
- [6]. Bonito V. Multimillion grant brings artificial womb one step closer. TU/e. https:// www. tue. nl/ en/ news/ news- overv iew/ multi milli on- grant- brings- artificial- womb- one- step- closer/. Accessed 2October 2020.
- [7]. Assad RS, Hanley FL. Editorial: artificial placenta—a need for fetal surgery? J Thorac Cardiovasc Surg. 1998;115:1021–2.
- [8]. Bulletti C, Palagiano A, Pace C, Cerni A, Borini A, de Ziegler D. The artifi-cial womb. Ann N Y Acad Sci. 2011;1221:124–8.

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### Volume 4, Issue 1, January 2024

- [9]. Bulletti C, Simon C. Bioengineered uterus: a path toward ectogenesis. Fertil Steril. 2019;112:446–7.
- [10]. Campo H, Cervelló I, Simón C. Bioengineering the uterus: an overview of recent advances and future perspectives in reproductive medicine. Ann Biomed Eng. 2017;45:1710–7.
- [11]. Dabaghi M, Fusch G, Saraei N, Rochow N, Brash JL, Fusch C, et al. An artificial placenta type microfluidic blood oxygenator with double-sided gas transfer microchannels and its integration as a neonatal lung assist device. Biomicrofluidics. 2018;12:044101.
- [12]. Davis RP, Bryner B, Mychaliska GB. A paradigm shift in the treatment of extreme prematurity: the artificial placenta. Curr Opin Pediatr. 2014;26:370–6.
- [13]. Ghidini A, Bianchi DW, Levy B, Van Mieghem T, Deprest J, Chitty LS. In case you missed it: the prenatal diagnosis editors bring you the most significant advances of 2018. Prenat Diagn. 2019;3
- [14]. "Complete human day 14 post-implantation embryo models from naïve ES cells". Nature. Nature (journal). 6 September 2023. Archived from the original on 6 September 2023.
- [15]. Bayerl, Jonathan; Ayyash, Muneef; Shani, Tom; Manor, Yair Shlomo; Gafni, Ohad; Massarwa, Rada; Kalma, Yael; Aguilera-Castrejon, Alejandro; Zerbib, Mirie; Amir, Hadar; Sheban, Daoud; Geula, Shay; Mor, Nofar; Weinberger, Leehee; Naveh Tassa, Segev (2021-09-02). "Principles of signaling pathway modulation for enhancing human naïve pluripotency induction". Cell Stem Cell. 28 (9): 1549–1565.e12. doi:10.1016/j.stem.2021.04.001. ISSN 1934-5909.
- [16]. "Scientists grow whole model of human embryo, without sperm or egg". BBC. BBC. September 6, 2023. Archived from the original on September 6, 2023.
- [17]. Randall, Vernellia; Randall, Tshaka C. (22 March 2008). "Built in Obsolescence: The Coming End to the Abortion Debate". SSRN Electronic Journal. Doi:10.2139/ssrn.1112367. S2CID 57105464.
- [18]. Chessen, Matt (2013-03-02). "Artificial Wombs Could Outlaw Abortion". Mattlesnake.com.
- [19]. Mathison, Eric; Davis, Jeremy (2017). "Is there a right to the death of the foetus?". Bioethics. 31 (4): 313–320. Doi:10.1111/bioe.12331. PMID 28182294. S2CID 3808881.
- [20]. Smajdor, Anna (Summer 2007). "The Moral Imperative for Ectogenesis" (PDF). Cambridge Quarterly of Healthcare Ethics. 16 (3): 336–45. Doi:10.1017/s0963180107070405. PMID 17695628. S2CID 36754378. Archived from the original (PDF) on 2013-09-11. Retrieved 2013-06-28.



