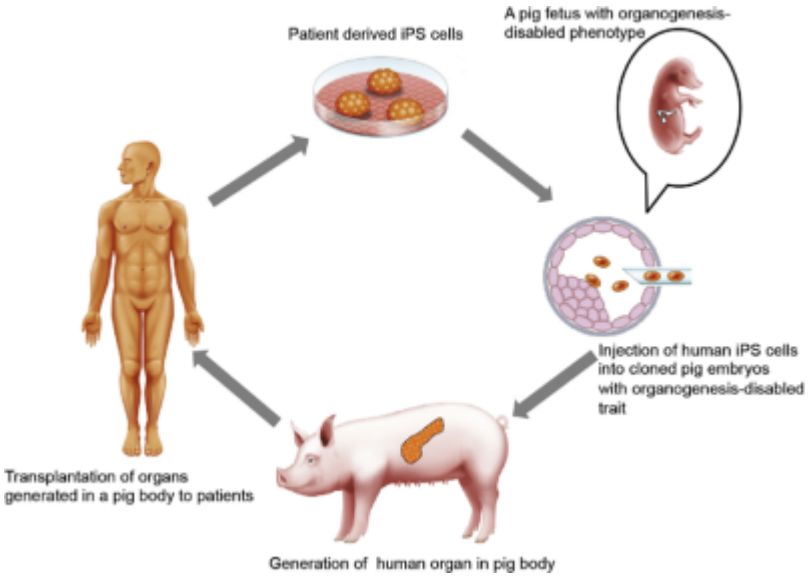
Blastocyst complementation



Blastocyst complementation is an emerging methodology in which human stem cells are transferred into genetically engineered pre-implantation animal embryos eventually giving rise to fully developed human tissues and organs within the animal host for use in regenerative medicine. The ethical issues surrounding this method have caused the National Institutes of Health to issue a moratorium on funding for blastocyst complementation citing the potential for human cells to substantially contribute to the brain of the chimeric animal. To address this concern, Crane et al. performed an in-depth review of the neural transplantation literature to determine how the integration of human cells into the non-human neural circuitry has altered the behavior of the host. Despite reports of widespread integration of human cell transplants, the review of 150 transplantation studies found no evidence suggestive of humanization of the animal host, and they thus conclude that, at present, concerns over humanization should not prevent research on blastocyst complementation to continue.

Crane et al. suggest proceeding in a controlled and transparent manner, however, and include recommendations for future research with careful consideration for how human cells may contribute to the animal host nervous system.

Due to a severe shortage of human organs and tissues, thousands of patients die each year due to an inability to procure organs for transplantation. Blastocyst complementation is a methodology that has the potential to generate large quantities of functioning human organs and tissues but is hindered by a National Institutes of Health moratorium on funding citing concern over substantial human cell contribution to the brain of the animal. This review summarizes published, peer-reviewed studies on human-animal neural transplantation and suggests that this concern over neurological chimerism should not prevent research to continue in a controlled and transparent manner [1)].

1)

Crane AT, Voth JP, Shen FX, Low WC. Human-Animal Neurological Chimeras: Humanized Animals or Human Cells in an Animal? Stem Cells. 2019 Jan 10. doi: 10.1002/stem.2971. [Epub ahead of print] Review. PubMed PMID: 30629789.

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