



## Legal and Ethical Considerations of Brain Organoid Technology

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### Abstract:

Organoids enable the study of organs in 3D models, allowing modification of genetic and environmental factors that influence ultimate function. Organoids are essentially microcosms of organs, recapitulating organ function. Derived from stem cells, organoids are propagated in culture in three-dimensional cell clusters for later experimentation. Organoids develop upon the culture of pluripotent cells - meaning that organoids may develop into any of a variety of different mature cell types when placed in an amenable environment for growth- hES (human embryonic stem) and hiPS (human induced pluripotent stem) cells. The stem cell origins of organoids enables them to develop into a multitude of different organoid types. In this fashion, organoids are capable of regenerating and modeling development and disease in organs such as the liver, pancreas, lung, intestine, stomach, prostate, breast, and brain. Thus, biomedical research in vitro and in vivo using organoids has potential uses for diagnostics, precision and personalized medicine, tissue regeneration and transplantation. Yet, ethical considerations are increasingly debated as demand for brain organoid technology increases and clinical trials progress. Concerns regarding the potential sentience of cerebral organoids have left neuroethicists and bioethicists in a quandary regarding the morality of their creation and use. Recently, scientists detected brain wave activity which mimicked that of whole brain specimens in brain organoids. The brain wave activity was positively correlated with the age and maturity of the brain cells. Although many scientific entities, including EuroStemCell, a research initiative supported by the European Union's Horizon 2020 program, currently deny that brain organoids are capable of consciousness or higher-order thinking, this does not mean that brain organoids will remain incapable of such activity. As brain organoid technology becomes more sophisticated, clinical and research teams must consider how they will adeptly weigh legal and ethical concerns of informed consent, human rights, and a host of other relevant issues. This research project will examine how clinicians, ethicists, policymakers, and legal scholars may address some of these future brain organoid concerns.



### Biography:

Dorkina Carmell Myrick is an accomplished leader, physician, scientist, policymaker, writer, and future attorney at the Boston University School of Law with work experience in the governments of the United States (judicial, legislative, and executive branches) and the United Kingdom.

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