

## Retina Created From Human Embryonic Stem Cells

An eight-layer, early stage retina was created from human embryonic stem cells (hESC) by researchers at the University of California, Irvine.<sup>1</sup> The investigators developed 3D tissue constructs by culturing hESC-derived neural retinal progenitors in a matrix on top of hESC-derived retinal pigment epithelial cells in a cell culture insert.

To mimic early stage retinal development, the researchers built microscopic gradients for solutions in which to bathe the stem cells to initiate specific differentiation paths. An osmolarity gradient maintained the nutrition of the 3D cell constructs, according to a university news release.

Tissue constructs derived from hESC expressed transcription factors characteristic of retinal development, such as pax6, Otx2, Chx10, and retinal RAX, according to the study authors. Additionally, many of the cells expressed neuronal markers including nestin, beta-tubulin, and microtubule-associated proteins.

These findings are the first step toward the development of transplant-ready retinas to treat eye disorders such as retinitis pigmentosa and macular degeneration, the investigators said. Currently, early-stage retinas are being tested in animal models to evaluate the extent to which they improve vision.

1. Nistor G, Seiler MJ, Yan F, et al. Three-dimensional early retinal progenitor 3D tissue constructs derived from human embryonic stem cells. *J Neurosci Methods*. 2010 May 4. [Epub ahead of print]