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Abstract

Human Pluripotent Stem Cells from Diabetic and Nondiabetics Improve Retinal Pathology in Diabetic Mice †

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Human-induced pluripotent stem cells (hiPSCs) cells have the proliferative potential and ability to differentiate into numerous cell types. We have previously generated vascular wall-derived reparative cells called endothelial colony-forming cells (ECFCs) from iPSCs derived from well-characterized, healthy, and diabetic individuals [1]. Our studies showed that these human iPSCs incorporate into blood vessels when implanted subcutaneously into immune compromised mice. These cells, of either diabetic or nondiabetic origin, when injected into the vitreous of diabetic mice with retinal damage, are incorporated

into retinal blood vessels and restore perfusion to ischemic areas. Our studies also show that iPSCs from diabetic donors are able to function in vivo and that reprogramed diabetic iPSC cells behave similarly to nondiabetic hiPSCs. The iPSC-derived ECFCs improved the electroretinograms of the diabetic mice and their ocular kinetic responses. These studies support the notion that iPSCs of diabetic and nondiabetic origin, when differentiated into ECFCs, can correct vascular dysfunction, which in turn improves key functions of the neural retina.

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