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(54) Title: CULTURE SYSTEM FOR RAPID EXPANSION OF HUMAN EMBRYONIC STEM CELLS

(57) Abstract: This disclosure provides an improved system for culturing human pluripotent stem cells. Traditionally, pluripotent stem cells are cultured on a layer of feeder cells (such as mouse embryonic fibroblasts) to prevent them from differentiating. In the system described here, the role of feeder cells is replaced by components added to the culture environment that support rapid proliferation without differentiation. Effective features are a suitable support structure for the cells, and an effective medium that can be added fresh to the culture without being preconditioned by another cell type. Culturing human embryonic stem cells in fresh medium according to this invention causes the cells to expand surprisingly rapidly, while retaining the ability to differentiate into cells representing all three embryonic germ layers. This new culture system allows for bulk proliferation of pPS cells for commercial production of important products for use in drug screening and human therapy.