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LIF gene transfected human embryonic lung fibroblasts serve as candidate feeder cells for maintenance of human embryonic germ cells

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A human embryonic germ (hEG) cell line was first established by Gearhart and his colleagues in 1998. Although reports of human EG cells remains limited from 1998 to now, in contrast to plenty of human embryonic stem (hES) cell lines have been derived. hEG cells share significant similarities with hES cells, and thus promise significant therapeutic potential. We use human embryonic lung fibroblasts (hELF) overexpressing leukemia inhibitory factor (LIF) as feeder cells to support the self-renewal of hEG cells. We examine the morphology, gene expression, and developmental potential of hEG cells grown on a feeder layer of LIF-expressing hELF (hELF/lif) cells. hEG cells were positive for alkaline phosphatase (AP), SSEA-1, SSEA-4, TRA-1-60, TRA-1-81. In addition, hEG cells maintained on hELF/lif expressed higher levels of pluripotency genes such as *Oct4* and *Nanog*. We also show that hEG cells maintained on hELF/lif cells can give rise to differentiated tissues when grown as embryoid bodies, consistent with the broad developmental potential of the starting population. Our results suggest that a hELF/lif feeder layer can support the proliferation of hEG cells, and that LIF signaling plays an essential role in this process. This human-derived culture system provides an attractive alternative to more commonly used mouse-derived feeder layers for use in clinical applications. While our system shows significant promise towards this end, our conditions still rely on the use of FBS and are thus still subject to risks of pathogen transmission. Future studies will focus on the development of effective and safer culture conditions that will enable the study and development of hEG cell-derived therapies for human disease intervention.

Keywords**:** human embryonic germ cells, leukemia inhibitory factor, feeder layer, human embryonic stem cells

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