

## Comparison of Gene Expression in Human and Mouse Embryonic Stem Cells.

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To assess differences between human and rodent ES cell lines we have compared gene expression profiles of mouse and human ES cells by immunocytochemistry, RT-PCR and microarray analysis. Several markers that in concert, could distinguish undifferentiated ES cells from their differentiated progeny were identified. These included known markers such as (SSEA antigens, OCT3/4, SOX-2, REX-1 and TERT as well as additional markers such as UTF-1, TRF1, TRF2, connexin43, connexin45, FGFR-4, ABCG-2 and Glut-1. In addition we have developed a set of negative markers that confirm the absence of differentiation. These include genes characteristic of trophoectoderm differentiation as well as markers of germ layers and of more specialized progenitor cell differentiation. While the expression of many of the markers was similar in rodent and human cells significant differences were found in the expression of vimentin,  $\beta$ -III tubulin, eomesodermin, FOXD3, eomesodermin, HEB, ARNT, AFP, krt14, LIF-R and gp130 expression. To further assess difference in rodent and human lines we compared expression of three hundred genes related to cell cycle, apoptosis and cytokine expression using three specific cDNA microarrays (96 genes/array). Many differences were identified in the pattern of expression of these genes, especially as related to apoptosis. To confirm that the differences observed were consistent in other human cell lines, the expression of selected genes was tested in three additional populations H9, IS6 and a pooled sample of DNA from H1, H4 and H9. The comparison confirmed that the difference between D3 and H1 lines were likely due to difference in species rather than differences in maintaining cells in culture.