

# Supplementary information to poster Pluripotent cell isolation for regenerative medicine

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## Glossary

### Blastomere

Pluripotent cells of the developing embryo from the 2-cell stage to approximately the 32-cell (morula) stage.

### Bone morphogenetic protein

(BMP). A family of growth factors that bind BMP receptors and activate the SMAD signalling pathway. BMP4 is used to maintain human embryonic stem cells in an undifferentiated state.

### Direct reprogramming

Induction of an embryonic epigenetic state in a somatic cell through the ectopic expression of OCT4, SOX2, KLF4 and MYC (which is dispensable but aids efficiency) or OCT4, SOX2, NANOG and LIN28. The expression of these genes results in reactivation of the pluripotency maintenance transcriptional network.

### Embryonic carcinoma cells

(ECCs). Cells that are derived from germ-cell tumours that have active pluripotency genes.

### Embryonic germline cells

(EGCs). Pluripotent cell type spontaneously formed through the *in vitro* culture of PGCs.

### Embryonic stem cells

(ESCs). *In vitro* culture of cells that are derived from the inner cell mass of the blastocyst. ESCs have an active pluripotency network.

### Epiblast stem cells

(EpiSCs). Pluripotent stem cells that are derived from the epiblast, a later stage of development than the blastocyst from which ESCs are derived. Human ESCs resemble mouse EpiSCs in their morphology and growth factor dependence.

### Epigenetic reprogramming

Resetting of the epigenetic state of the somatic genome to an embryonic state that has an active pluripotency transcriptional network.

### Fibroblast growth factor

(FGF). A soluble growth factor, the activity of which is required for human ESC and mouse EpiSC proliferation and self-renewal.

### Germline stem cells

(GSCs). Progenitor cells that give rise to the gametes (egg and sperm). In males, the GSCs known as spermatogonial stem cells can give rise to MGSCs spontaneously in culture.

### Induced pluripotent stem cell

(iPS cell). The epigenetic state resulting from direct reprogramming of a somatic cell.

### Inner cell mass

(ICM). The group of cells within the blastocyst that gives rise to the entire embryo proper (excluding extra-embryonic tissue such as the placenta) and are the source of ESCs.

### Leukaemia inhibitory factor

(LIF). An interleukin-family cytokine that binds the LIF receptor, thereby activating the Janus kinase (JAK)–signal transducer and activator of transcription (STAT) and mitogen-activated protein kinase (MAPK) signalling pathways. LIF maintains mouse ESCs in an undifferentiated state, and its requirement can be bypassed by NANOG overexpression.

### Multipotent germline stem cells

(MGSCs). Pluripotent cells that are spontaneously derived from cultures of male germline stem cells (spermatogonial stem cells).

### NANOG

A homeodomain transcription factor that is integral to the core pluripotency maintenance network.

### Nuclear transfer

(NT). A process in which a somatic nucleus is placed into an enucleated oocyte, in which it is exposed to unknown reprogramming factors, resulting in epigenetic reprogramming.

### OCT4

POU-domain-containing transcription factor specifically expressed in pluripotent cells and cells of the germ lineage. OCT4 is known to partner with SOX2 to maintain pluripotency.

### Pluripotency

The developmental competence of cells enabling them to generate all tissues and cell types of a developing organism, except for extra-embryonic tissue such as the placenta.

### Pluripotent hybrid cells

Pluripotent tetraploid fusion product which contains the genomes of both a pluripotent recipient cell (ESC or ECC) and somatic donor cell.

### Pluripotency transcriptional network

The repertoire of gene expression that is governed by the transcription factors SOX2, OCT4, TCF3 and NANOG. In concert with chromatin regulators such as the polycomb group proteins and with histone modifications, these factors maintain the expression of genes that are required for self-renewal and suppress the expression of genes that drive differentiation.

### Primordial germ cells

(PGCs). Germ cell precursors within the embryo that have not yet migrated to the gonads and can give rise to pluripotent embryonic germline cells in culture.

### SOX2

SRY-related HMG-box transcription factor that maintains pluripotency in cooperation with OCT4.

### TCF3

A transcriptional effector of the Wnt signalling pathway and a member of core pluripotency network.

## FURTHER READING

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## Additional abbreviations

ESX1L, extra-embryonic, spermatogenesis, homeobox-1; HESX1, homeobox expressed in ES cells-1; LEFTY2, left-right determination factor-2; LHX5, Lim homeobox protein-5; MEIS1, myeloid ecotropic viral integration site-1; NEUROG1, neurogenin-1; PAX6, paired box-6; SKIL, Ski-like protein; ZIC3, zinc-finger protein-3