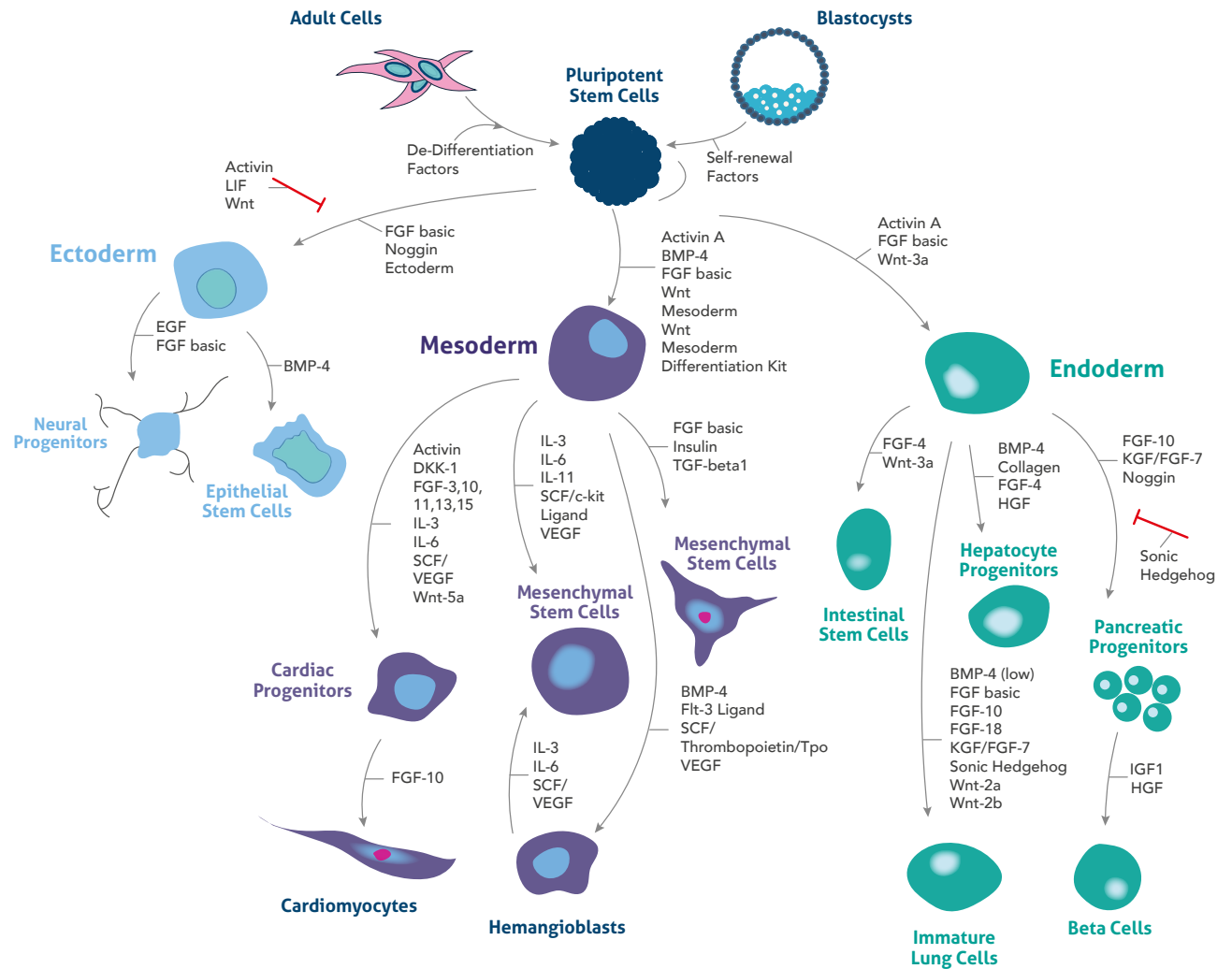


Induced Pluripotent Stem Cell

iPSCs can be differentiated into one of three lineages dependent on the growth-factor used. Within each of the lineages - ectoderm, mesoderm, endoderm – additional growth-factors can be used to induce differentiation into specialized human cell types.

Both embryonic stem cells (ESCs) and induced pluripotent stem cells (iPSCs) are types of pluripotent stem cell; meaning they have the capacity to divide into further stem cells or differentiate into any cell in the human body. Differentiation can take place through one of three main lineages: Ectoderm, Mesoderm, and Endoderm. ESCs are derived from blastocyst cells from human embryos, whilst iPSCs are adult human somatic cells that have been biologically re-programmed back to pluripotency.

The figure (right) depicts the differentiation of pluripotent stem cells into ectoderm, mesoderm and endoderm lineages, and subsequent differentiation into specialized cell types.



Here you will find a guide on which growth-factors influence differentiation to a specific specialized cell type, and which antibodies can be subsequently used against markers of those cell types for confirmational experiments.

iPSC



Ab - Nanog, OCT4, SOX2

Endoderm

GF - Activin A, Wnt3a, FGF basic
Ab - SOX17, FOXA2



Mesoderm

GF - Noggin, PDGFbb, FGF basic, Activin A, BMP-4
Ab - NCAM, GATA4



Ectoderm

GF - Noggin, FGF basic
Ab - OTX2, PAX6, SOX1



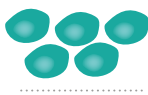
Pancreas

GF - HGF
Ab - HNF1b, PDX1, HLXB9, NGN3, NKX2.2, Insulin, SST, GHRL



Liver

GF - FGF-4, HGF, Oncostatin M, BMP-4
Ab - PROX1, AFP, TBX3, Albumin, Serpin A1



Intestine

GF - FGF-4, Wnt3a, Noggin
Ab - CDX2, SOX9



Lungs

GF - FGF-4, Wnt3a, Noggin
Ab - NKX2, FOXJ1, ACTUB, MUC5AC, SCGB1A1, AQP5



Heart

GF - BMP-4, IL-6, DKK-1
Ab - Troponin I, Alpha actinin, NKX2.2, Insulin, SST, GHRL



Kidney

Ab - PAX8, PODXL



Bone

GF - FGF basic, TGF beta, BMP-2, BMP-4
Ab - Biglycan, Fibronectin, Sclerostin, SPARC



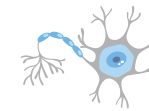
Neural Stem cells

GF - FGF basic
Ab - Beta-III Tubulin, Nestin, SOX2



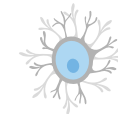
Neuron

GF - FGF basic
Ab - MAP2, DCX



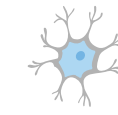
Astrocyte

GF - GDNF
Ab - GFAP, S100b



Oligodendrocyte

GF - FGF basic, PDGF
Ab - OLIG2, MBP, OSP



*Ab- Antibody | GF- Growth factors