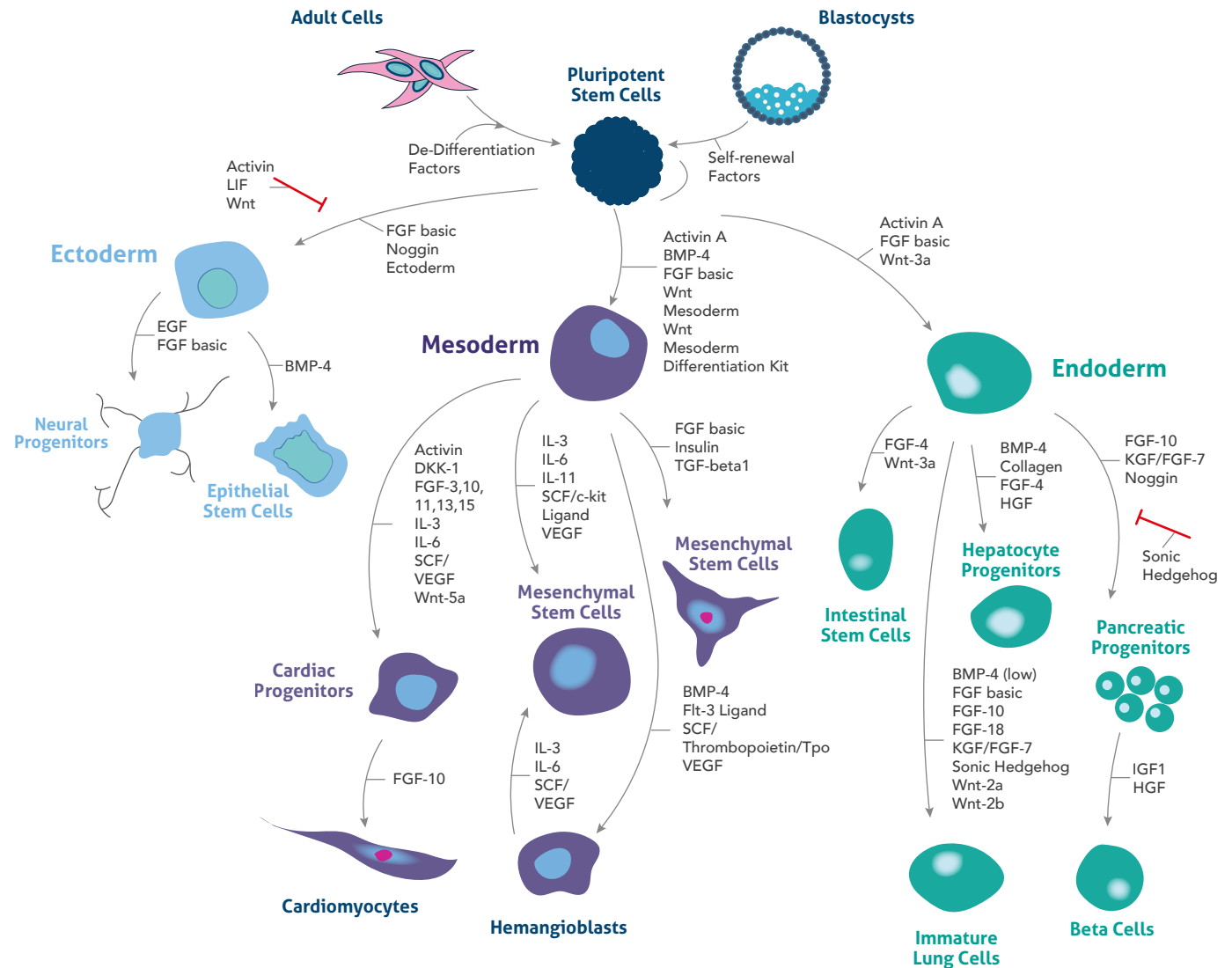


# Induced Pluripotent Stem Cell

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

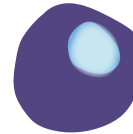
### Endoderm

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



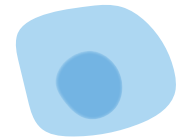
### Mesoderm

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



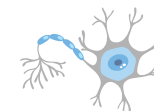
#### Bone

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



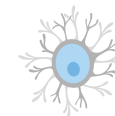
#### Neural Stem cells

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