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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

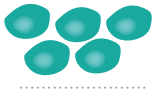
GF - Activin A, Wnt3a, FGF basic

Ab - SOX17, FOXA2

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

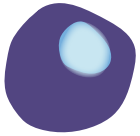
Ab - CDX2, SOX9

Lungs

GF - FGF-4, Wnt3a, Noggin

Ab - NKX2, FOXJ1, ACTUB, MUC5AC, SCGB1A1, AQP5

Mesoderm



GF - Noggin, PDGFbb, FGF basic, Activin A, BMP-4

Ab - NCAM, GATA4

Heart

GF - BMP-4, IL-6, DKK-1

Ab - Troponin I, Alpha actinin NKX2.2, Insulin, SST, GHRL

Kidney

Ab - PAX8, PODXL

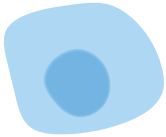
Bone

GF - FGF basic, TGF beta, BMP-2, BMP-4

Ab - Biglycan, Fibronectin, Sclerostin, SPARC

*Ab- Antibody | GF- Growth factors

Ectoderm



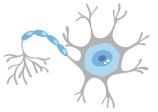
GF - Noggin, FGF basic

Ab - OTX2, PAX6, SOX1

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

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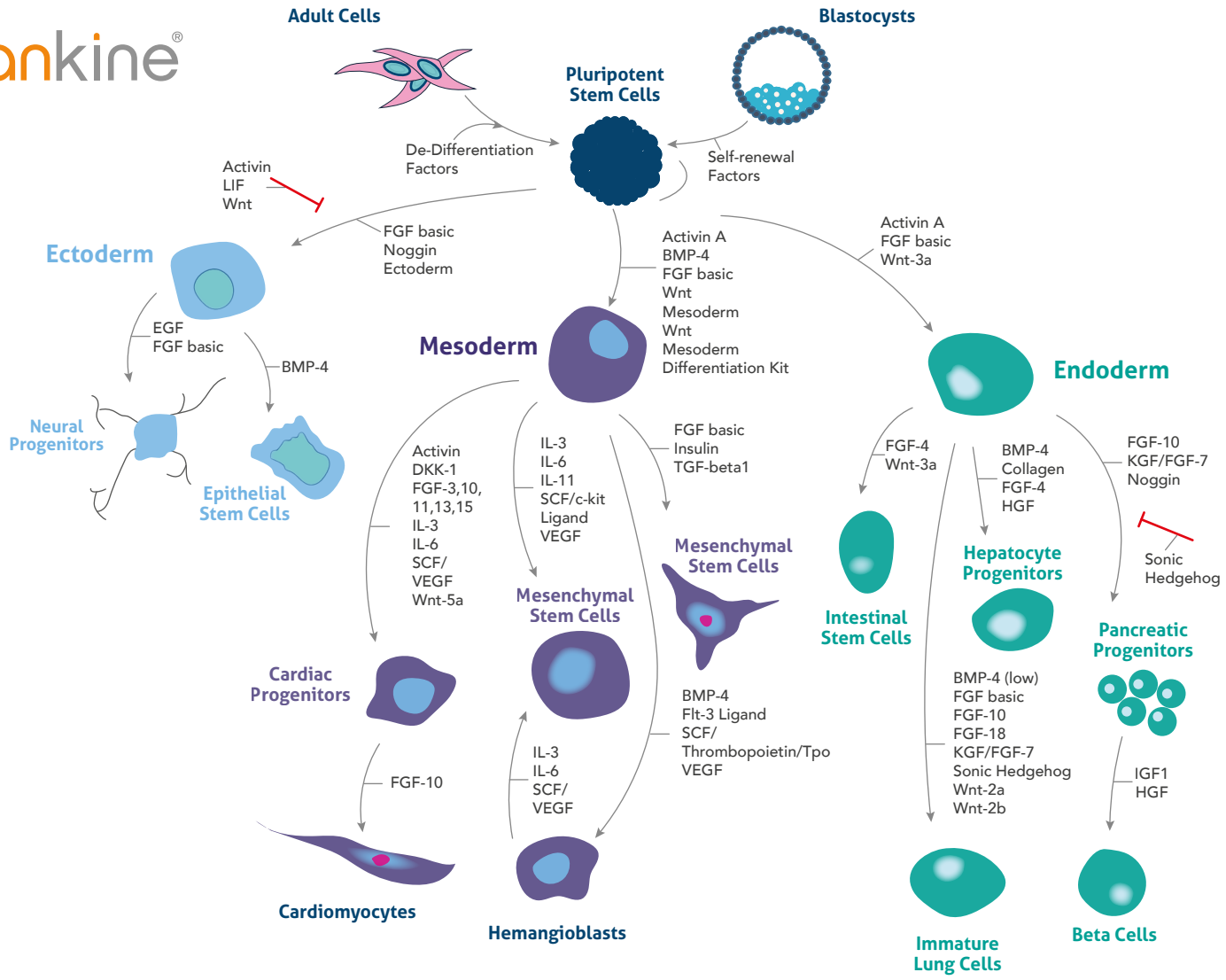
Induced Pluripotent Stem Cell

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.



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