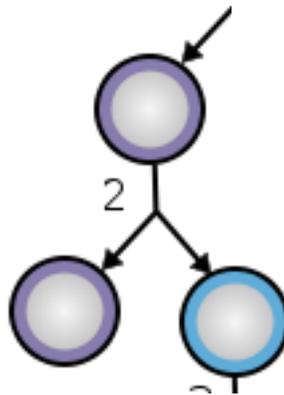


CONCEPT: STEM CELLS

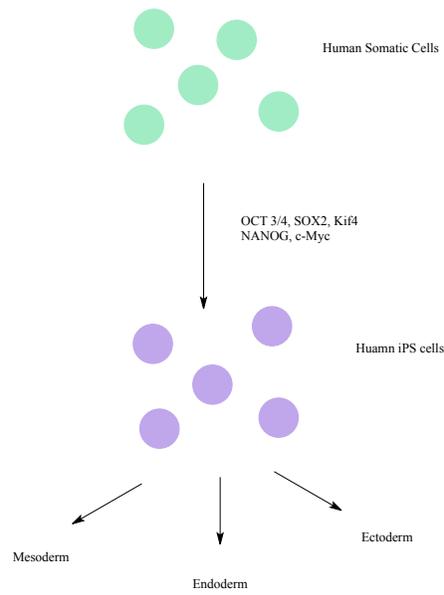
- **Stem cells** are responsible for providing a continuous _____ of differentiated cells
 - They are **self-renewing** which means their divisions replace themselves
 - One daughter cell remains a stem cell
 - One daughter cell becomes differentiated cell
 - Stem cells are present in most adult tissues in a **stem cell niche** location
 - They are used to repair damage

EXAMPLE:



- There are many different _____ of stem cells
 - **Embryonic stem cells (ES)** are stem cells that are derived from embryos
 - They are **pluripotent** meaning that they can differentiate into any cell type
 - **Induced pluripotent stem cells** are cells taken from adult tissue and reprogrammed to become ES cells
 - Scientists use proteins Oxt3/4, Sox2, and Kif4 to turn them into ES cells (not super efficient)
 - Can be used to make patient specific stem cells
 - **Progenitor cells** are stem cells that give rise to only a few differentiated cell types
 - A bit more specialized than ES cells
 - Include: *Hematopoietic stem cells* (blood) and *neuronal stem cells* (nerve

EXAMPLE:



PRACTICE:

1. Pluripotent means...
 - a. The cells can differentiate into only one cell type
 - b. The cells can differentiate in a few different cell types
 - c. The cells can differentiate into all cell types
 - d. The cells are found only in embryonic tissues

2. Which of the following terms describes stem cells that can only give rise to certain types of cells?
- a. Embryonic stem cells
 - b. Pluripotent stem cells
 - c. Totipotent stem cells
 - d. Progenitor stem cells