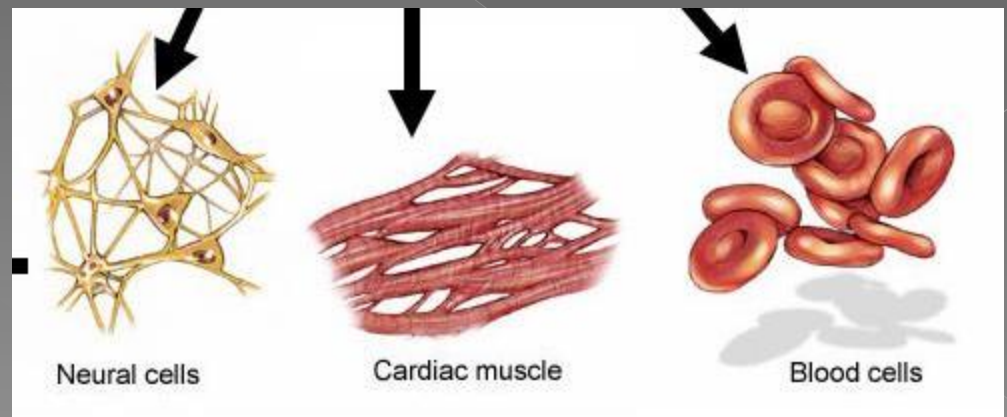


# Cell Division

How are cells arranged? What differentiates different cells?

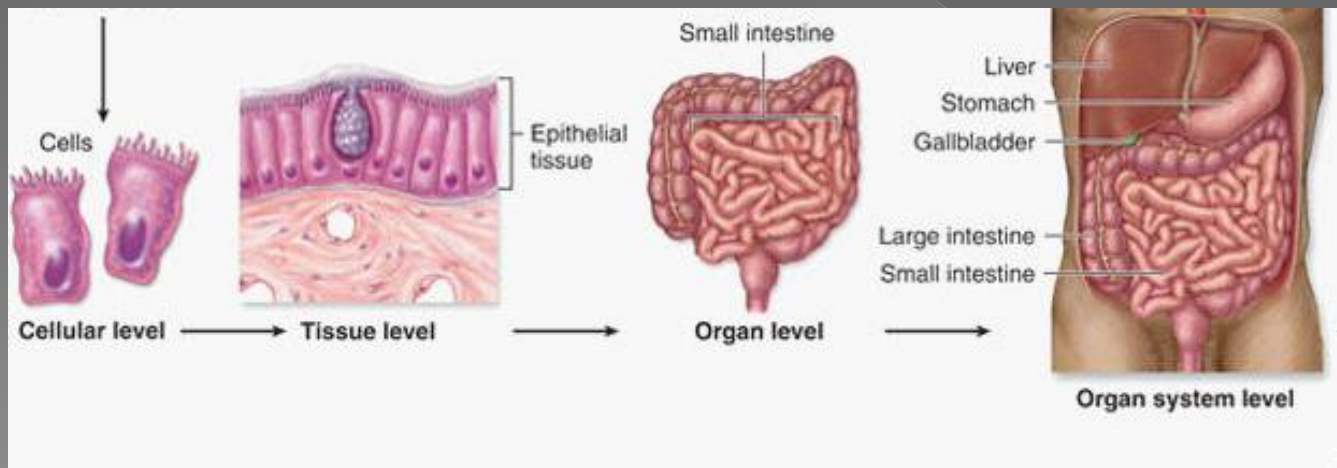
# Reproduction

- For most multicellular organisms, a single cell (fertilized egg) gives rise to many different types of cells
  - > This happens through cell division
  - > These cells undergo differentiation to become a certain kind of cell



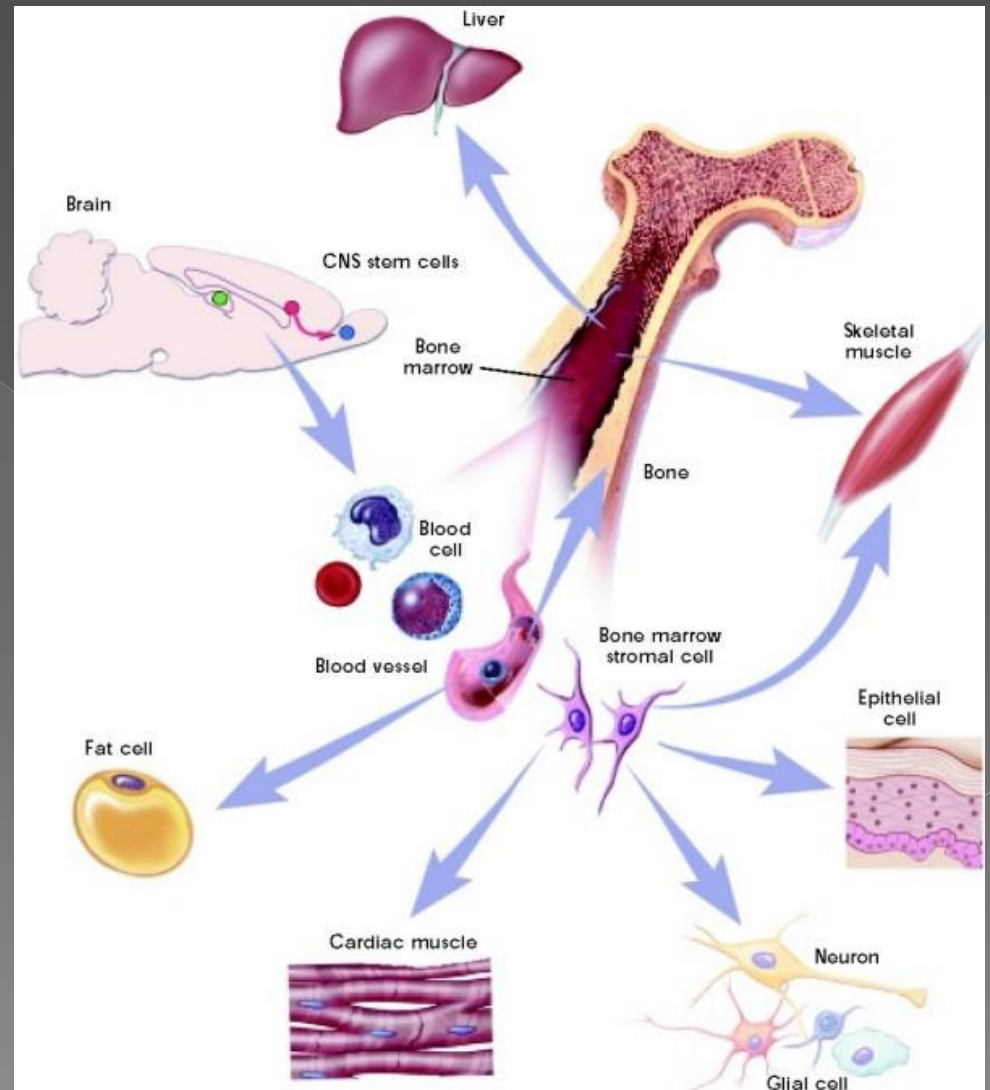
# Cell Organization

- Various types of cells (such as blood, muscle, or epithelial) are arranged into tissues, which are arranged into organs, then to organ systems
- Cells → tissue → organ → organ system



# Differentiation

- How does a skin cell know it is a skin cell (vs. a muscle cell or nerve cell?)
- Because all cells come from a single cell, they have the same DNA



# Differentiation

- ◉ In each cell, *only specific parts of the DNA are activated*
  - > The parts of the DNA that are active determine what the cell looks and acts like
  - > This is called **differentiation**
  - > Once a cell is differentiated, it can't go back to the 'blank' state or be changed to anything else
    - The cell is considered **committed**

# Stem Cells

- 'Blank' cells are called **stem cells**
  - > They have the potential to become any cell type
- **Embryonic stem cells** come from embryos
- **Adult stem cells** come from adults, like in the bone marrow

