**Stem Cells**

### What are stem cells?

- **Embryonic**
  - On the inside layer of an embryo
  - Undifferentiated
  - Can produce all the specialised cells in the body
  - Limited ability to differentiate
  - Produces mainly cells of the blood

- **Adult**
  - Skin
    - Limited ability to differentiate
    - Produces cells found in different layers of the skin
  - Other organs such as brain and liver
    - Limited ability to differentiate
    - Produces cells found in these organs
  - Umbilical cord blood
    - Limited ability to differentiate
    - Produces cells of the blood, muscle, and nerve tissue

- **Meristem**
  - Tips of roots and shoots
  - Fully undifferentiated
  - One cell can divide and produce a whole new plant

### Animals vs Plants

- **Animals**
  - Embryonic stem cells help to form all of the different tissues and organs
  - Adult stem cells replace cells lost through damage to produce new cells for growth

- **Plants**
  - Meristem cells can differentiate into the cells needed by the plant in regions where growth is occurring
  - Meristem cells in the roots can differentiate into root hair cells
  - Stem cells keep the ability to differentiate into any type of plant cell throughout the life of the plant