

Topic 06

Cell Division

Learning Objectives

At the end of this module, students will be able to:

- Recall differences of prokaryotic & eukaryotic cells
- Recognize difference of fission and mitosis
- Recognize difference of meiosis and mitosis
- Recognize key words and abbreviations in mitosis
- Describe steps of mitosis using a diagram

Outline

- a. Prior concepts
- b. Fission, meiosis & mitosis
- c. Mitosis cycle
- d. Cellular differentiation

06.a

Prior concepts

Overview

Prokaryotes are unicellular organisms that lack organelles or other internal membrane-bound structures.

Prokaryotic cells preceded eukaryotic cells on the evolutionary timeline.

Eukaryotes are organisms whose cells have a nucleus enclosed within membranes.



06.a

Prior concepts

Relative sizes of cells

Eukaryotes

Biggest 

Medium 

Smallest 

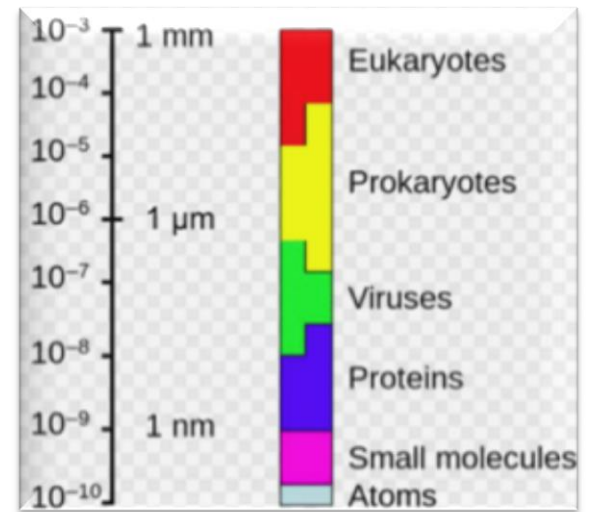
Prokaryotes

Biggest 

Medium Big 10x smaller than a “big” prokaryote

Medium Small 100x smaller than a “big” prokaryote

Smallest 1,000 smaller than a “big” prokaryote



06.a

Prior concepts

Single-celled organisms are able to carry out all the processes of life without help from other cells.

- **All** prokaryotes are single-celled organisms.
- **Some** eukaryotes are single-celled.

06.a

Prior concepts

Multicellular organisms carry out their life processes through division of labor. They have specialized cells that do specific jobs.

- All eukaryotes are multi-cell organisms.
- Plants & animals have a variety of cell types.

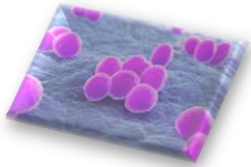
~ obvious examples ~

- Tree bark and leaves have different cells.
- Human skin and bones have different cells.

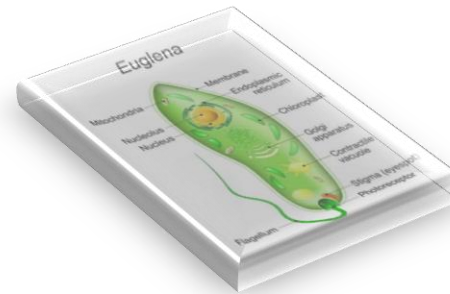
06.a

Prior concepts

Cell examples

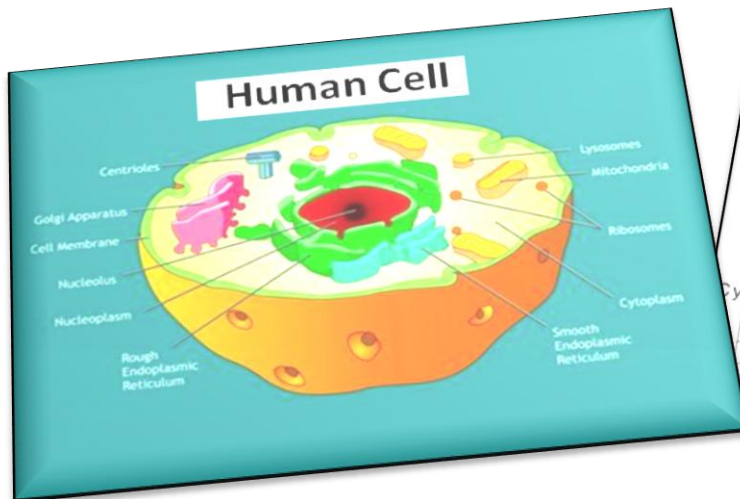


Staphylococcus
Bacteria
Prokaryotic

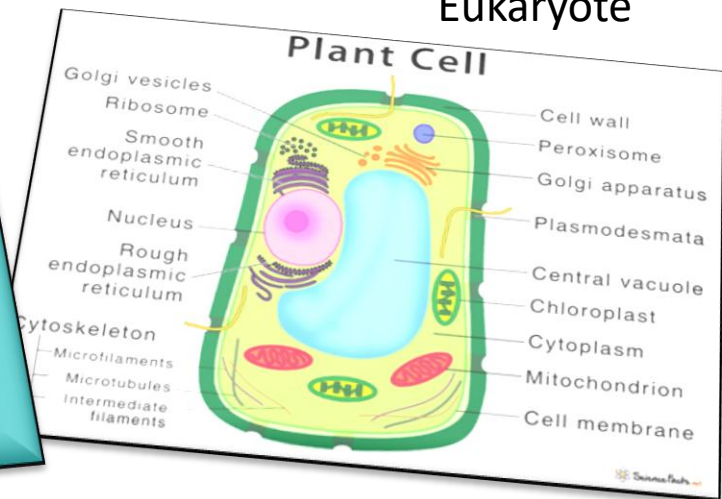


Euglena
Protist
Single cell
flagellate Eukaryote

Human Cell
With Organelles
Eukaryote



Plant Cell
With Organelles
Eukaryote



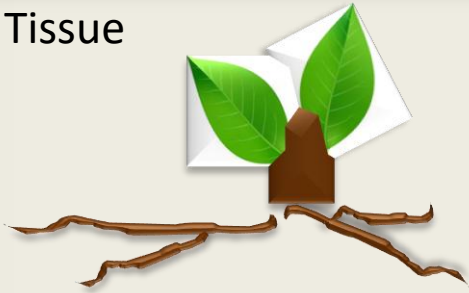
06.a

Prior concepts

Shoots & roots

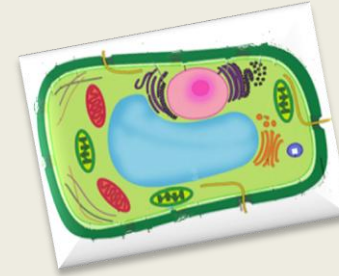
Plant cell organelles

Tissue



Meristematic
Continuous division

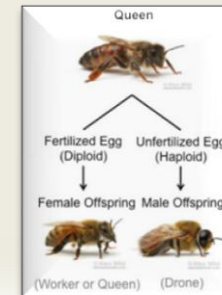
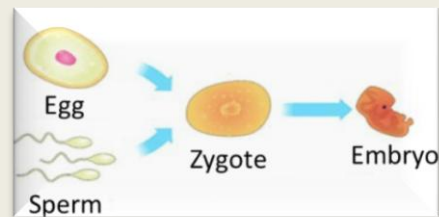
Non-meristematic
No more division



Sexual reproduction

Sexual

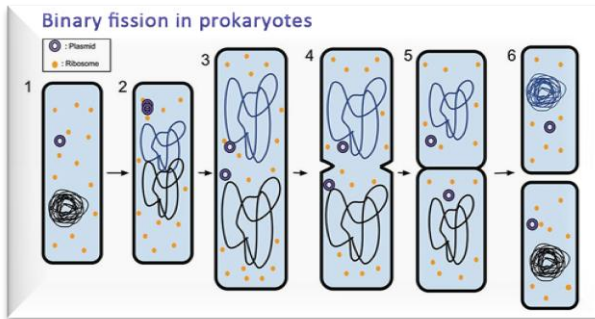
Cyclical
parthenogenesis



06.b

Fission Meiosis & Mitosis

Binary fission in prokaryotes



Meiosis

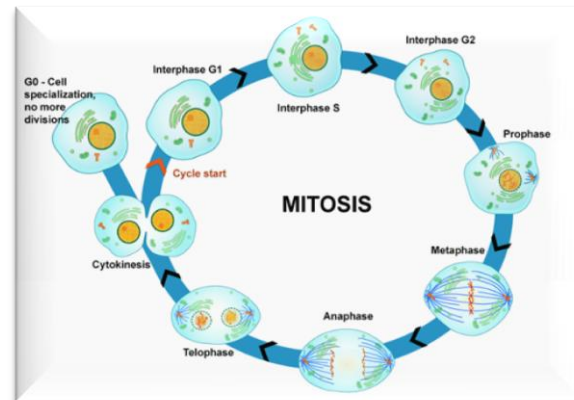
Sexual reproduction in eukaryote

Mitosis doesn't occur in gamete cells.



Mitosis happens in **all eukaryotic cells** (plants, animals, and fungi). In plants, mitosis only occurs in the **meristematic tissue**.

With humans, mitosis occurs in the nucleus of the body's normal cells (the somatic cells). Mitosis happens in all cell types such as **skin, bone, blood, and structural cells**, among others, except the germ cells.

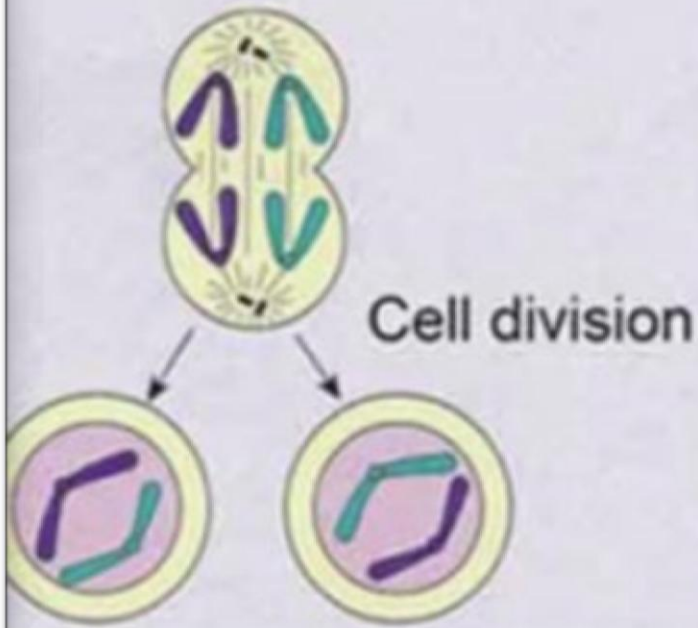


06.b

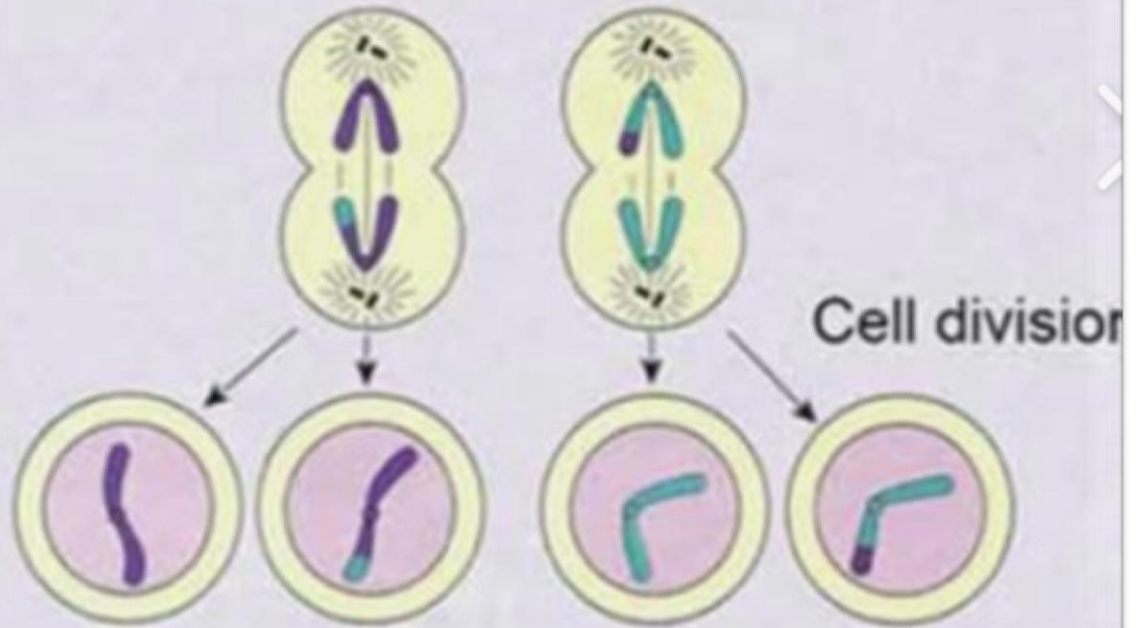
Fission Meiosis & Mitosis

Differences Between Mitosis and Meiosis

MITOSIS

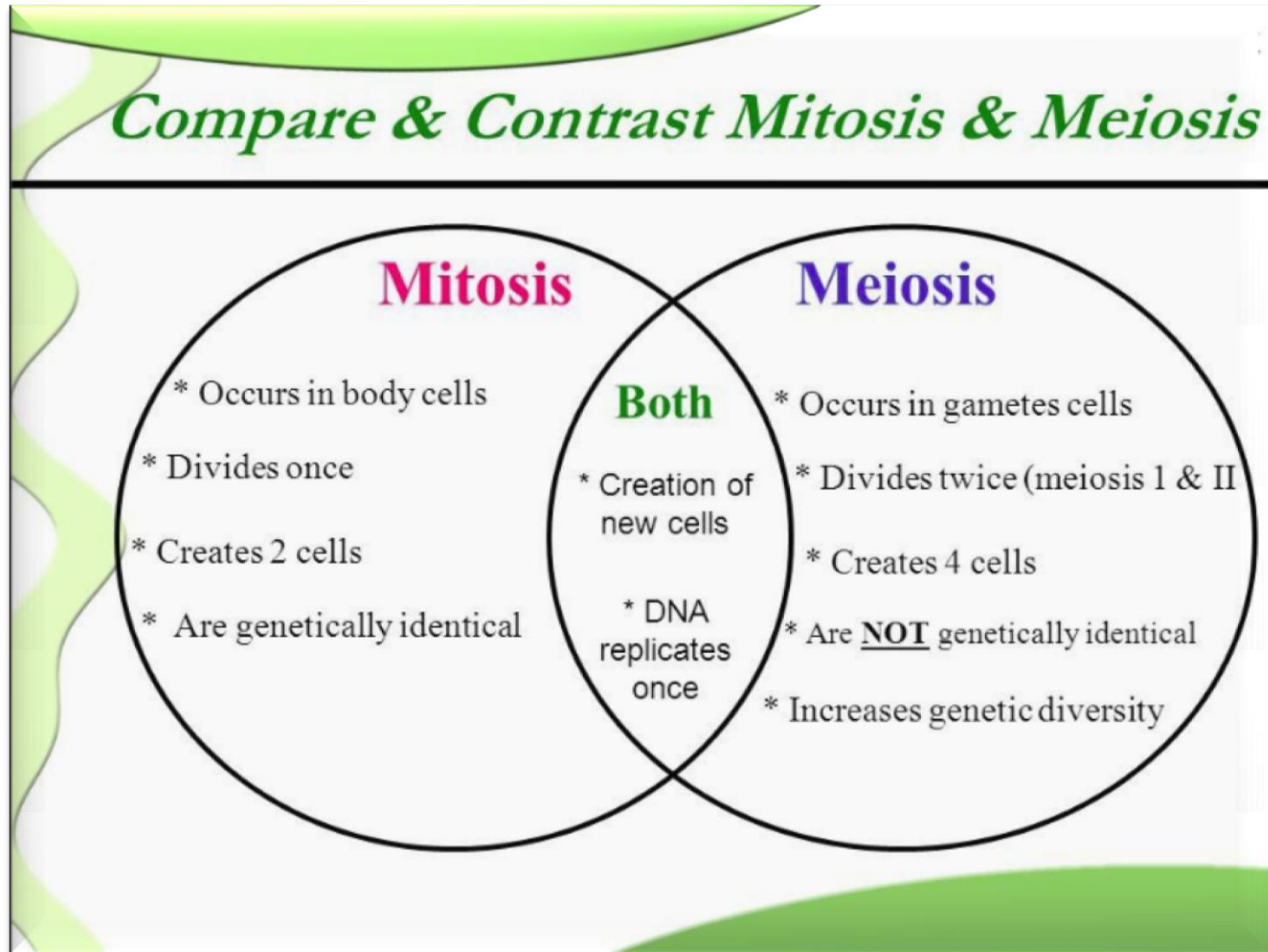


MEIOSIS



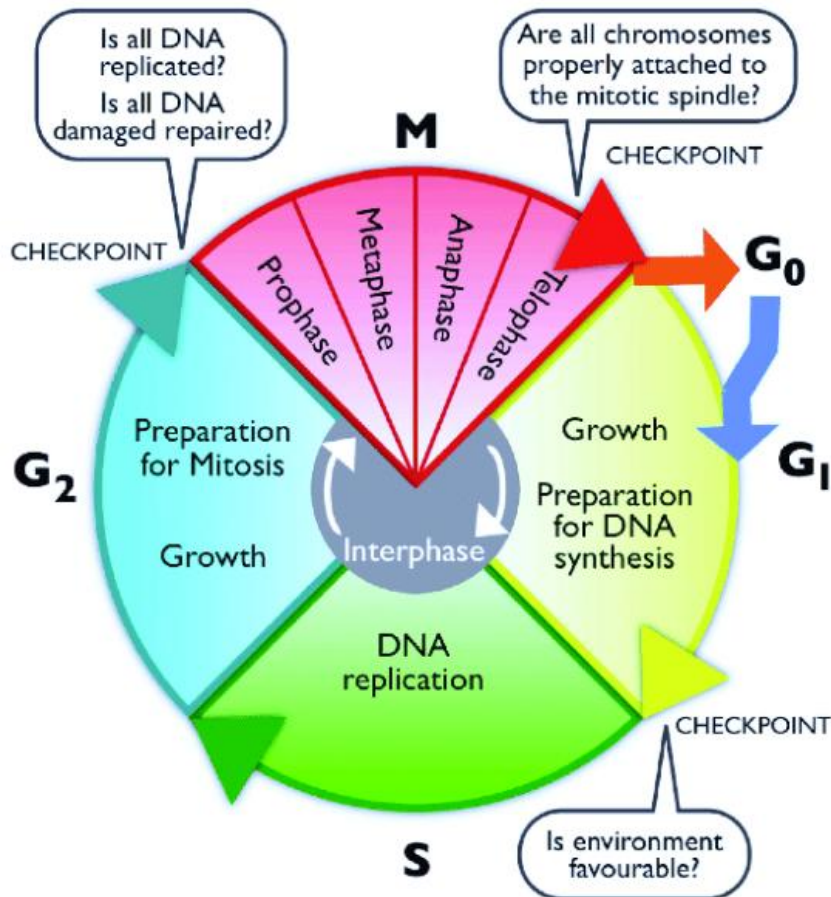
06.b

Fission Meiosis & Mitosis



06.c

Mitosis cycle

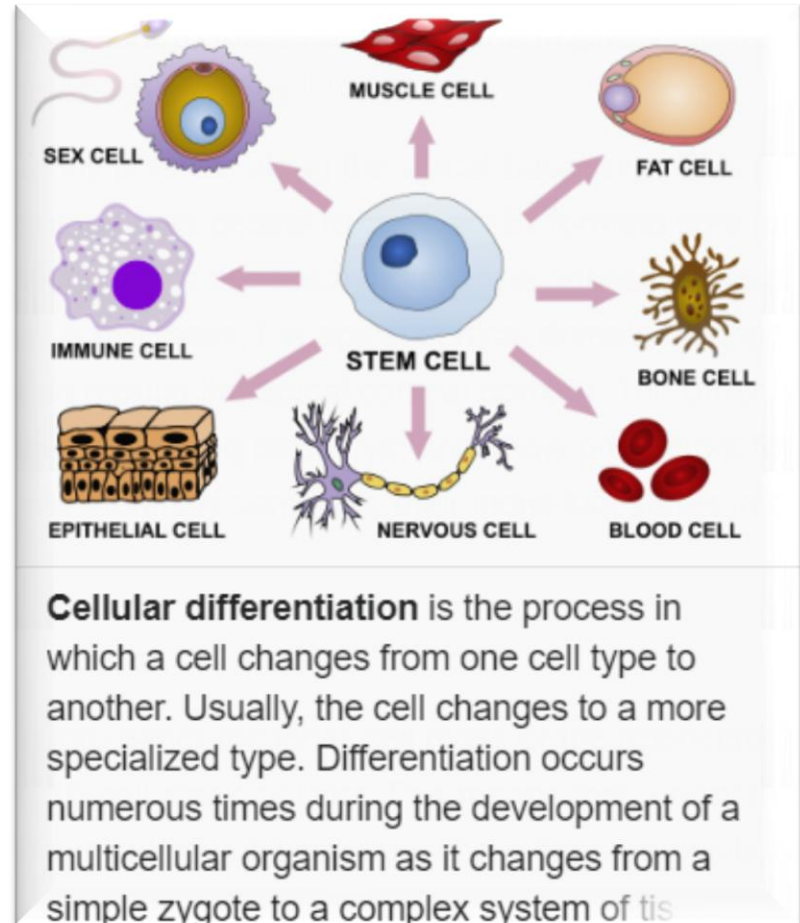


06.d

Cellular differentiation

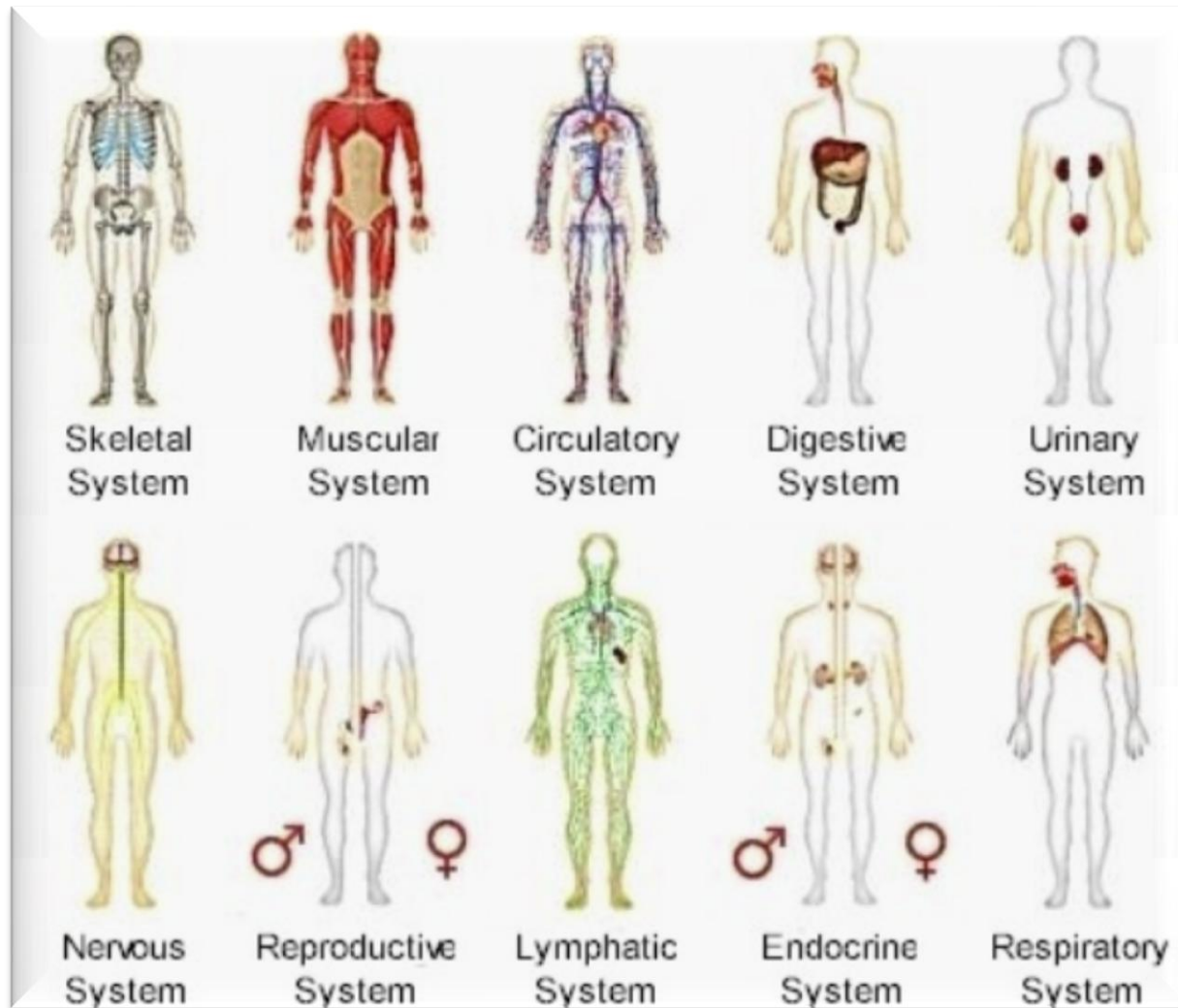
Types of Stem Cells

- Embryonic
- Totipotent
- Pluripotent
- Multipotent
- Oligopotent
- Unipotent



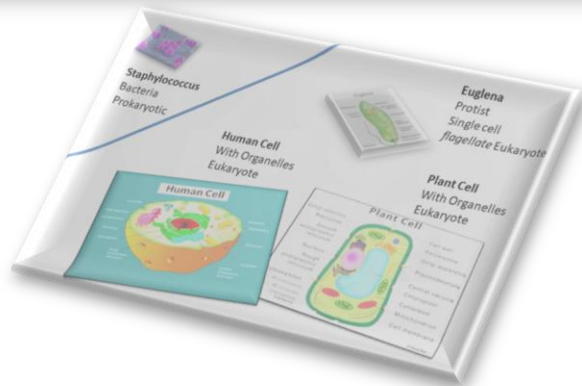
06.d

Cellular differentiation

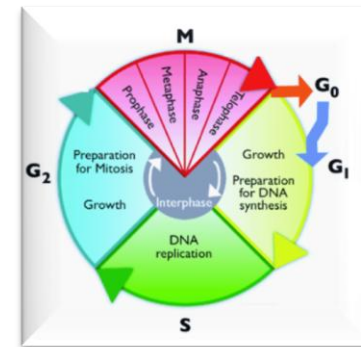


Summary

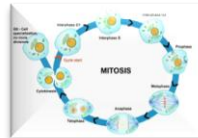
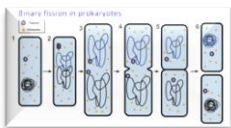
Prior concepts



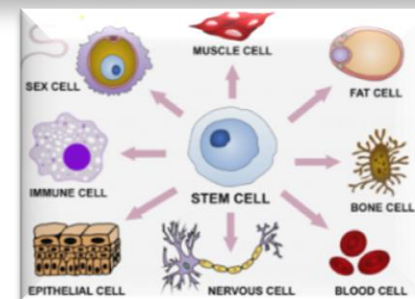
Mitosis cycle



Fission, meiosis & mitosis



Cellular differentiation



Check

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