



Cell quiz tomorrow

Importance of Cell Division

New cells need to be created to

- Replace old / dead cells
- Repair damaged tissues
- Allow organisms to grow

Why do cells divide instead of increasing in size?

If a cell were to increase in size then the volume of the cell would increase. As you know, a cell is surrounded by a membrane. Think of the cell like a balloon. The more air you put into a balloon the thinner the outer layer becomes. If you continue increasing the size of the balloon eventually the balloon will burst. The same applies to the cell.



Cells need to divide in order to make organisms larger because our cell membrane acts as a balloon. If you keep adding air to a balloon, eventually it will burst.

Cell division allows an organism to grow, while maintaining the cells size that keeps the organism healthy.

Page 149
Question 1-3

1) Why is cell division important?


Cell division permits single cells to develop into multicellular organisms. It also permits the replacement of damaged cells. Few cells live for the adult life span of a multicellular organism.

2) Provide evidence that suggested that not all cells in your body divide at the same rate.

Cells from a sunburn are replaced quickly while those in the brain have very limited reproduction capacity. Prior to 1998, scientists generally believed that in the adult brain were not capable of cell division.

3) Imagine two cubic cells, one with sides of 1mm, and one with sides of 2mm. For each cell, calculate

(a) The total surface area



$$A = b \times h$$


$$= 1\text{mm} \times 1\text{mm}$$

$$= 1\text{mm}^2$$

$$SA = 6 \cdot A$$

$$= 6 \cdot 1\text{mm}^2$$

$$= 6\text{mm}^2$$



$$A = b \times h$$

$$= 2 \times 2$$

$$= 4\text{mm}^2$$

$$SA = 6 \cdot A$$

$$= 6 \cdot 4\text{mm}^2$$

$$= 24\text{mm}^2$$

(b) The volume

$$1 \times 1 \times 1$$

$$1\text{mm}^3$$

$$2^3$$

$$V = 2 \times 2 \times 2$$

$$= 8\text{mm}^3$$

(c) The surface area divided by the volume ratio

$$\frac{6\text{mm}^2}{1\text{mm}^3} = 6\text{mm}^{-1}$$

$$\frac{24\text{mm}^2}{8\text{mm}^3} = \frac{3\text{mm}^{-1}}{1}$$

x4 (between 6 and 24)
8x (between 1 and 8)

Using these results, explain why cells have to divide as an organism grows.

As a cell grows, volume increases at a greater rate than surface area. This means that amount of cytoplasm (volume) increases at greater rate than the cell membrane (surface area) needed to exchange nutrients and wastes.

Your life began as a single cell, the fertilized egg (zygote). Nine months later, when you were born, approximately 100 trillion made your body



Today's Investigation

How did one cell become 100 trillion cells?

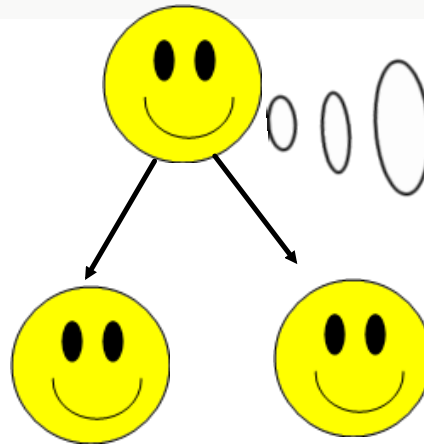
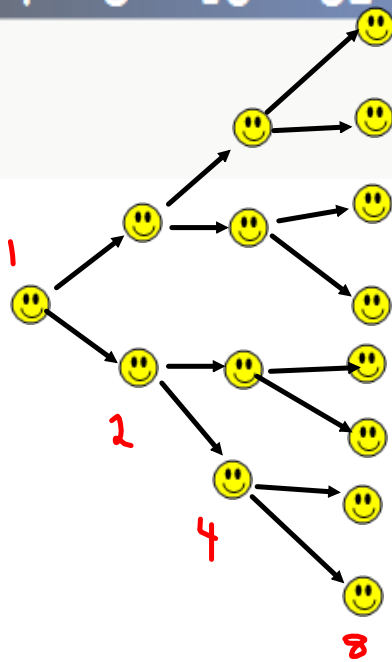


Cell Division

All cells come from preexisting cells through cell division.

Cells divide into two, then each into another two cells.

- 4 - 8 - 16 - 32 - 64 - 128 - 256 - 512 - 1024 - 2048



I am the mother cell. I divided into two identical daughter cells.

16 32