

### 4.3

### The Life & Divide of Cells

*Zip and Zap are in their dorm room studying for a big biology exam.*

Zip: *(looking at his thumb)* Owwww! That hurt! I hate paper cuts! It's weird how they always hurt so much!

Zip: *(looking at Zap's thumb )* But at least they don't bleed too long!

Zip: So true, so true. How is it that our skin heals when cut? Seems like magic or something!

Zip: *(condescending)* There is no such thing as Magic, Zap.

Zip: *(rolling eyes)* Oh sure, go ahead and ruin the mystery for me!

Zip: The skin has to fill in the space where the cut is by making more cells.

Zip: Really? Making more cells? How does our body do that, Zip?

Zip: By mitosis, silly! Don't you remember learning it in biology? It's going to be on our exam!

Zip: *(scratching head)* Hmm... it sounds familiar. Mitosis is part of the cell cycle, right?

Zip: Sure is, Zap. Every cell goes through a life span called the cell cycle. Mitosis is the part when the cell divides in half, creating two new baby cells.

Zip: They're called "daughter" cells, Zip, not "baby" cells!

Zip: *(excited)* Of course. See—you do remember it! Tell me the next step of the cell cycle, Zap!

Zip: *(unsure)* Well...the daughter cells have to "grow up", so they go through the G1 stage, growing in size.

Zip: *(nodding)* That's right, Zap. Then the daughter cells go through the S phase, which is when the cell doubles its DNA.

Zip: Why does this happen, Zip?

- Zip: Well, for the cell to divide in half when it reaches the mitosis, it needs twice the amount of DNA so that each new daughter cell gets the right amount.
- Zap: *(looking confused)* So... after the S phase, the daughter cells are “grown up” and are called parent cells?
- Zip: Yes, but the daughter cell has some more growing to do before it can divide in mitosis.
- Zap: *(excited)* That’s right, it goes through G2 phase first, then it’s ready for mitosis!
- Zip: Yes Zap! At mitosis, the parent cell divides, producing daughter cells, and starts the whole process over!
- Zap: *(rubbing chin)* I remember that mitosis is made of four phases, right Zip?
- Zip: Yup! But let’s talk about that later. The main thing is to realize that mitosis allows a parent cell to produce daughter cells with the same amount of DNA, instead of dividing in half and ending up with half the DNA, which would not be a good thing!
- Zap: You’re saying that the cells keep the same chromosome number, which is diploid.
- Zip: Exactly! *(pointing finger)* Humans have a diploid chromosome number of 46, and all of our body cells must keep that same amount to function properly.
- Zap: *(palms out)* But what about sperm cells and egg cells? They only have 23 chromosomes, the haploid number!
- Zip: That’s because sperm and egg cells have to join together at conception to make body cells, and their chromosomes together must add up to 46!
- Zap: *(nodding)* So that’s why the gametes go through a different process called meiosis. I think I’m getting it now!

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