

## Agree/Disagree

Below are six questions, which I will reveal one at a time. I would like you to read the question, then indicate whether you "strongly agree," "agree," "disagree," or "strongly disagree." You will do this by walking to the corners of the room, each of which has been labelled with one of those four answers.

1. If you had the option, would you want to live for ever?
2. If everyone could live forever, same question.
3. The main reason I would not want to live forever would be the physical decay of my body.
4. Some cells in my body are constantly being replaced.
5. Some cells in my body last my entire lifetime.
6. The new cells in my body are grown by using energy.

# Cell Theory

Let's review the cell theory, what were the 6 postulates?

1. All living things are composed of one or more cells.
2. The cell is the basic unit of life.
3. All cells come from pre-existing cells.
4. Energy flow occurs within cells.
5. Hereditary information (DNA) is contained within cells.
6. All cells have the same basic chemical composition.

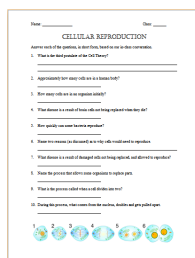
Today we will be focusing on postulate #3.

# Cellular Reproduction

Today I will be discussing a lot of information dealing with cellular reproduction. While I do so, you are expected to remain quiet, and listen carefully to the discussion.

You will each be given a question sheet to complete as I am talking. All of the answers come directly from the discussion we will be holding today. You will be handing this in today, at the end of my discussion.

This sheet is to be treated like a quiz. You are not sharing information, you are not discussing the questions. If you do not understand as I am speaking, you need to make sure you ask questions, so that you are able to answer your questions.





## Cellular Reproduction

I did some research, looking to see if I could find the answer to *how many cells can be found in a human body?* Although the answers varied, the most common answer I found was 37.2 trillion, or

37 200 000 000 000

If we look at the third postulate of the cell theory, it indicates that each of these 37 trillion cells would have come from a pre-existing cell.

This fact becomes more incredible when you answer this question:

How many cells is an organism made from initially?

All organisms start as a single cell, a fertilized egg, which will split into 2, then 4, then 8, 16, 32 etc. By doubling in this fashion it would take over 45 generations of cells to get to 37 trillion.

This, however, does not account for the loss of cells.



## Cellular Reproduction

When a fertilized egg is growing, initially all of the cells are the same. However, as it grows, the cells begin to change, and become specialized cells. As the organism grows, there is no longer a doubling process, but cells begin to divide so that they can replace damaged cells. For example, your red blood cells have a rather short life, a human body produces approximately one million new red blood cells every second, and in a matter of months, every red blood cell in your body is replaced. On the opposite end of the spectrum are the cells found in your brain. Brain cells will last your entire lifetime, so once you are fully grown, there are no new cells being produced. This is why diseases, such as Alzheimer, are difficult to manage.

Compared to the cells in a human body, some cells reproduce at a very fast pace. Some bacteria have been found to reproduce as quickly as 20 minutes.

From 1 red blood cell to 1 million - 4 years

From 1 bacterium to 1 million - 8 hours

# Cellular Reproduction

So, why is it that we need cells to constantly reproduce?

There are a few reasons as to why new cells are needed.

Firstly, new cells are needed in order for an organism to grow. Cells can grow, but that growth is limited. In order for an organism to get larger, it requires more cells.

Another reason that cells reproduce is to replace damaged cells. There are several things that can damage cells, including physical contact, heat, or a lack of necessary resources (oxygen, nutrients).

If a cell becomes damaged, the organism will get rid of it, break it down and replace it. One result of damaged cells not being replaced is known as:

Cancer

# Cellular Reproduction

As humans, we see evidence of cells replacing themselves. When we get a cut the tissue needs to be healed. Over time new skin tissue will replace the damaged tissues.

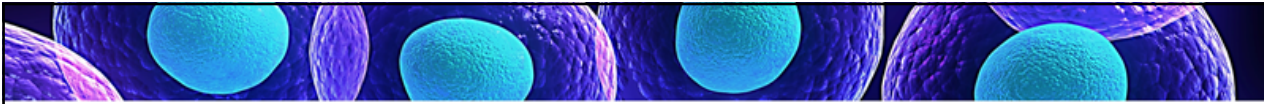
Some organisms see this process in much more extreme situations. Some types of deer will shed their antlers, and grow new ones every year - this is done through cellular reproduction.

Some species are capable of something called *regeneration*. Lizards are capable of re-growing their tail if it is taken off by a predator (some can purposely "drop" their tail). Lobsters can even grow new legs if they were to lose one.

As biology advances, scientists have looked into ways of using animal DNA to help humans to re-grow limbs.





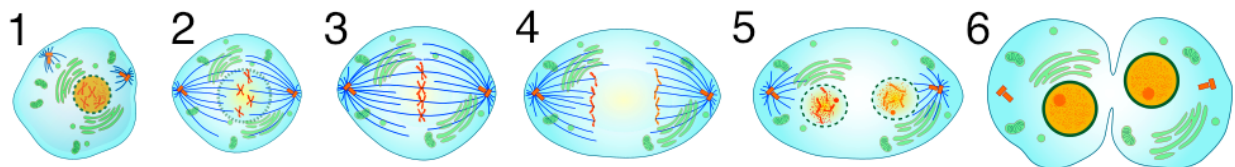


# Mitosis

So, the question is, just how does a cell reproduce?

The process that cells undertake is known as *Mitosis*.

1. The DNA starts to form into two sets of identical chromosomes on the inside of the nucleus
2. The nuclear membrane starts to dissolve
3. Parts, known as "spindles" attach to the chromosomes
4. The chromosome pairs are pulled apart
5. New nuclei start to form, all other parts from the cell are divided between the two halves
6. The cell membrane pinches closed in the middle



# Mitosis



[Youtube Link](#)

Please hand in your question sheet.

## Attachments

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2-14 Cellular Reproduction Questions.pdf