<http://www.youtube.com/watch?v=C6hn3sA0ip0>

MITOSIS NOTES

What is mitosis?

Why is cellular division required?

A.

B.

C.

What is the ultimate goal of mitosis?

What are the stages of mitosis?

Mitosis is one part of the cell cycle. How long does this typically take for a eukaryotic cell?

BTW… What is the difference between a eukaryote and a prokaryote?

In which stage does a cell spend most of its life?

What happens in G1?

What happens in S?

What happens in G2?

What is the first stage of mitosis called?

What is happening in this stage?

What would a cell look like in stage 1? 🡪

What is the third stage of mitosis called?

What is happening in this stage?

What would a cell look like in stage 3? 🡪

What is the fourth stage of mitosis called?

What is happening in this stage?

What would a cell look like in stage 4? 🡪

What is the fifth stage of mitosis called?

What is happening in this stage?

What would a cell look like in stage 5? 🡪

What is the sixth stage of mitosis called?

What is happening in this stage?

What would a cell look like in stage 6? 🡪

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

Alleles are a very specific “\_\_\_\_\_\_\_\_\_\_\_” that determines something very specific about you! This can be something like short, brown hair, unibrow, type O blood, blue eyes, wide nose, round face, etc. An allele is the genetic code for a \_\_\_\_\_\_\_\_\_\_\_\_\_\_! You usually have two alleles for each trait. Alleles are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a…

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

Genes are codes within our DNA that call for a trait. Genes call for everything from height, hair color, hair coverage, blood type, eye color, nose shape, face shape, etc. Genes are located on very specific places on our chromosomes in places called \_\_\_\_\_\_\_\_\_\_ (or \_\_\_\_\_\_\_\_\_\_\_ (singular)). It is estimated that us humans have in the range of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ genes in the human genome! All of these loci (our genes) are found in long, wispy strands called….

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

You have approximately 2 meters of DNA in every one of your cells! Imagine trying to stuff about 1.5 miles of string into a marble! The cell has devised a genius way of doing just that. Our DNA is wrapped around proteins called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to save space. The resulting structure is called chromatin! During a cell’s life (namely the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ stage in interphase), these chromatin are duplicated into something called…

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

One of the sister chromatids is called a, you guessed it, a chromotid. The chromatids condense making the: 1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and 2) more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and 3) easier to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Sister chromatids are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ copies of each other. When you inherit one of those two chromatids from mom and the other chromatid from dad, you now have…

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

Same length, same loci, same genes, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ alleles.

Remember this…

Sister chromatids are IDENTICAL and you’ll find them when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Homologous chromosomes are similar but have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. You’ll find them when the “male” code gets together with the “female” code.

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MITOSIS NOTES

What is mitosis? Cellular division

Why is cellular division required?

A. Birth

B. Growth

C. Maintenance

What is the ultimate goal of mitosis? To form two new cells

What are the stages of mitosis? Prophase, Prometaphase, Metaphase, Anaphase, Telophase, Cytokinesis

Mitosis is one part of the cell cycle. How long does this typically take for a eukaryotic cell? 80 minutes

BTW… What is the difference between a eukaryote and a prokaryote? Eukaryotes have

In which stage does a cell spend most of its life? Interphase

What happens in G1? Growth stage – full growth, it performs its function

What happens in S? DNA in the nucleus is replicated

What happens in G2? Cell finishes growing, basically doubles everything

What is the first stage of mitosis called? Prophase

What is happening in this stage? Condensing chromosomes, microtubules

form, nucleolus disappears

What would a cell look like in stage 1? 🡪

What is the second stage of mitosis called? Prometaphase

What is happening in this stage? Nuclear membrane disintegrates, spindle

fibers form, migrate to poles, and attach to kinetochore (non-code)

What would a cell look like in stage 2? 🡪

What is the third stage of mitosis called? Metaphase

What is happening in this stage? Sister chromatids align in middle of cell

Called the equatorial plane

What would a cell look like in stage 3? 🡪

What is the fourth stage of mitosis called? Anaphase

What is happening in this stage? Microtubules and spindle fibers pull

apart sister chromatids

What would a cell look like in stage 4? 🡪

What is the fifth stage of mitosis called? Telophase

What is happening in this stage? Components of new cell appear, spindle

fibers dissolve, chromosomes uncoil

What would a cell look like in stage 5? 🡪

What is cytokinesis?

It is the division of the cell. The cell gets “pinched” into two new, IDENTICAL cells.

Now, the cell enters G1 again.

Apoptosis! Whoa…

Are you ready for this?

Apoptosis is the result of PCD, or programmed cellular death.

At the end of each of our chromosomes are sections called telomeres. Telomeres are likened to the plastic wrapping at the end of your shoelaces. They both keep your shoelaces and your chromosomes from fraying and becoming useless.

However… with each cellular division, the telomeres shorten. After a set number of cellular divisions, the protective telomeres on the end of your chromosomes no longer protects the chromosome from destruction and thus… boom! Your cell dies.

So, why would a cell ever be programmed to commit suicide?

Well…

In almost all of your cells, there is a protein called telomerase. Telomerase is a protein that can produce/repair new telomeres on the ends of your chromosomes. Your cells would never die if the telomerase is turned on!

In most cases, the telomerase is turned off. With telomerase turned off, your telomeres would shorten and your cells would die.

Short answer to a long question. Why PCD?

Combats cancer - unstoppable cellular division is one reason for cancer. Chemotherapy is meant to trigger apoptosis.

As a fetus, we have webbed toes/feet. Apoptosis gets rid of that so we grow toes and fingers.

Menstration – shedding of the uterine lining when egg is no longer viable (once the egg dies). When female hormone levels drop, apoptosis of cells in the uterine lining occurs and the useless, unfertilized egg is removed. When fertilized, hormone levels go up and your body is “told” not to get rid of the egg. Amazing.

Alleles!

Alleles are a very specific “code” that determines for something very specific about you! This can be something like short, brown hair, unibrow, type O blood, blue eyes, wide nose, round face, etc. An allele is the genetic code for a trait! You usually have two alleles for each trait. Alleles are variations of a…

Gene!

Genes are codes within our DNA that call for a trait. Genes call for everything from height, hair color, hair coverage, blood type, eye color, nose shape, face shape, etc. Genes are located on very specific places on our chromosomes in places called loci (or locus (singular)). It is estimated that us humans have in the range of 100,000 genes in the human genome! All of these loci (our genes) are found in long, wispy strands called….

Chromatin!

You have approximately 2 meters of DNA in every one of your cells! Imagine trying to stuff about 1.5 miles of string into a marble! The cell has devised a genius way of doing just that. Our DNA is wrapped around proteins called histones to save space. The resulting structure is called chromatin! During a cell’s life (namely the synthesis stage in interphase), these chromatin are duplicated into something called…

Sister Chromatids!

One of the sister chromatids is called a, you guessed it, a chromotid. The chromatids condense making the: 1) visible and 2) more durable and 3) easier to manage/move around. Sister chromatids are IDENTICAL copies of each other. When you inherit one of those two chromatids from mom and the other chromatid from dad, you now have…

Homologous Chromosomes!

Same length, same loci, same genes, possibly different alleles.

Remember this…

Sister chromatids are IDENTICAL and you’ll find them when one of your cells divide.

Homologous chromosomes are similar but have a different code. You’ll find them when the “male” code gets together with the “female” code.