Cheatography

meiosis vs mitosis Cheat Sheet

by leahjjane13 via cheatography.com/158995/cs/33542/

Meiosis vs mitosis

Mitosis	Meiosis	Same
2 diploid identical daughter cells	4 haploid non-identical daughter cells	Produces new cell
one division	two divisions	Starts with a diploid parent cell
growth and repair, asexual reproduction	producing gametes	Cells undergo cell replication
somatic cells	germ cells	The body needs both
46 chromosomes	23 chromosomes	Both take place in cell nuclei
No crossing over/genetic recombination	Crossing over (genetic variation)	Both involve cell division

Types of stem cells

Totipotent	Pluripotent	Multipotent
early embryo/blastocyst	inner cell mass of developing embryo	bone marrow/cord blood
any type of cell/tissue	differentiate many tissue types/but cannot create	differentiate into blood cells

What is the purpose of meiosis and mitosis?

Mitosis	Meiosis
The purpose of miosis is for growth and repair, or asexual reproduction.	The purpose of meiosis is to produce germ cells, games, sex cells.

Mitosis

What is cancer? (cont)

Apoptosis is programmed cell death, where a cell that isn't functioning will die, therefore it isn't taking recourses from functioning cells

Usually when these cells are present our immune system will break them down

However when the apoptosis gene is off and the cell division gene is on these cells start to continually replicate at a rate that our body cannot keep up with. Lots of cells = tumour

Ethics behind stem cells

Confidentiality

Voluntary participation

Risk of harm

Informed consent

It involves the destruction of embryos to harvest totipotent and pluripotent stem cells (when is something living? When it has a heartbeat or the moment its cells start replicating?)

Mitosis

how does meiosis allow for genetic variation?

Crossing over	00:00 00:36 Crossing over, as related to genetics and genomics, refers to the exchange of DNA between paired homologous chromosomes (one from each parent) that occurs during the development of egg and sperm cells (meiosis). This process results in new combinations of alleles in the gametes (egg or sperm) formed, which ensures genomic variation in any offspring produced.
Random fusion of gametes	which egg is released is random and which sperm that enters the egg is random therefore the alleles that are being carried by the egg and sperm and eventually the offspring were randomly selected

how does meiosis allow for genetic variation? (cont)

Random assortment of genes	the separation, or assortment, of homologous chromosomes is random. This means that all of the maternal chromosomes will not be separated into one cell, while the all paternal chromosomes are separated into another.

What are stem cells?

Interphase:

G1: cell contents duplicated, S: DNA replication, G2: check for error

Prophase:

Chromatin -> chromosomes, Nuclear membrane starts to breakdown, Centrioles move to opposite ends of the cell

Metaphase:

Spindle fibers are sent out from the centrioles, Spindle fibers attach to centromeres, Chromosomes line up in the middle (single file)

Anaphase:

Centromeres break down, Spindle fibers contract, Sister chromatids pulled to opposite sides of the cell

Telophase:

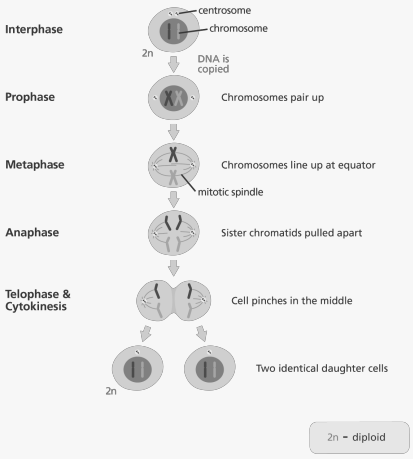
Nuclear membrane reforms, Cell starts to pinch in middle, Chromosomes -> chromatin

Cytokinesis:

Division of cytoplasm, 2 diploid identical daughter cells, Exact copy of genetic information

What is cancer?

Cancer cells are your cells, they are non-functioning cells that have had their apoptosis gene turned off



Stem cells are undifferentiated cells which means they currently have no job to do in the body Stem cells can be artificially modified to become a certain type of cell, for example they have grown fully functioning mouse hearts in a lab They also inject stem cells that have been programmed to be cartilage and ligaments into injured knees and joints.

Stem cells are categorised according to their ability to develop into different tissue types. Some stem cells are capable of differentiating into more different tissue types than others

Stem cells can be artificially modified to become a certain type of cell, for example they have grown fully functioning mouse hearts in a lab

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meiosis

Interphase 1	Prophase 2
G1, S, G2	Chromatin -?> chromosomes, Nuclear membrane starts to break down, Centrioles move to opposite ends of cell
Prophase 1	Metaphase 2
Chromatin -> chromosomes, Nuclear membrane starts to break down, Centrioles move to opposite ends of cell	Spindle fibers are sent out from centrioles and attach to centromeres Chromosomes line up in the middle (single file)
Metaphase 1	Anaphase 2
Spindle fibers are sent from centrioles and attach to centromeres, Chromosomes line up in middle as homologous pairs (2 lines), Crossing over occurs here	Centromeres break down Spindle fibers contract Sister chromatids pulled to ends of the cell
Anaphase 1	Telophase 2
Centromeres break down, Spindle fibers contract, Homologous chromosomes are pulled to opposite ends of the cell	Nuclear membrane reforms Cells start to pinch in middle Chromosomes -> chromatin

meiosis (cont)

Telophase 1	Cytokinesis 2
Nuclear membrane reforms, Cells start to pinch in the middle, Chromosomes -> chromatin	Division of cytoplasm 4 non-identical haploid daughter cells
Cytokinesis 1	
Division of cytoplasm, 2 non-identical haploid daughter cells	

What is a tumour?

A tumor is a mass of cells that are taking resources from the body but giving nothing back which means the body cannot function as it should. A tumor where the cells do NOT spread is said to be benign.

A malignant tumor where the cells DO spread via the circulatory or lymphatic systems cancer. A malignant tumor is a problem as when the cells spread they start making more tumors around the body. A tumor on the liver means the liver cannot function as it should but tumours on the liver, pancreas and stomach means all 3 of those organs cannot function as they should. Also 1 tumor is more easily treated then multiple tumours.

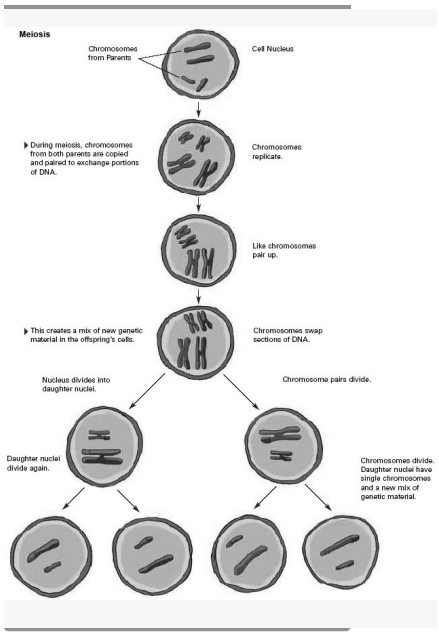
meiosis

Cancer treatments

Surgery	the goal of surgery is to remove the cancer or as much of it as possible
Chemotherapy	uses drugs to kill cancer cells
Radiation therapy	Radiation therapy uses high-powered energy beams, such as X-rays or protons, to kill cancer cells. Radiation treatment can come from a machine outside your body (external beam radiation), or it can be placed inside your body (brachytherapy).
Immunotherapy	Immunotherapy, also known as biological therapy, uses your body's immune system to fight cancer. Cancer can survive unchecked in your body because your immune system doesn't recognize it as an intruder. Immunotherapy can help your immune system "see" the cancer and attack it.

Cancer treatments (cont)

Targeted drug therapy	Targeted drug treatment focuses on specific abnormalities within cancer cells that allow them to survive. Targeted therapy is a cancer treatment that uses drugs to target specific genes and proteins that are involved in the growth and survival of cancer cells. Targeted therapy can affect the tissue environment that helps a cancer grow and survive or it can target cells related to cancer growth, like blood vessel cells.



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