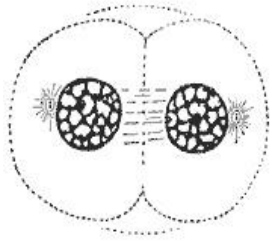


4. Telophase

- spindle fibers disintegrate
- nuclear envelopes form around both groups of chromosomes
- chromosomes revert to their extended state
- cytokinesis occurs, enclosing each daughter nucleus into a separate cell





Cytokinesis – Plant vs. Animal Cell

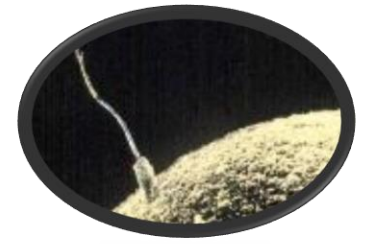


- **Plant cells** undergo cytokinesis by forming a cell plate between the two daughter nuclei.



- **Animal cells** undergo cytokinesis through the formation of a cleavage furrow. A ring of microtubules contract, pinching the cell in half.

Genetics Terminology



SEXually reproducing eukaryotes have two types of body cells...



1. somatic cells

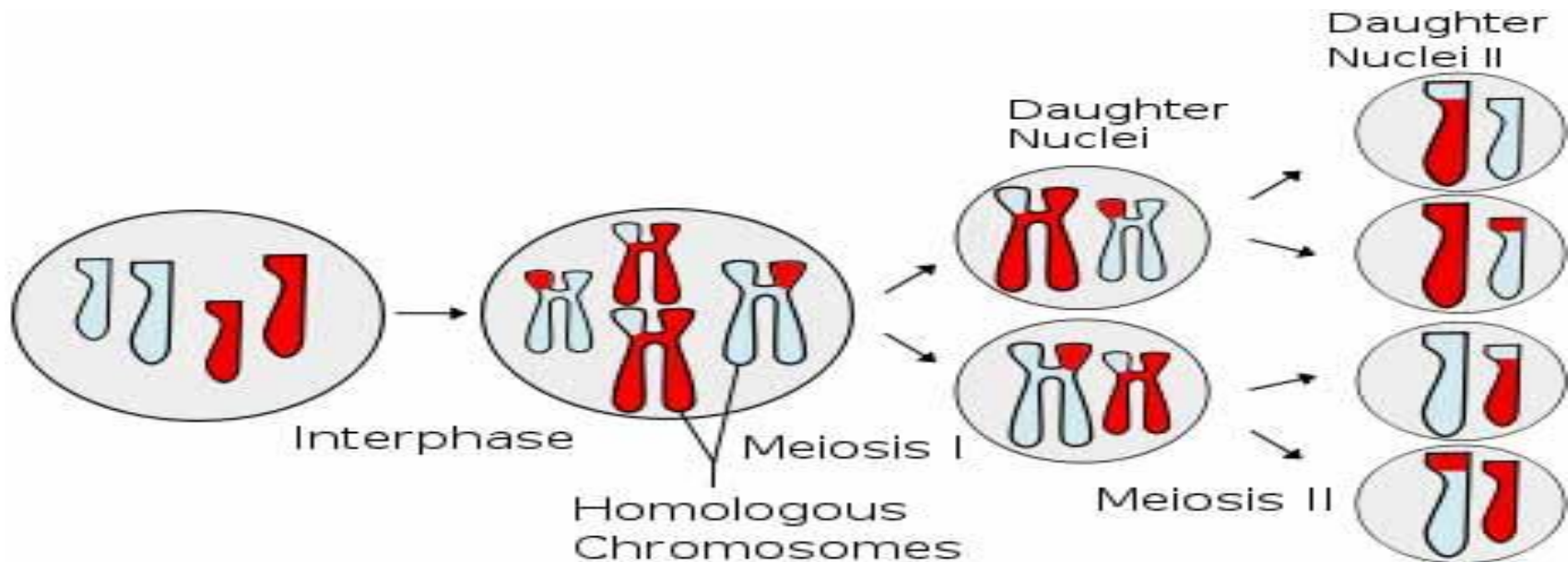
2. sex cells

(a.k.a. gametes, germline)

What is cell division of gametes called?

Meiosis

- A single germ cell divides into four unique daughter cells.
- Daughter cells have half the # of chromosomes as parent cell, so they are considered **haploid**.

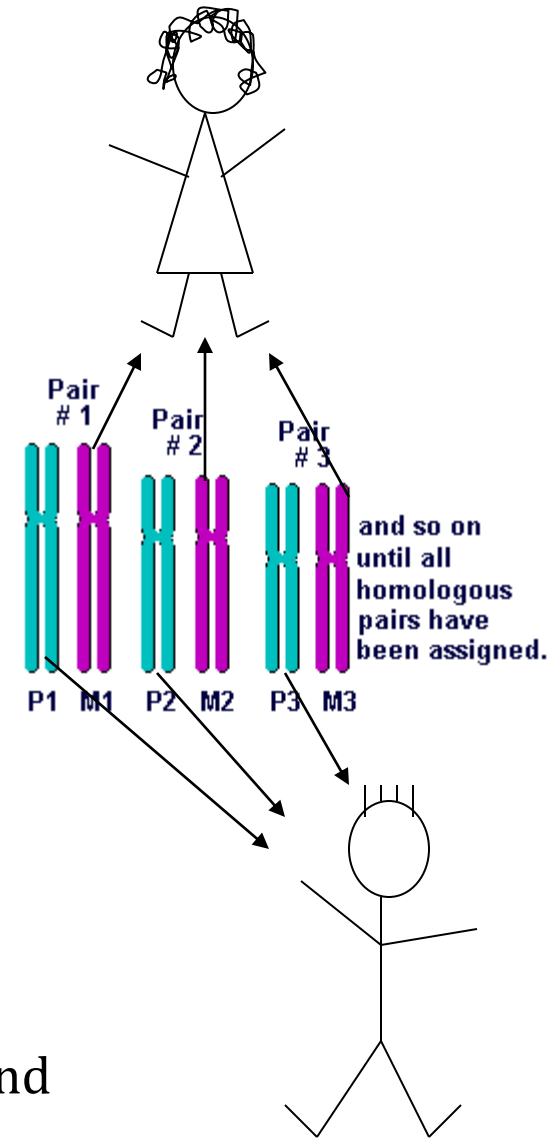


Genetics Terminology: Ploidy

Refers to the number of sets of chromosomes in cells.

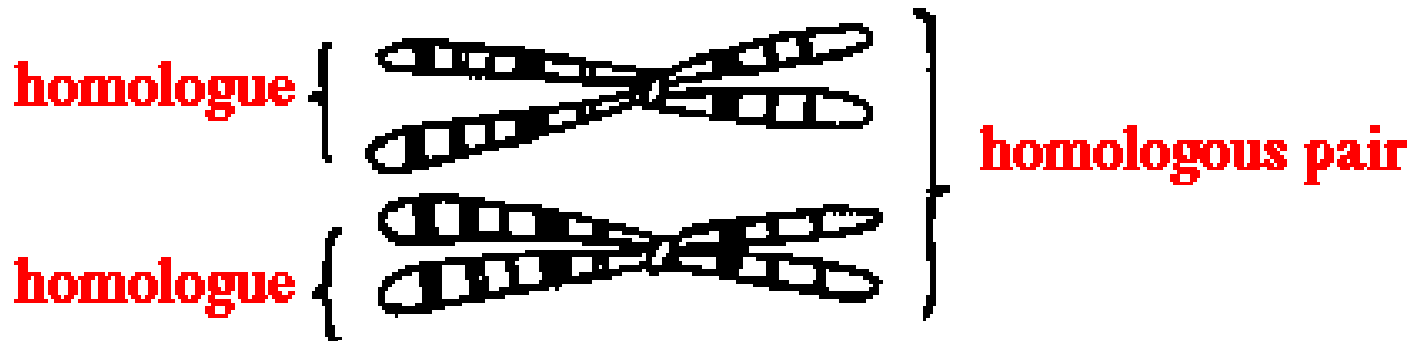
- **Haploid** – one copy of each chromosome
 - designated as “ n ”, the number of chromosomes in one “set”
 - gametes
- **Diploid** – two sets of chromosomes (two of each chromosome)
 - designated as “ $2n$ ”
 - somatic cells

Diploid organisms receive one of each type of chromosome from female parent (maternal chromosomes) and one of each type of chromosome from male parent (paternal chromosomes)



Genetics Terminology: **Homologues**

Chromosomes exist in homologous pairs in diploid ($2n$) cells.

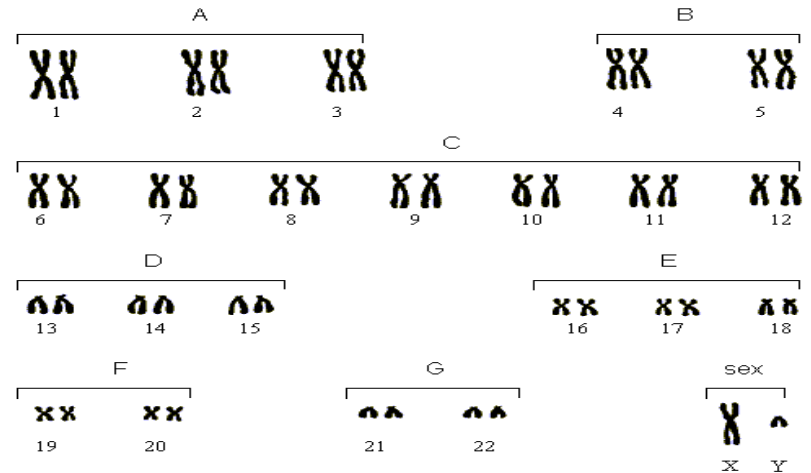
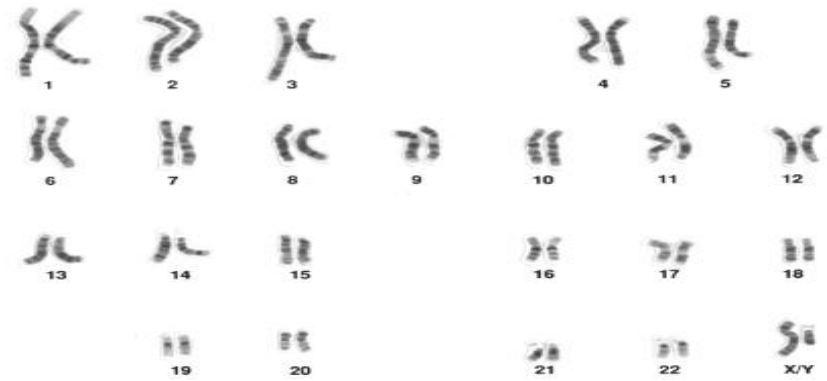


Exception: **Sex chromosomes** (X, Y).

All other chromosomes (**autosomes**) have homologues.

Karyotype

- **Q:** How many homologous pairs are in each karyotype?
- **Q:** How is the bottom karyotype different from the top two?

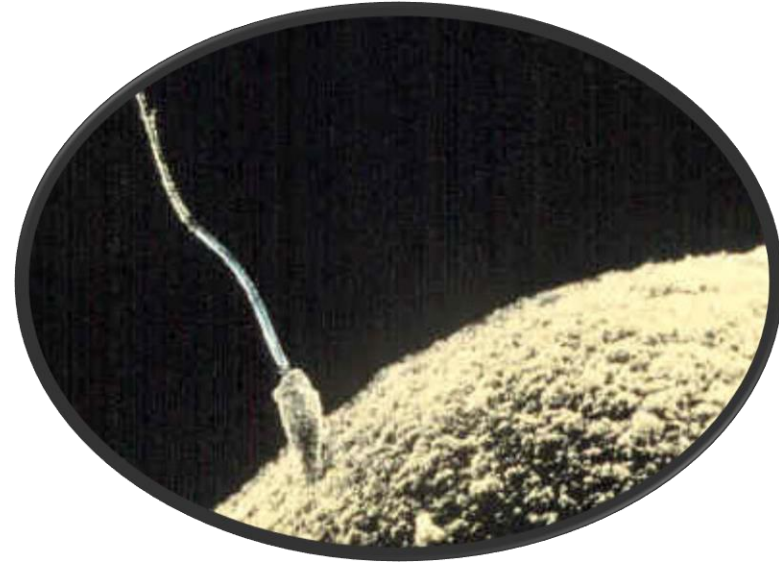


Sexual Reproduction

- Fusion of two **gametes** to produce a single zygote.
- Introduces greater genetic variation, allows genetic recombination.
- Zygote has gametes from two different parents (except in cases of self-fertilizing organisms).

Sexual reproduction in humans ...

- At fertilization, 23 chromosomes are donated by each parent.
(total = 46 or 23 pairs).
- **Gametes** (sperm/ova):
 - Contain 22 autosomes and 1 sex chromosome.
 - Are haploid (haploid number “ n ” = 23 *in humans*).
- Fertilization results in diploid zygote.
 - Diploid cell; $2n = 46$. ($n = 23$ *in humans*)
- **Q:** Most cells in the body are produced through what type of cell division?
(Remember, only *gametes* are produced through **meiosis**)



Meiosis - Sex Cell (Gamete) Formation

In meiosis, there are **2** divisions of the nucleus:
meiosis I
&
meiosis II

