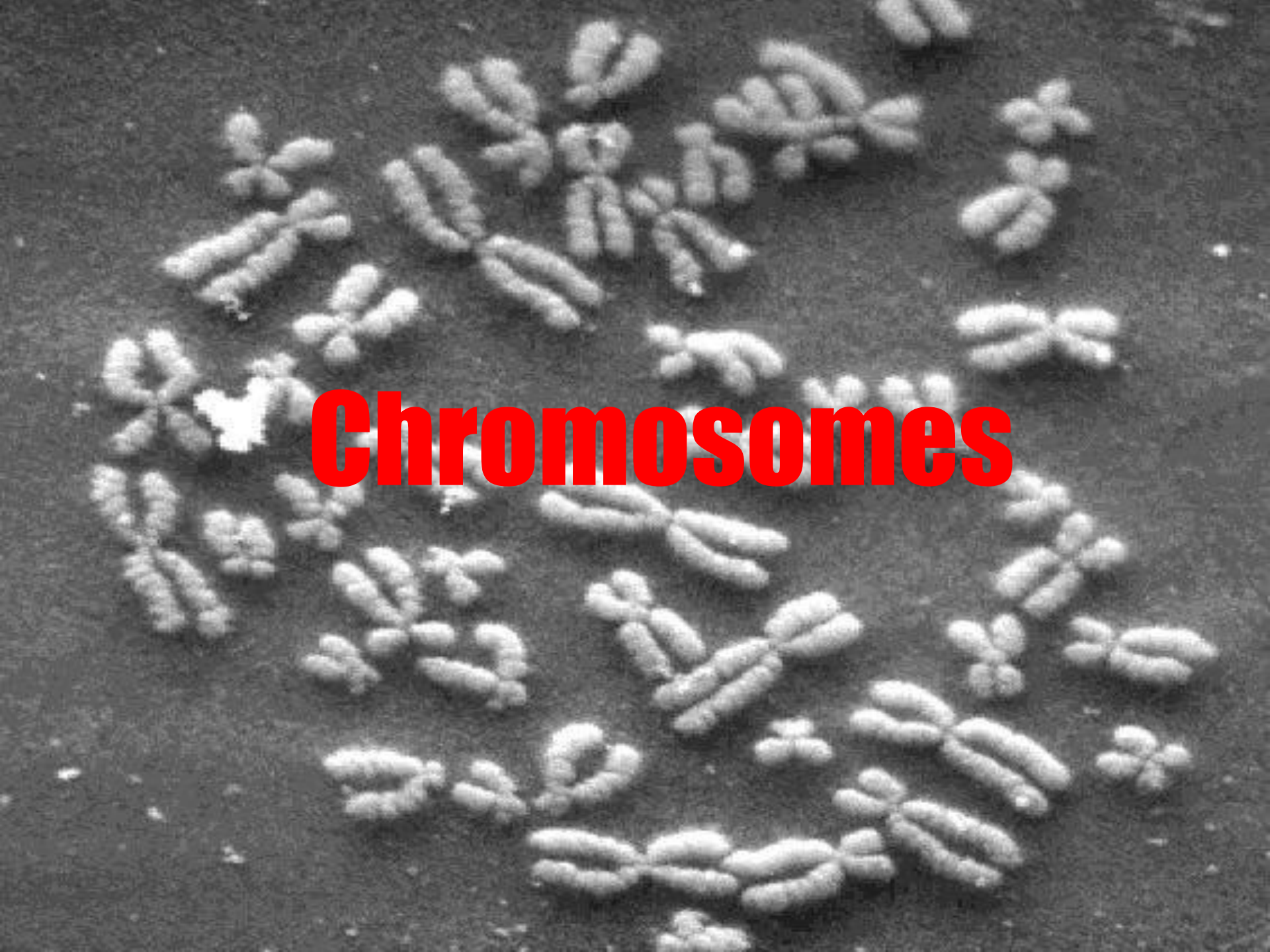
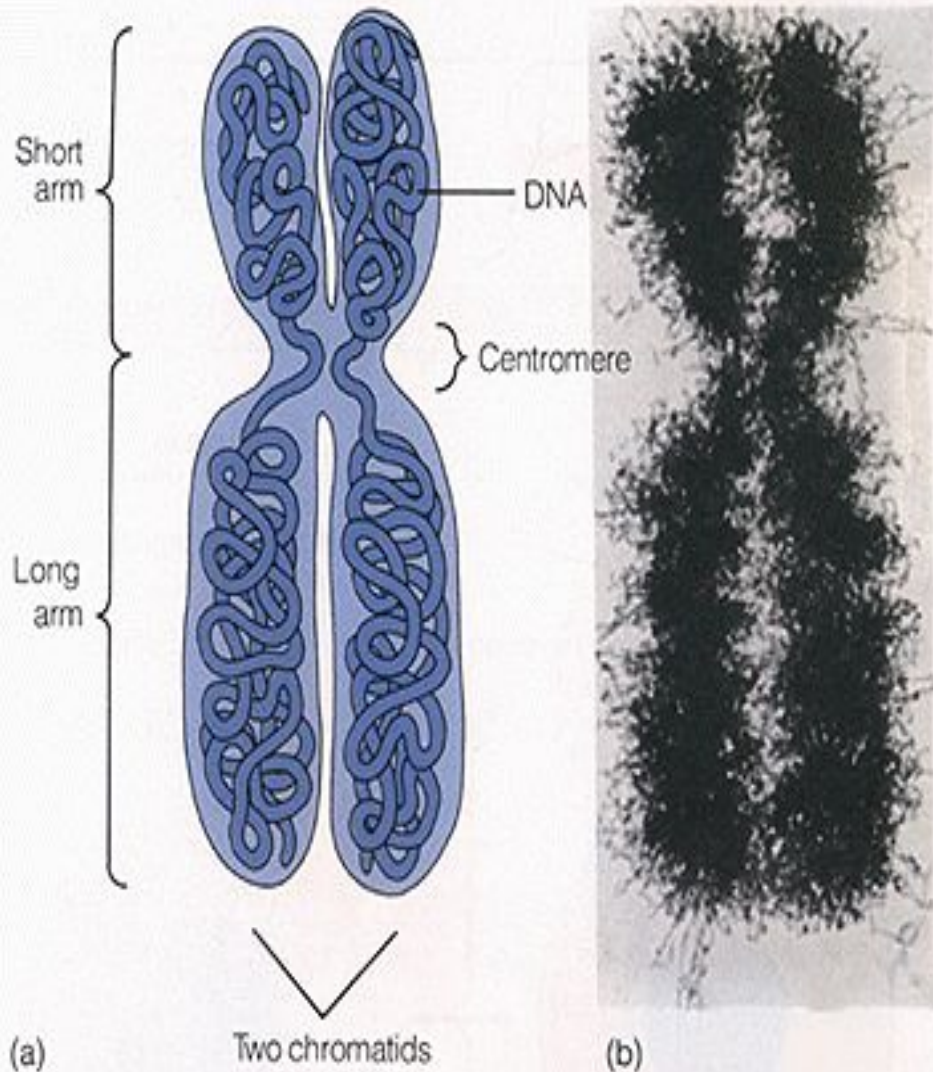




Chromosomes

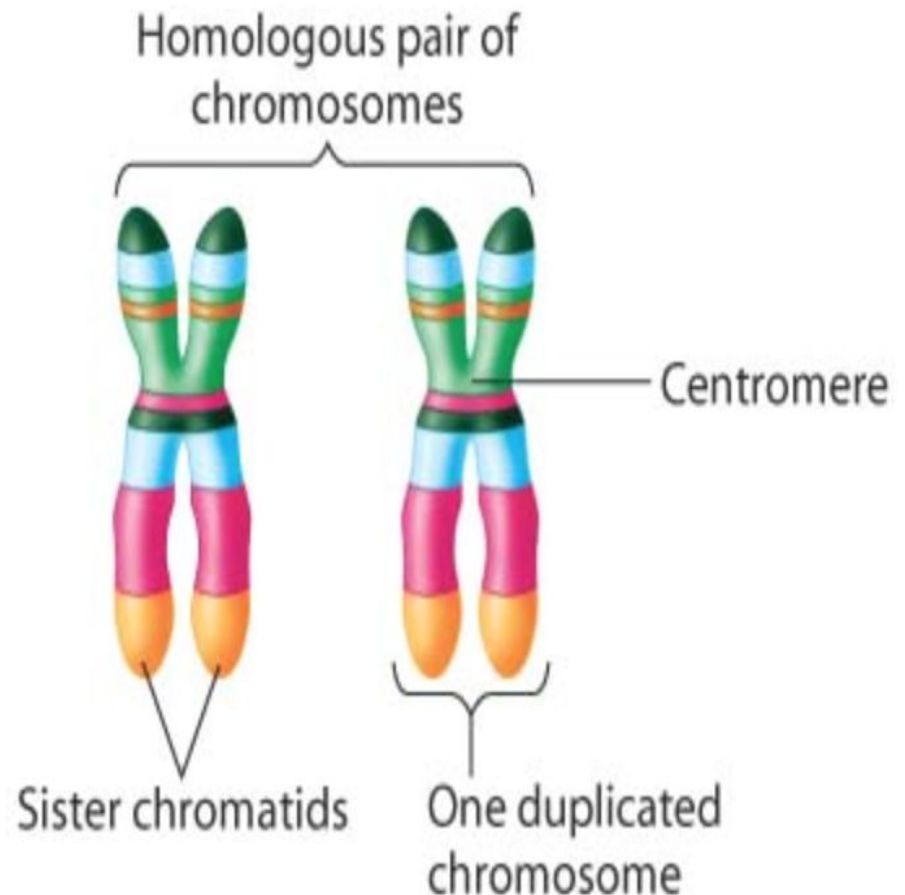
Chromosomes



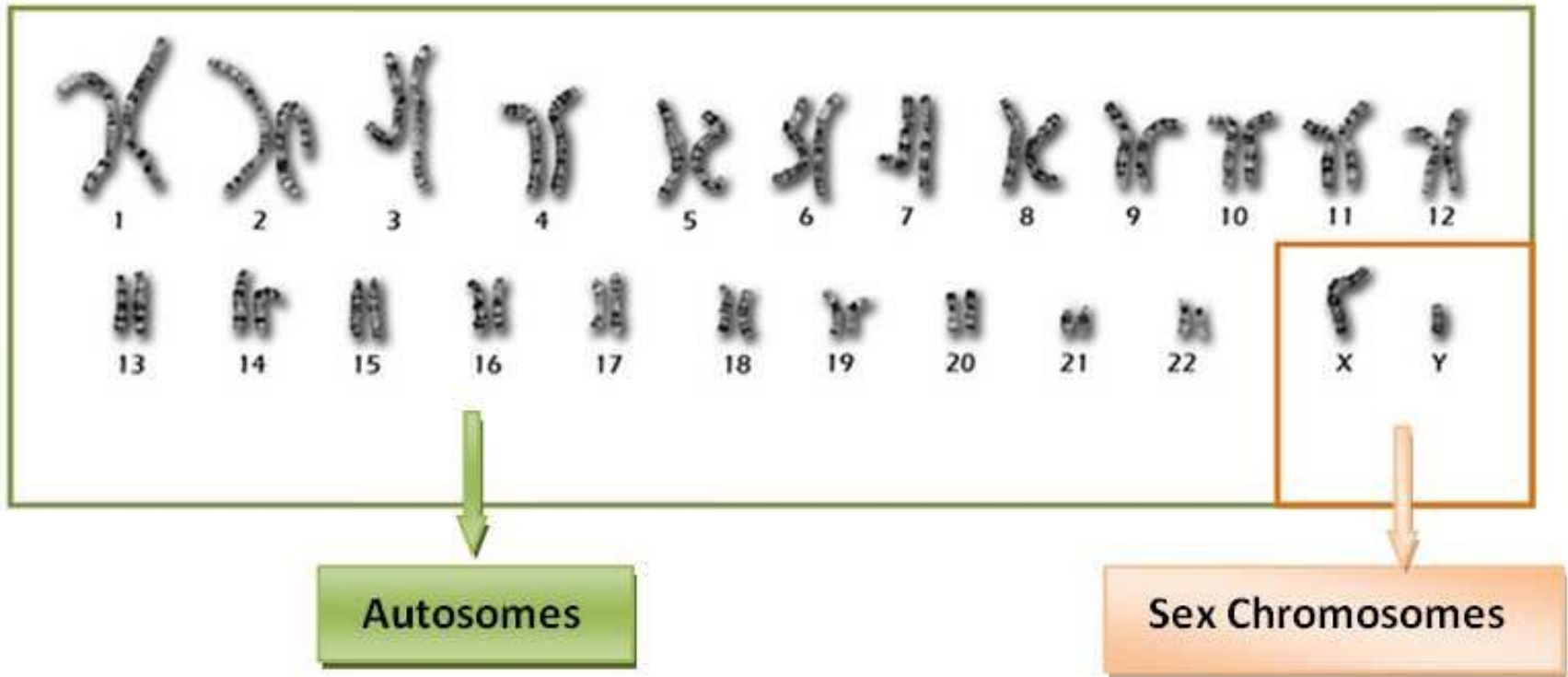
- **Defined**: Tightly coiled DNA wrapped around protein
- Form when cells divide
 - Chromosomes created for the new cells
- **2 Parts**:
 - 1) **Chromatids**: two identical parts of a chromosome
 - 2) **Centromere**: Joins chromatids together

Homologous Chromosomes

- Chromosomes that are the same in size, shape and genetic content
- Inherit one chromosome from mother, one chromosome from father



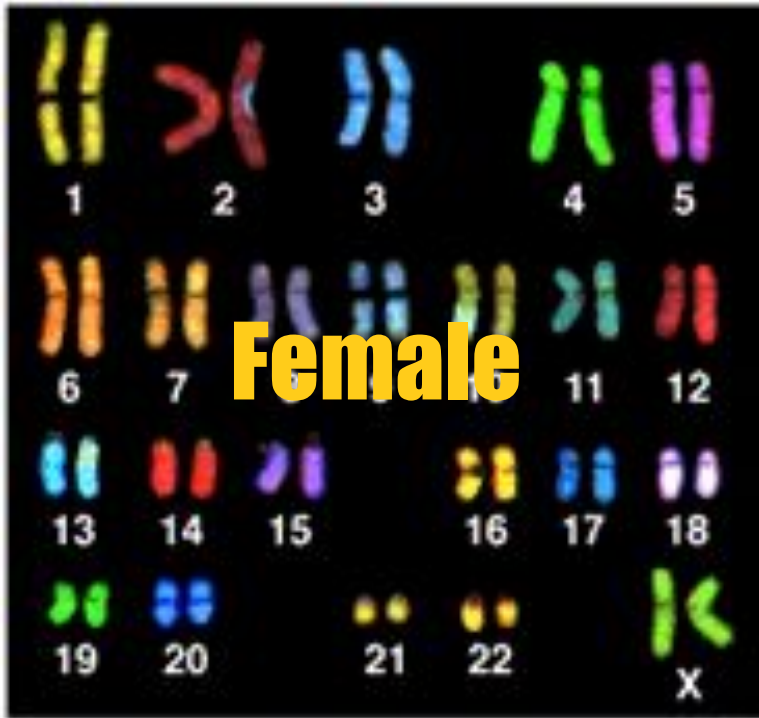
Autosomes vs Sex Chromosomes



- determine all traits except sex
- Pairs 1-22

- determine sex
- Pair 23

KARYOTYPE



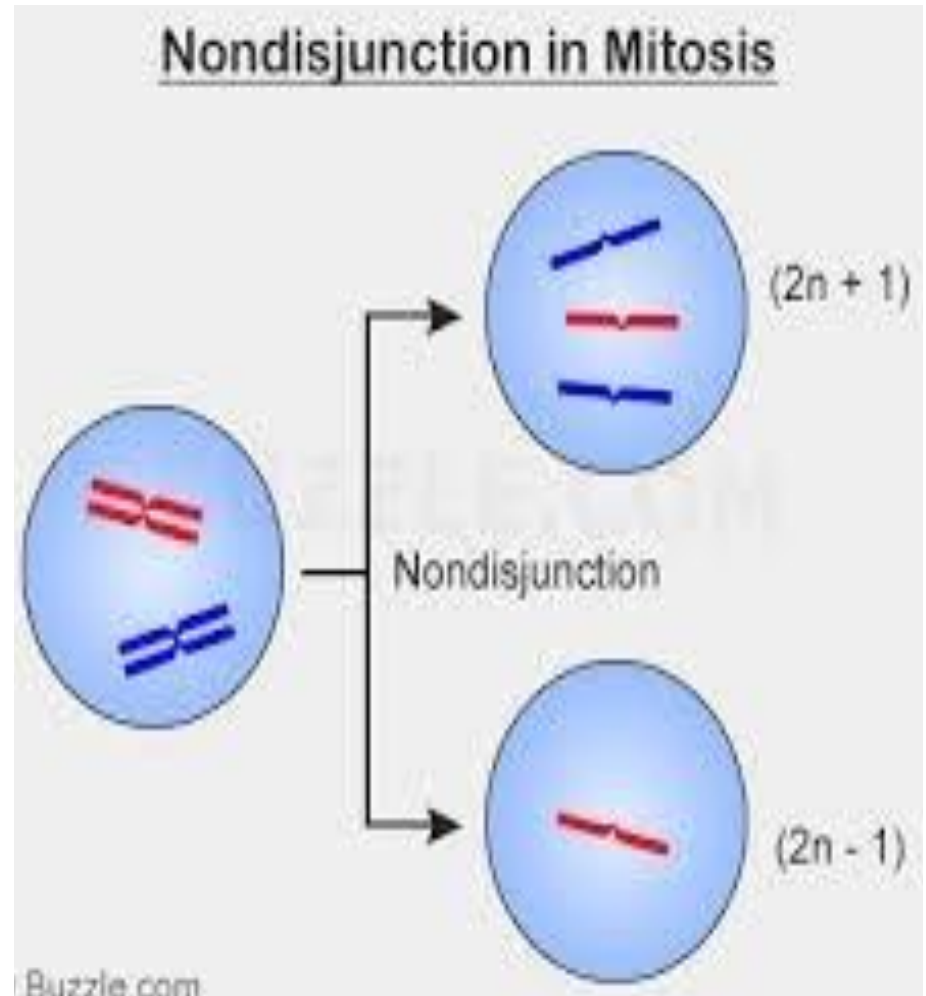
- **Defined**: Picture of an individual's chromosomes
 - Help identify sex & chromosome defects
- Size of final pair identifies sex



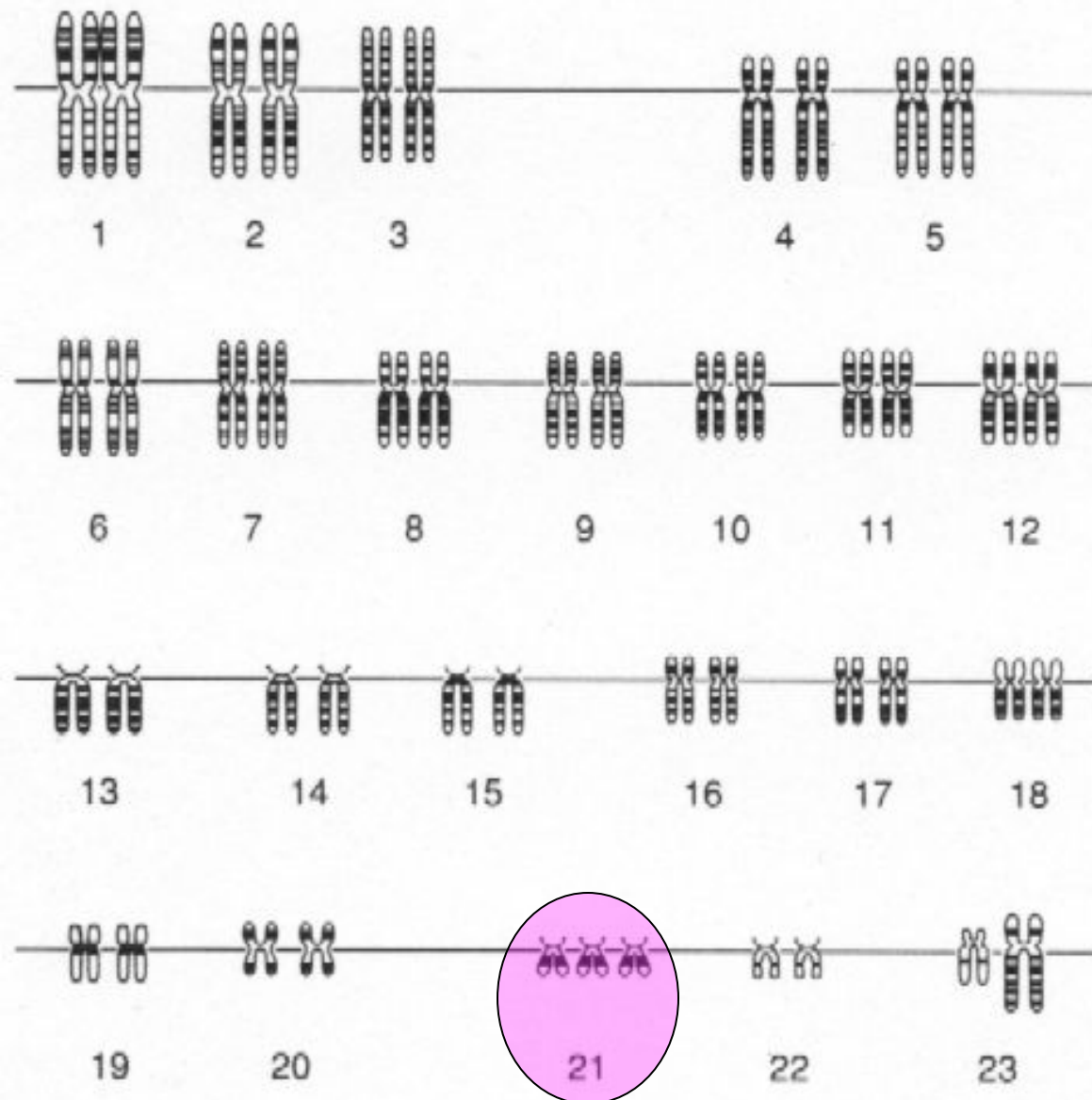
- Same size: XX = female
- Different size: XY = male
- Human with correct number of chromosomes will have 46 chromosomes

Nondisjunction

-failure of one or more pairs of homologous chromosomes (or sister chromatids) to separate normally

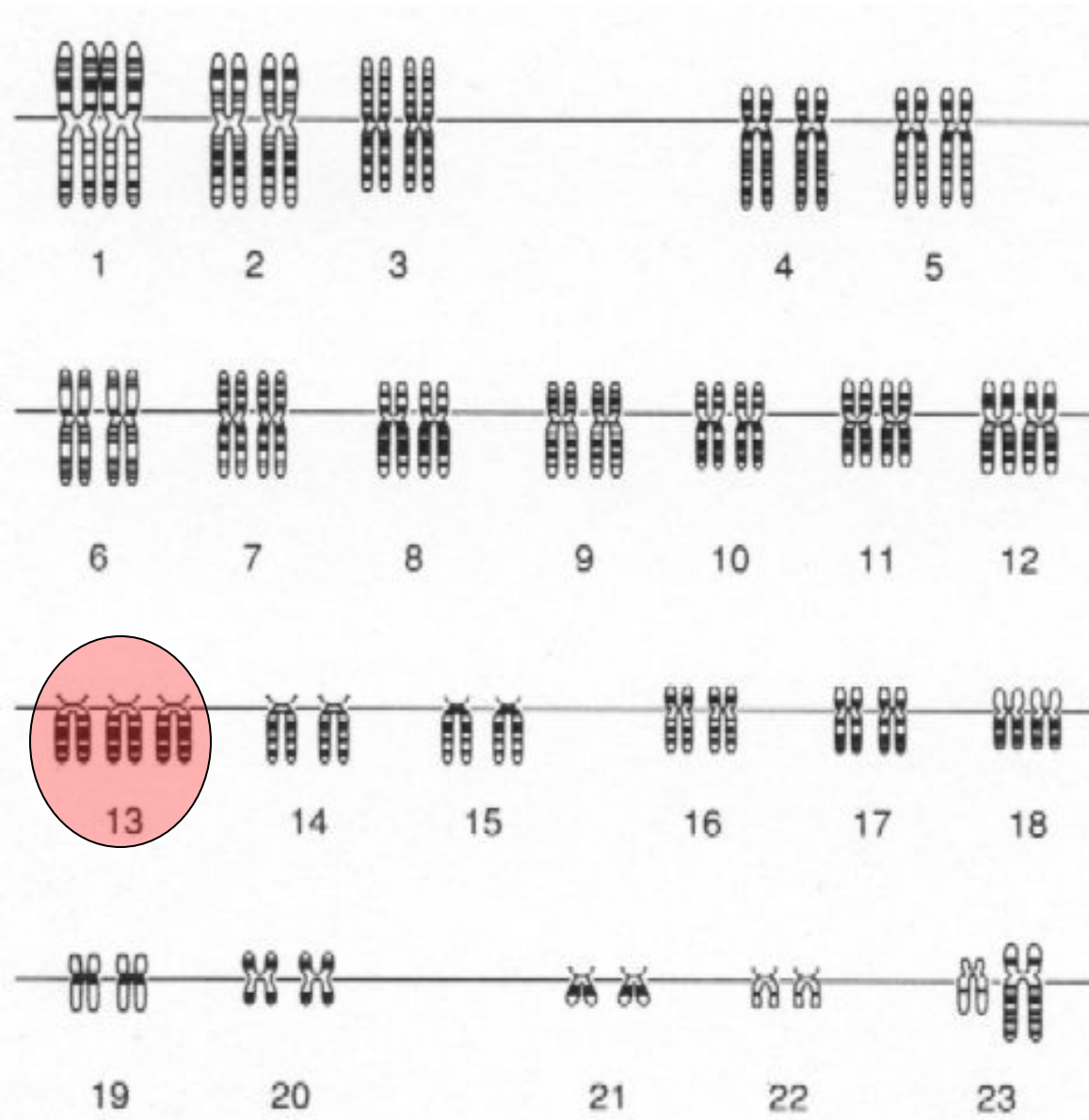


Down Syndrome:



- Down syndrome causes a distinct facial appearance, intellectual disability, developmental delays, and may be associated with thyroid or heart disease

Patau's Syndrome:

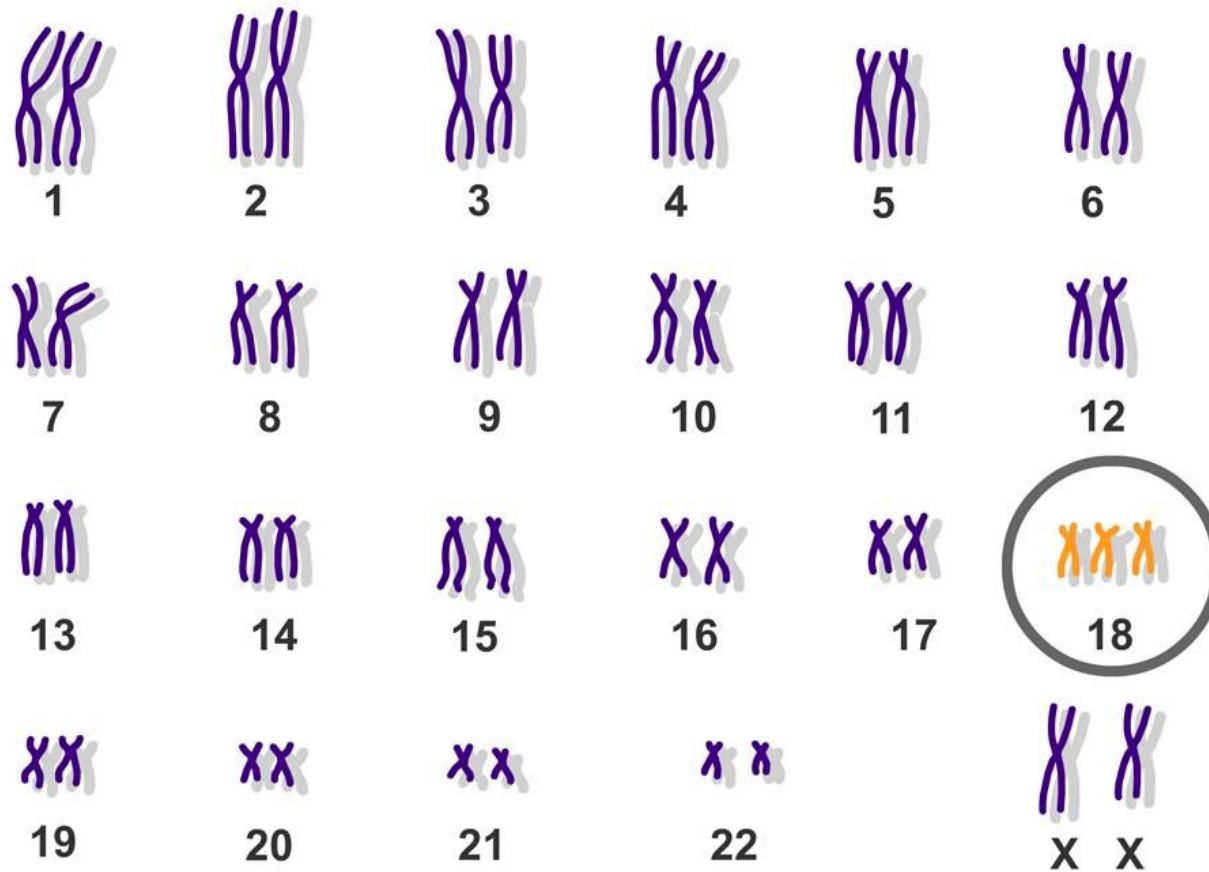


Patau syndrome causes severe intellectual disability and physical defects.

Most infants with this condition don't live past their first week of life.

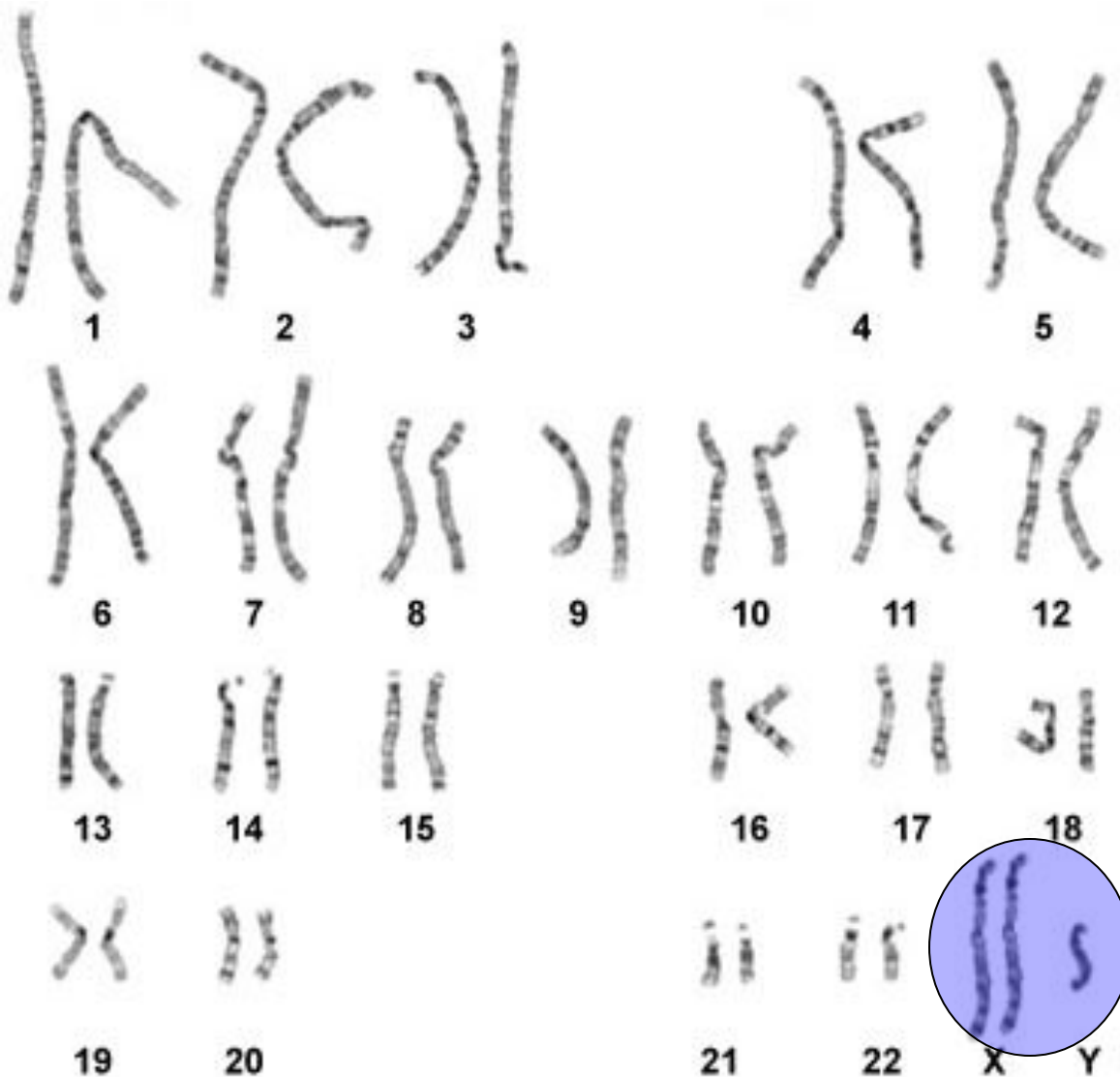
Treatment varies from child to child and focuses on relieving symptoms and managing complications.

Edward's Syndrome



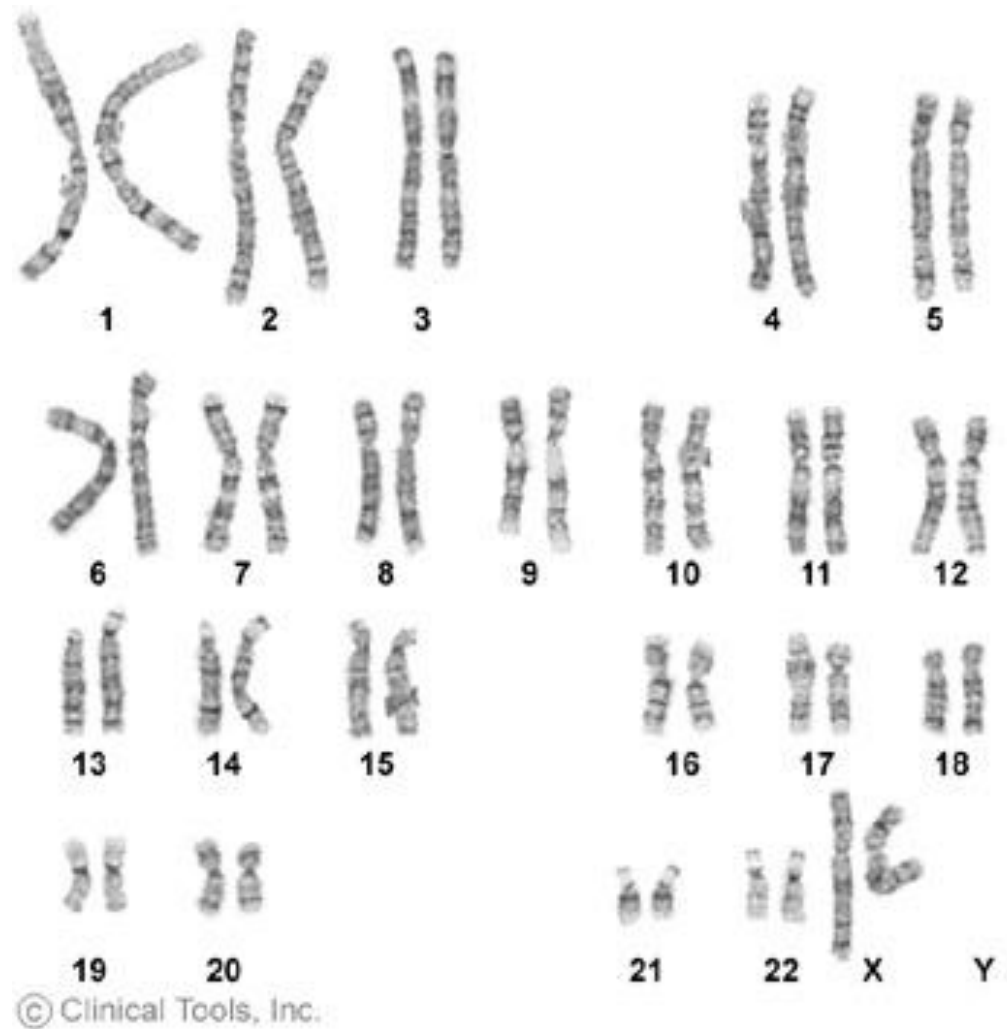
Klinefelter's Syndrome:

Males born with Klinefelter syndrome may have low testosterone and reduced muscle mass, facial hair, and body hair.



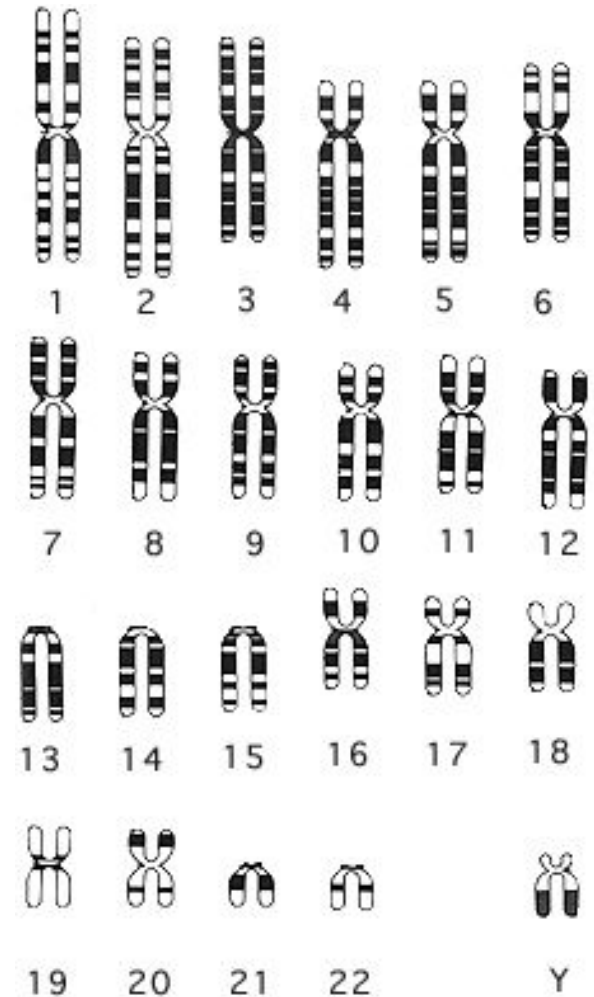
Diploid Cells

- **Diploid Cells** = Cells with the full set of chromosomes
 - Paired chromosomes
- Half of our chromosomes come from each parent (23 from each parent)
- **Somatic** (non-sex) cells are diploid
- Created by mitosis
- Ex: Skin, Muscle, Nerve, Blood Cells



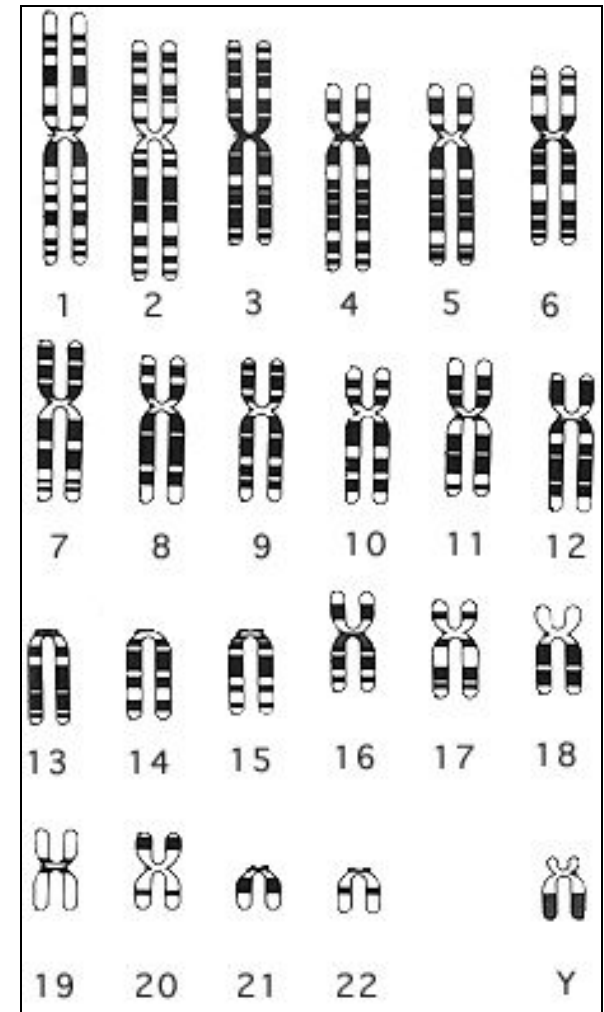
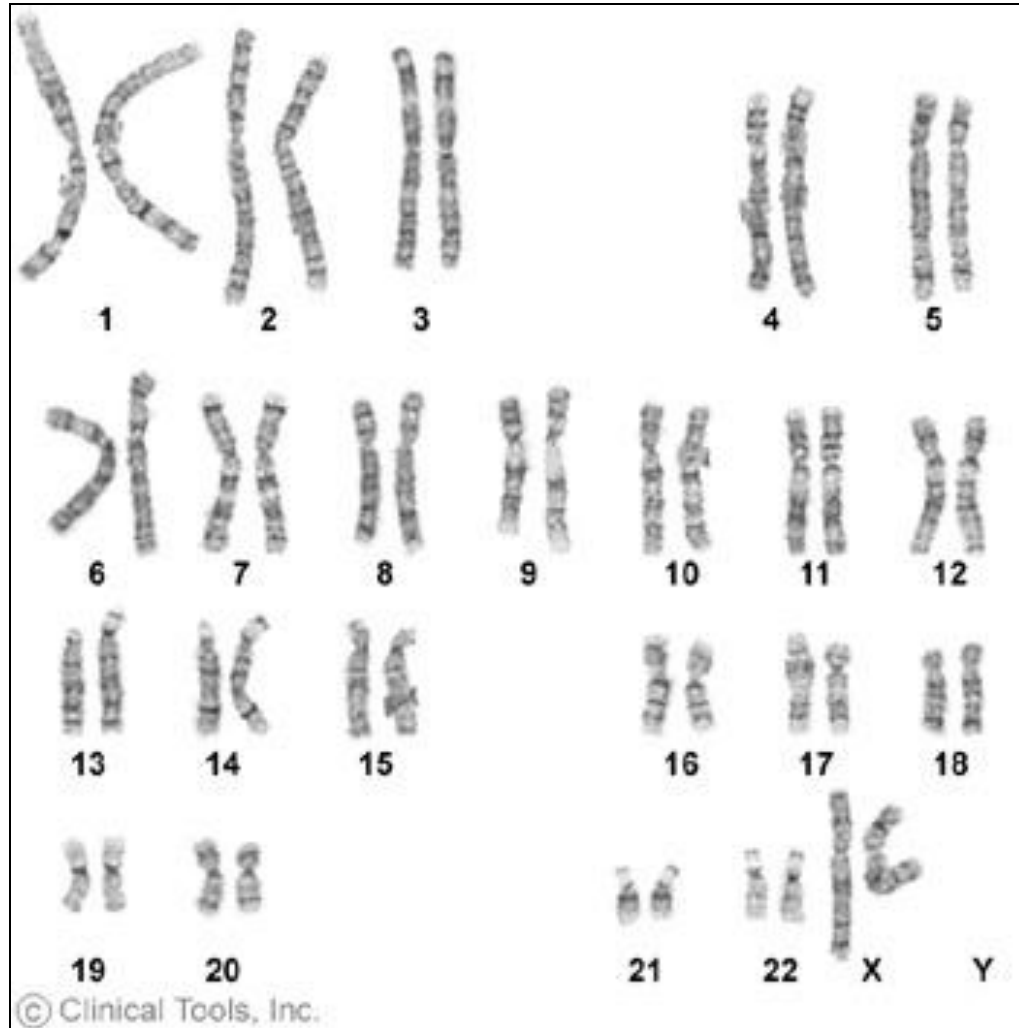
Haploid Cells

- **Haploid Cells** = Cells with $\frac{1}{2}$ the total number of chromosomes
- **Gametes** (sex cells) are the only haploid cells
 - Ex: Sperm, Egg, Pollen
- Created by meiosis
 - Chromosome number reduced by $\frac{1}{2}$
- How do humans get 46 chromosomes?



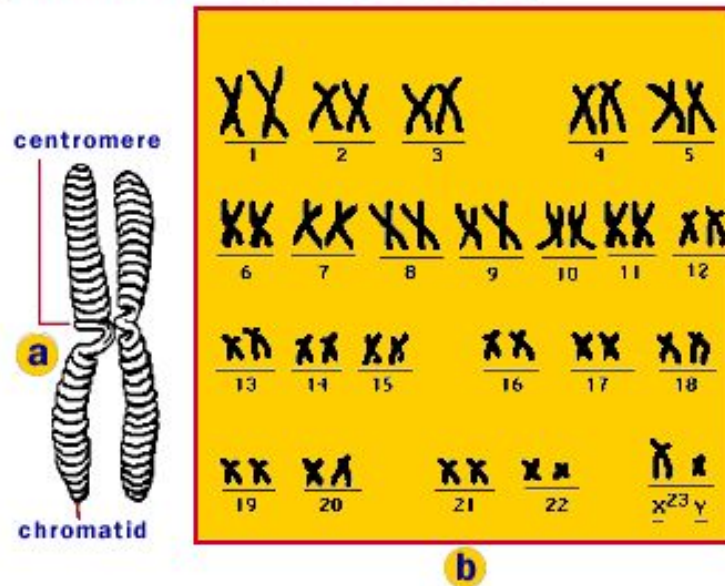
Haploid sperm cell (23) + Haploid egg cell (23) = Diploid zygote (46)

Diploid vs. Haploid Karyotypes



How many chromosomes are in human brain cells?

Human chromosomes!



Remember...Brain cells are non-sex cells...

...Somatic cells are non-sex cells...

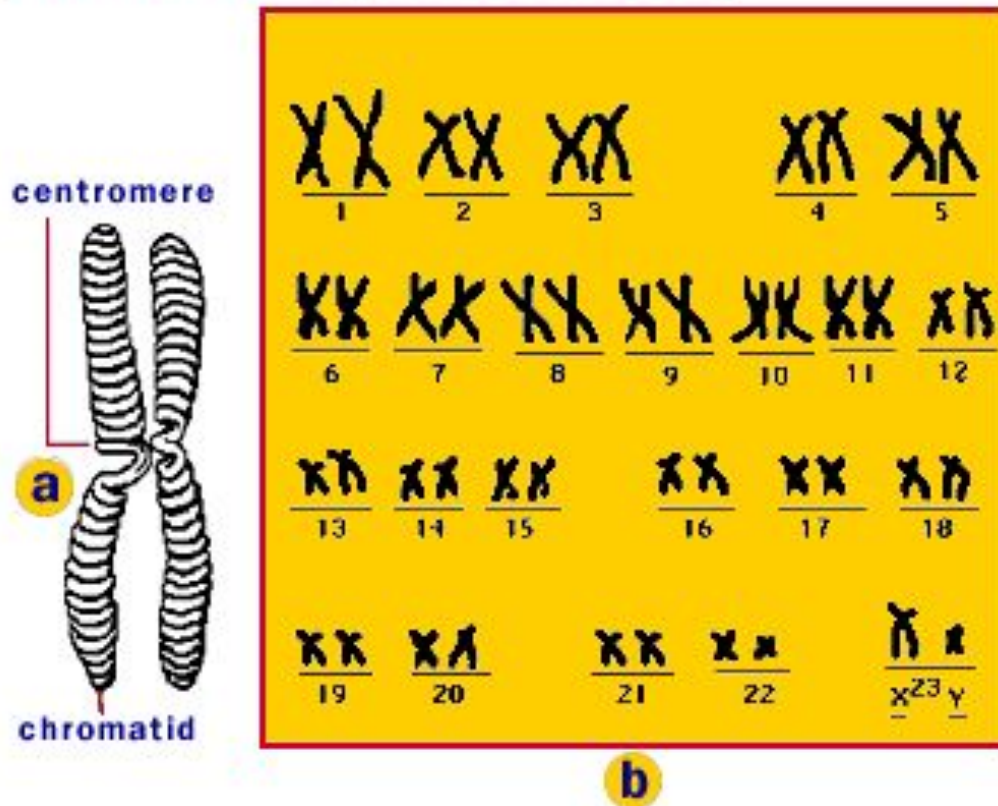
...Somatic cells are diploid...

...Diploid cells have the full set of chromosomes

Answer = 46

What is the human haploid chromosome number?

Human chromosomes!

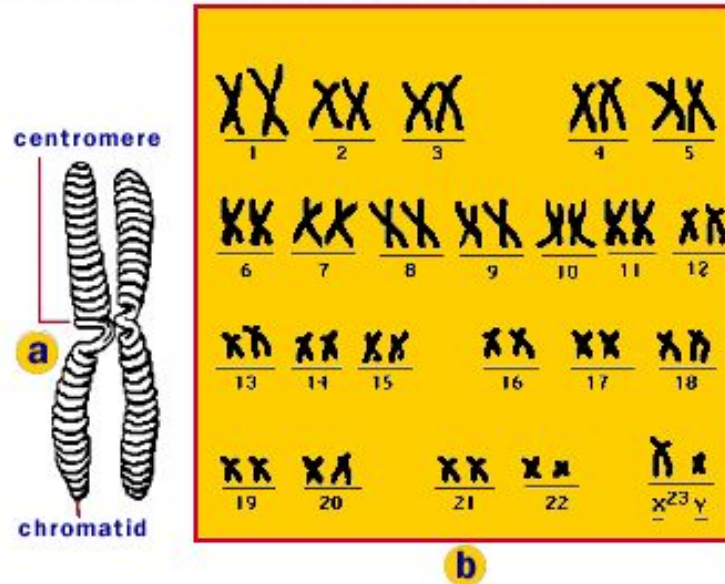


Remember...Haploid = half number of chromosomes

Answer = 23 chromosomes

How many chromosomes are in human female egg cells?

Human chromosomes!



Remember...Egg cells are sex cells...

...Sex cells are gametes...

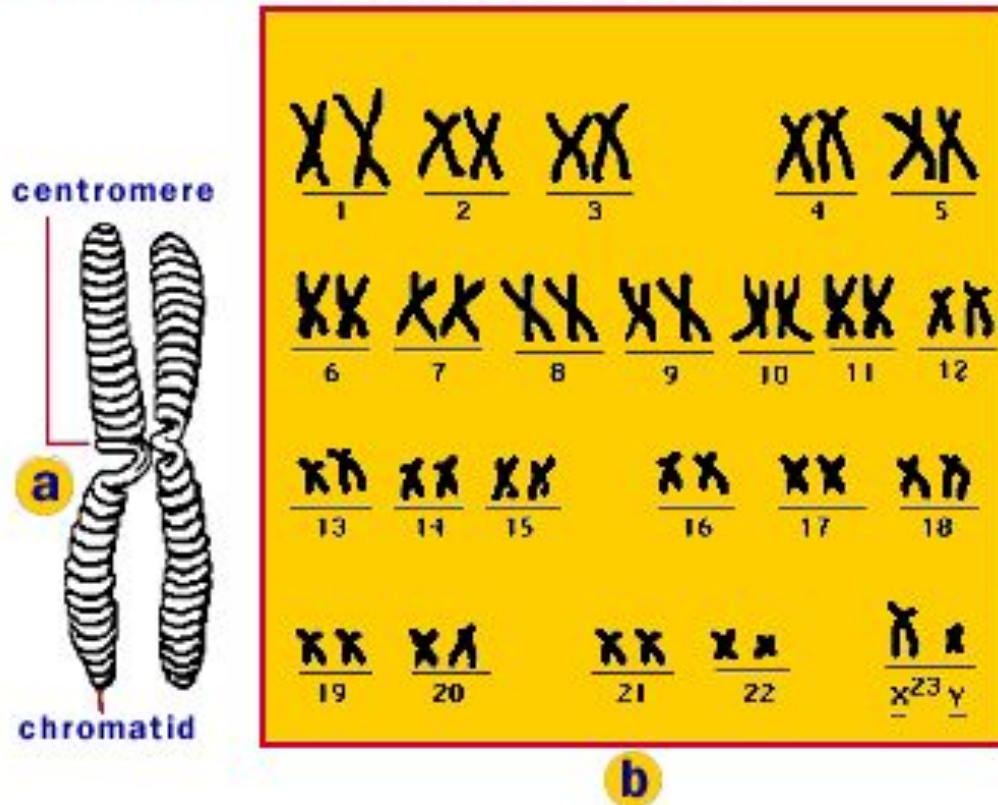
...Gamete cells are haploid...

...Haploid cells have $\frac{1}{2}$ the set of chromosomes

Answer = 23

What is the human diploid chromosome number?

Human chromosomes!

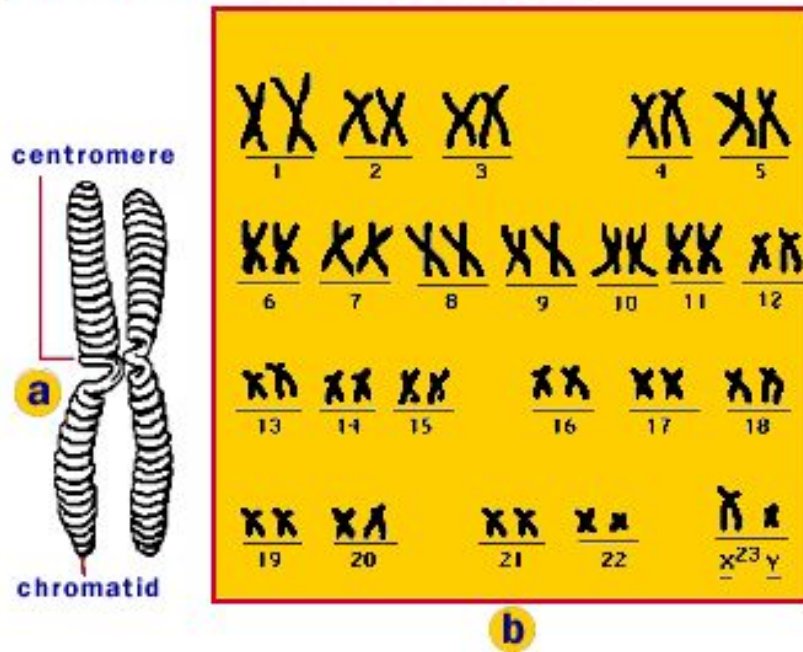


Remember...Diploid = total number of chromosomes

Answer = 46

What is the human gamete chromosome number?

Human chromosomes!



Remember...Gamete cells are sex cells...

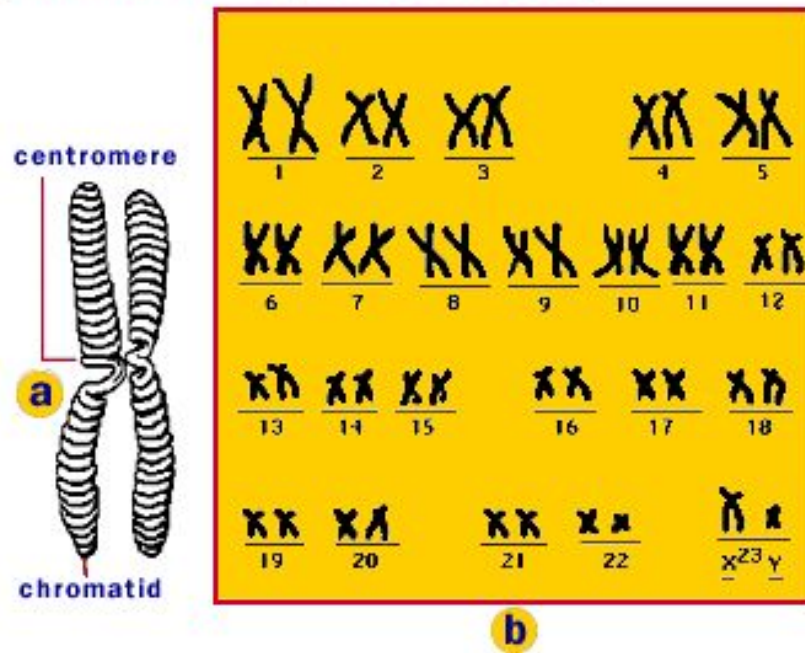
...Sex cells are haploid...

...Haploid cells have $\frac{1}{2}$ the set of chromosomes

Answer = 23

What is the human somatic chromosome number?

Human chromosomes!



Remember...Somatic cells are non-sex cells...

...Somatic cells are diploid...

...Diploid cells have the full set of chromosomes

Answer = 46