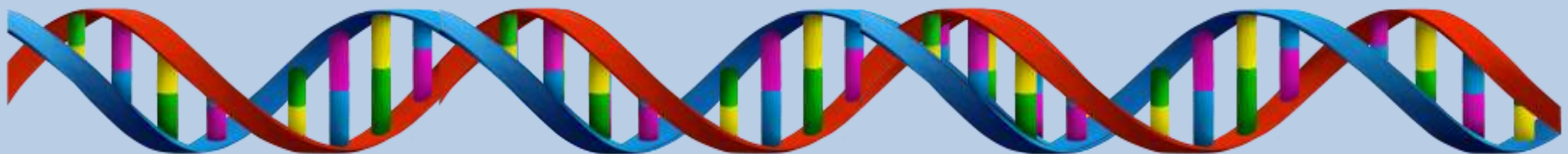
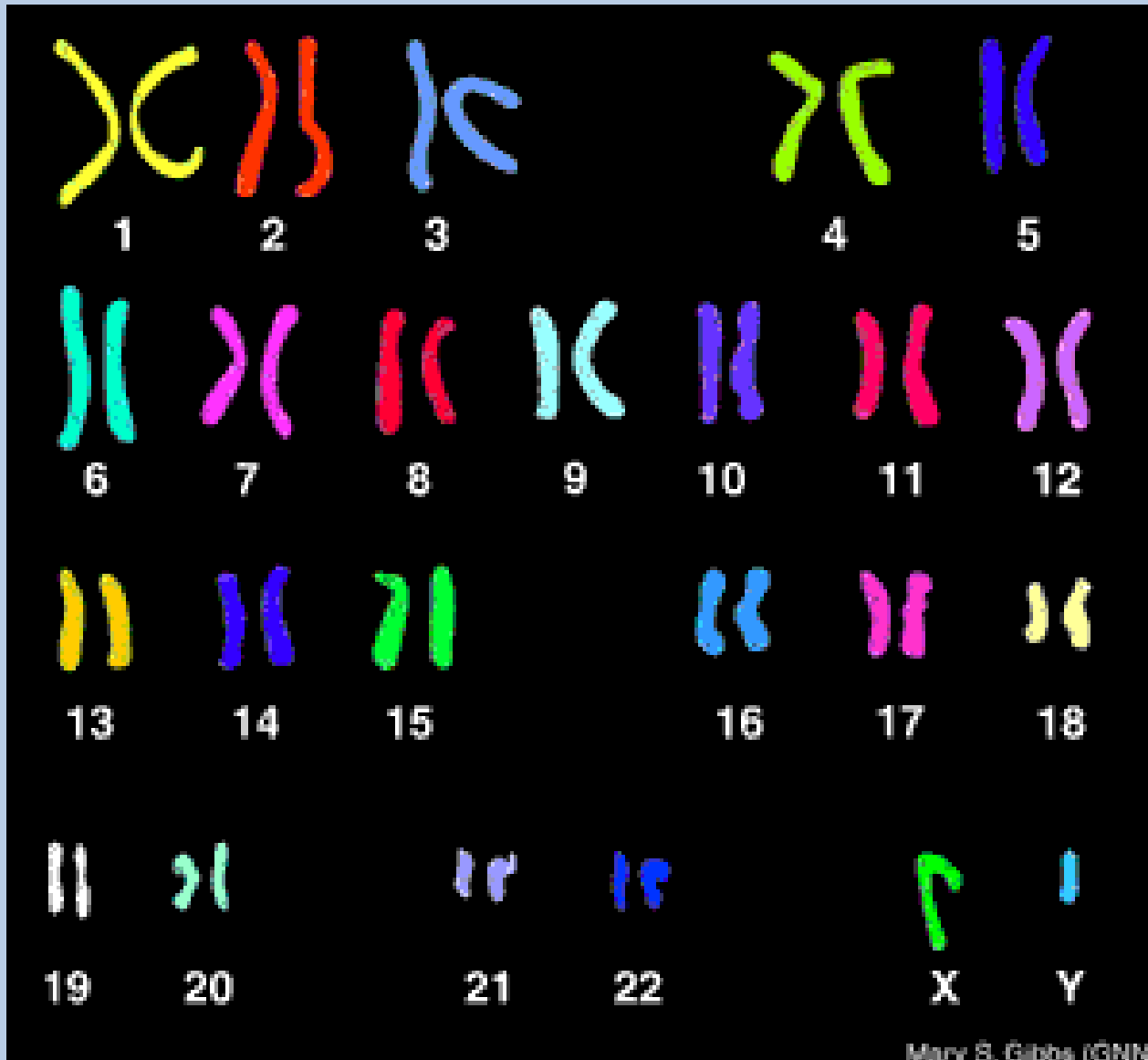


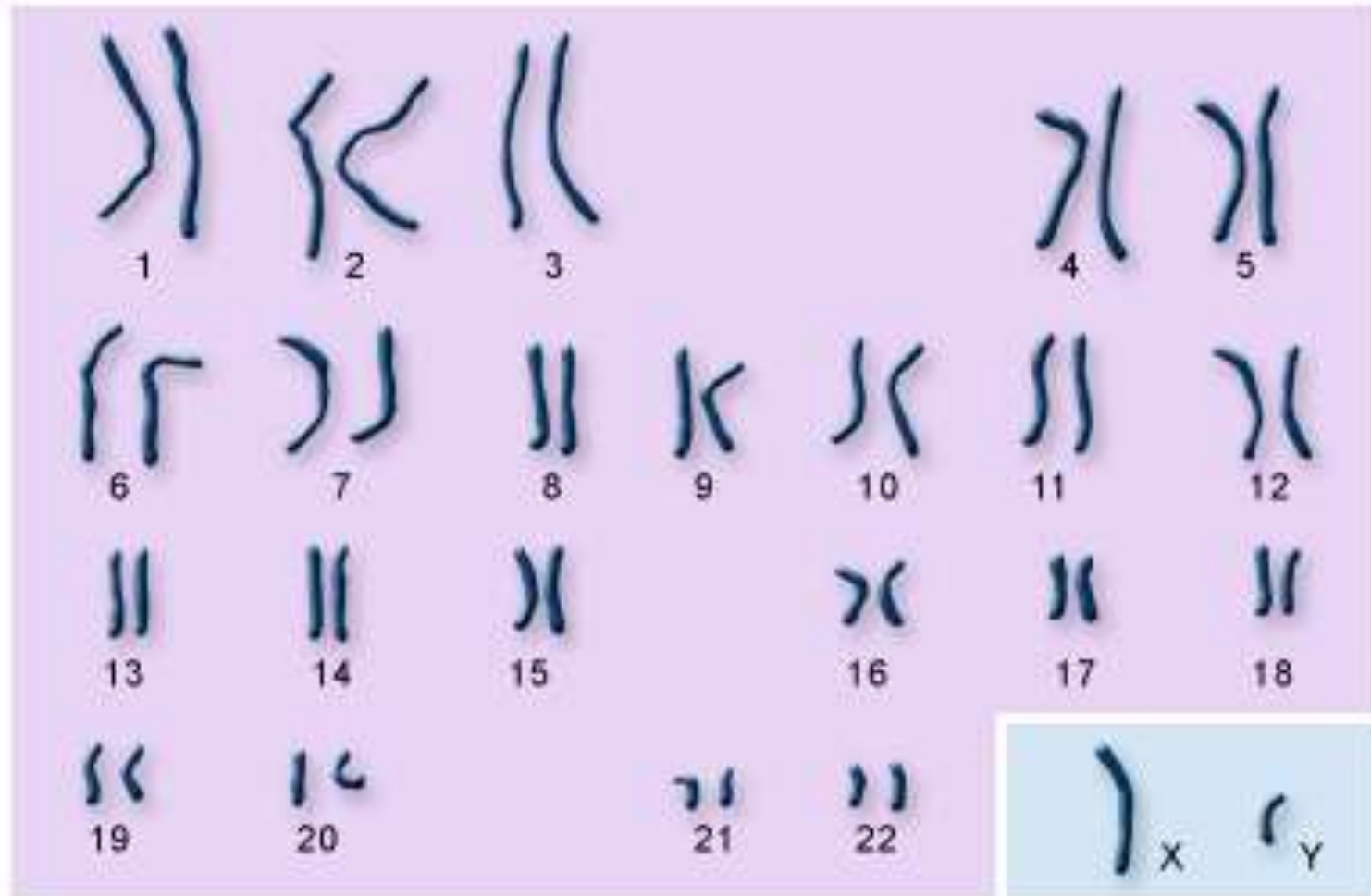
1. How many sex **CHROMOSOMES** do humans have?
2. What are the names of the sex **chromosomes** present in mammals?
3. What sex **chromosomes** do females have?
4. What sex **chromosomes** do males have?



Patterns of Inheritance – notes pg 61



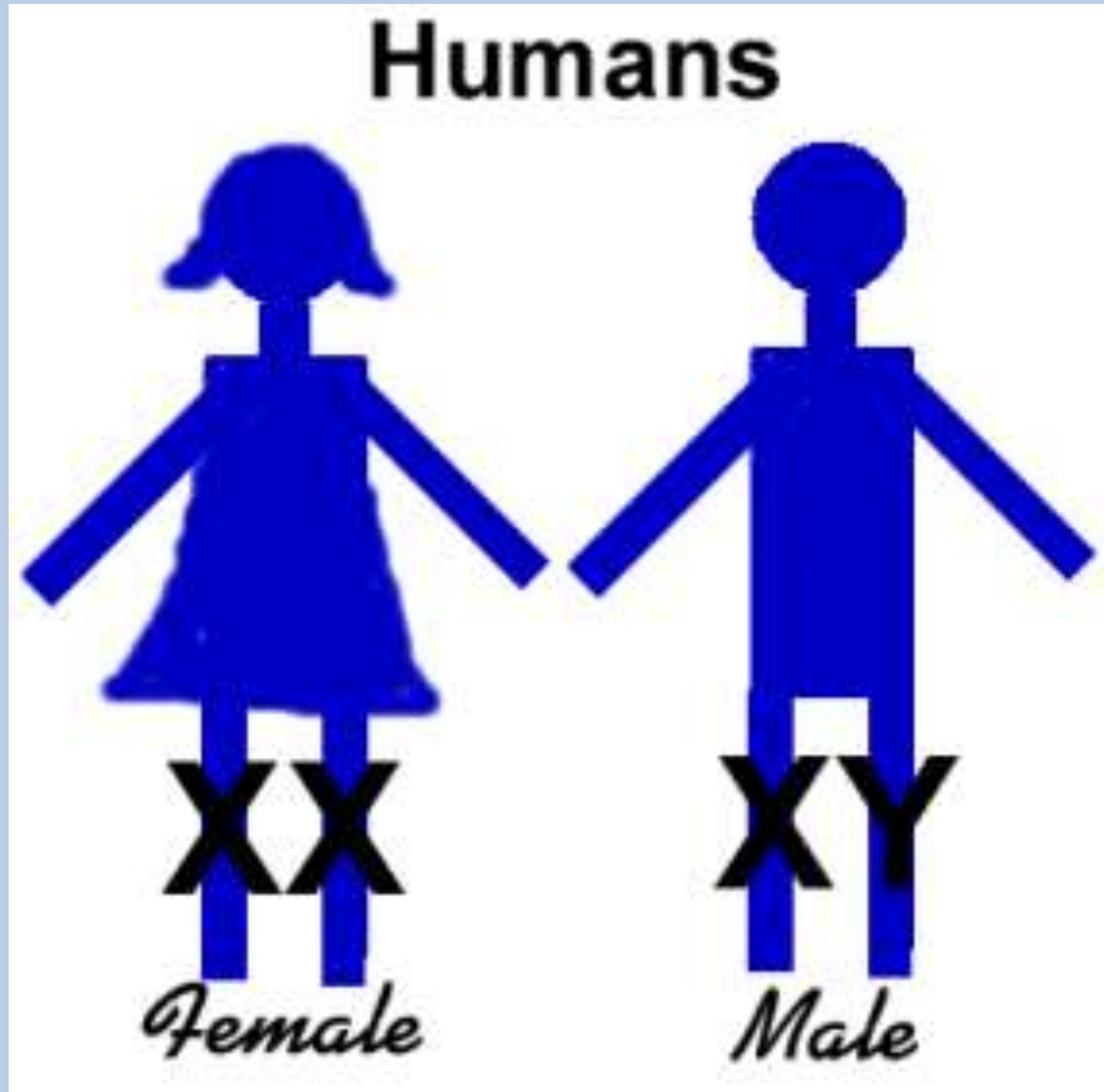
Chromosomes



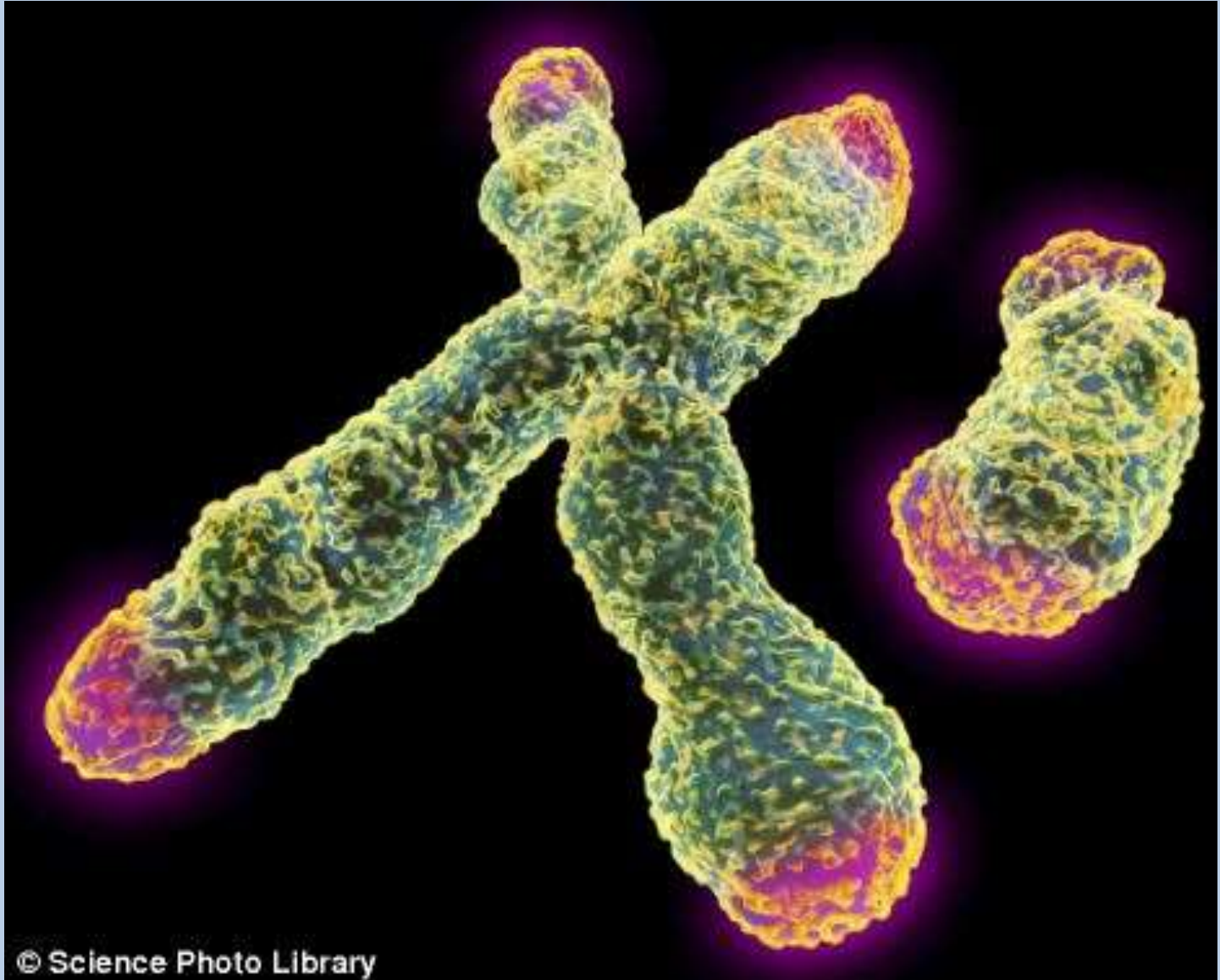
autosomes

sex chromosomes

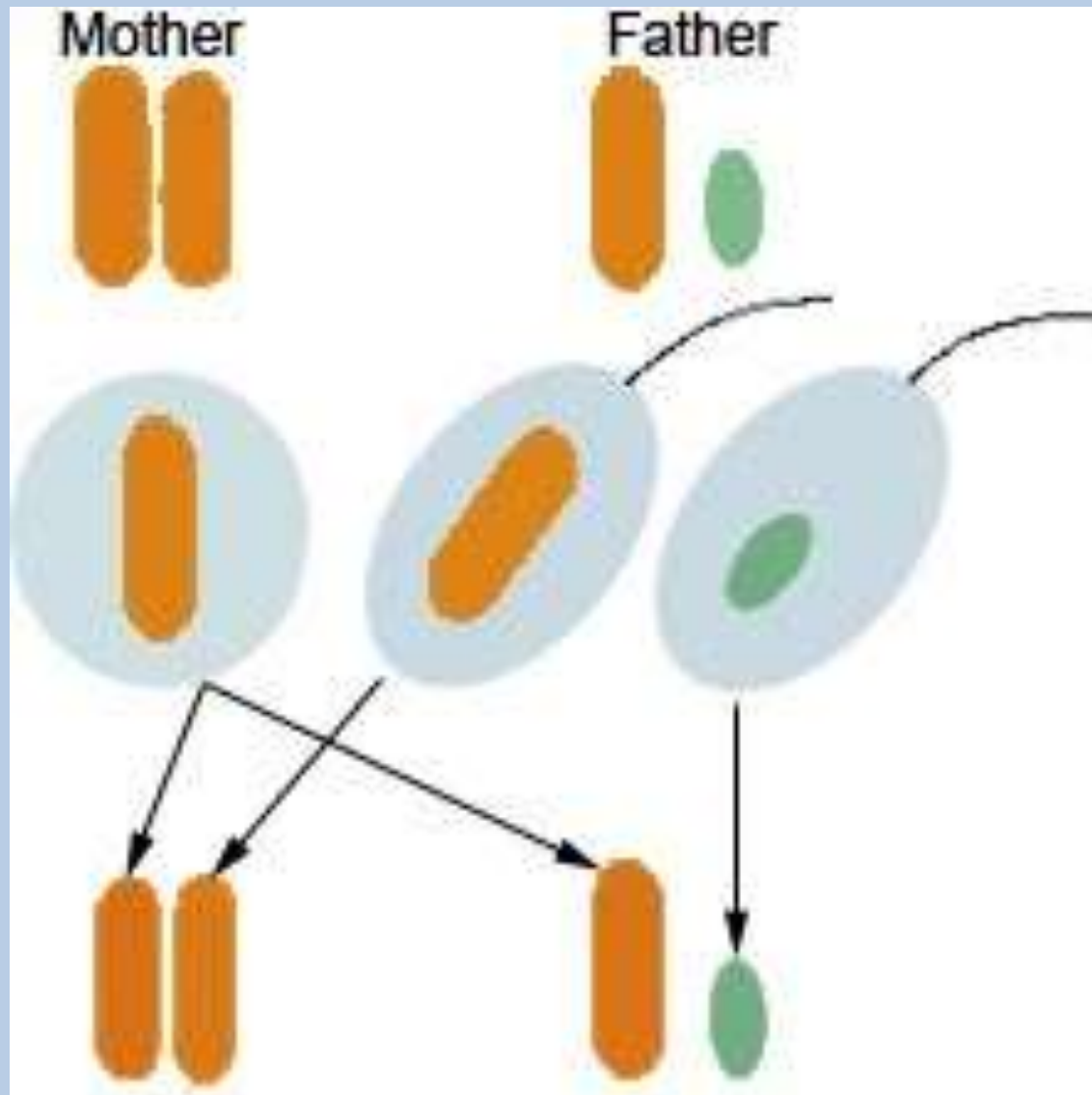
Chromosomes



Chromosomes



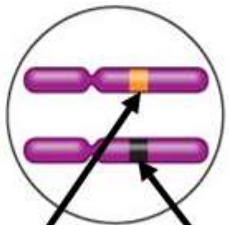
Chromosomes



Chromosomes

Early embryo:

X chromosomes



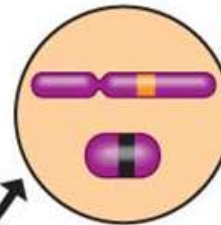
Allele for orange fur

Allele for black fur

Cell division and X chromosome inactivation

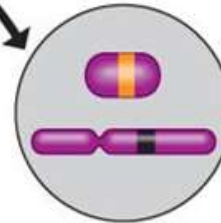
Two cell populations in adult cat:

Active X
Inactive X

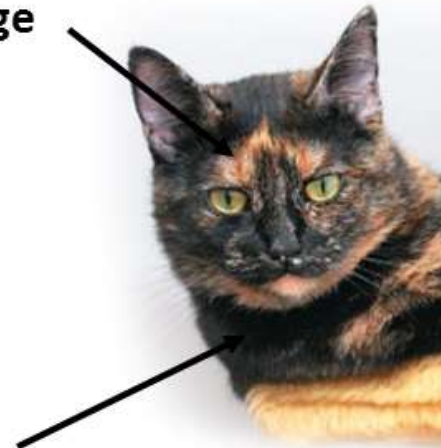


Orange fur

Inactive X
Active X

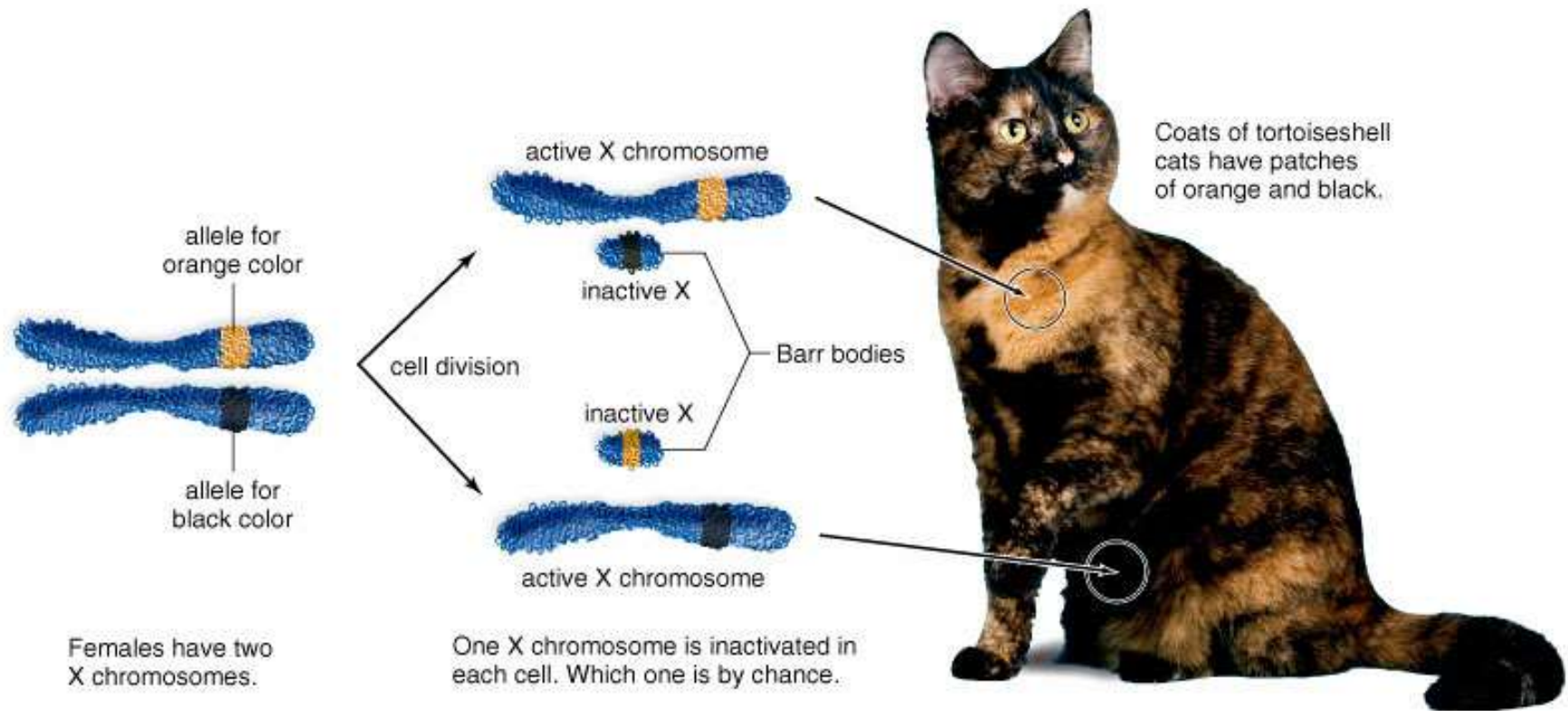


Black fur



Chromosomes

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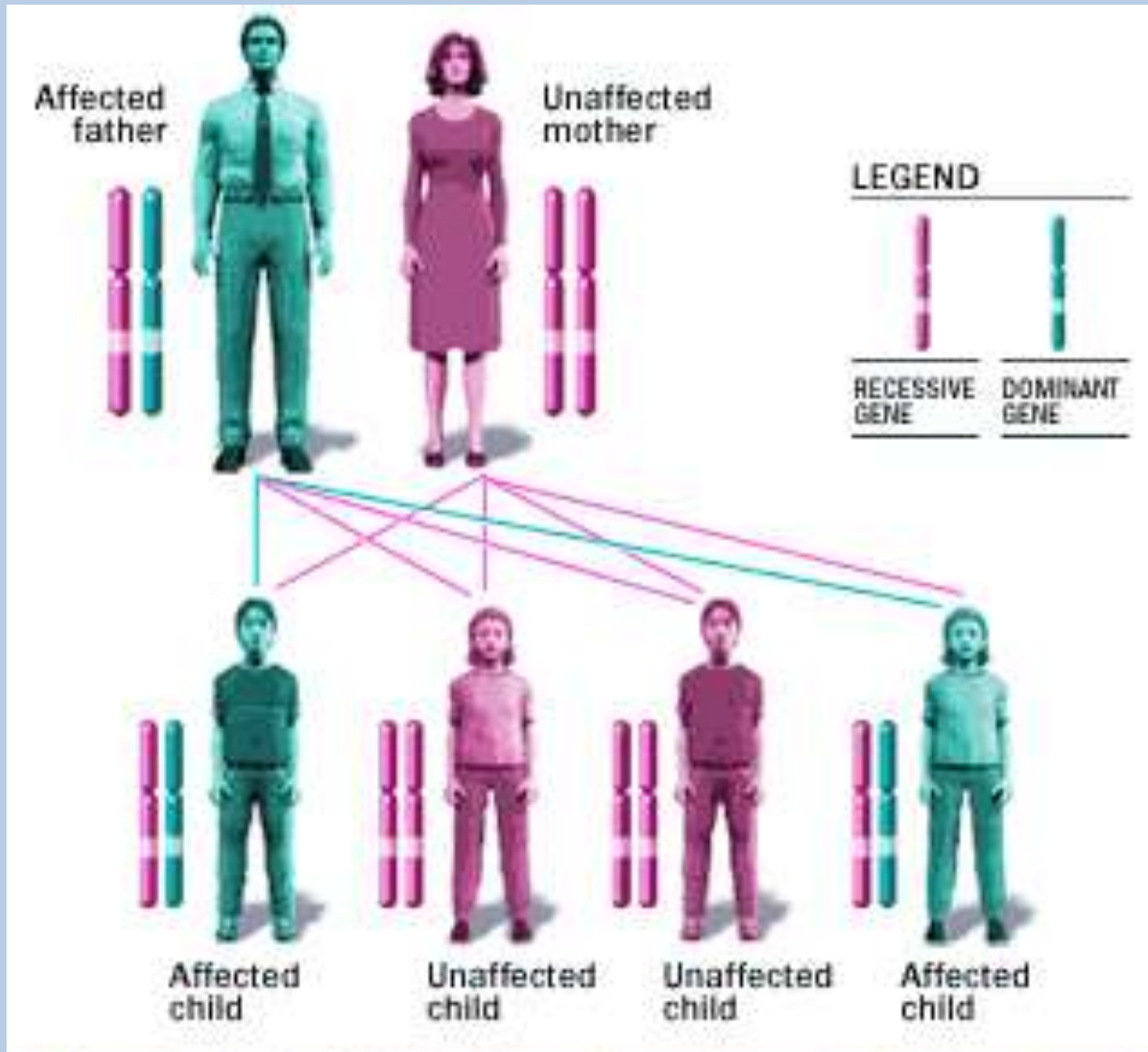


Females have two X chromosomes.

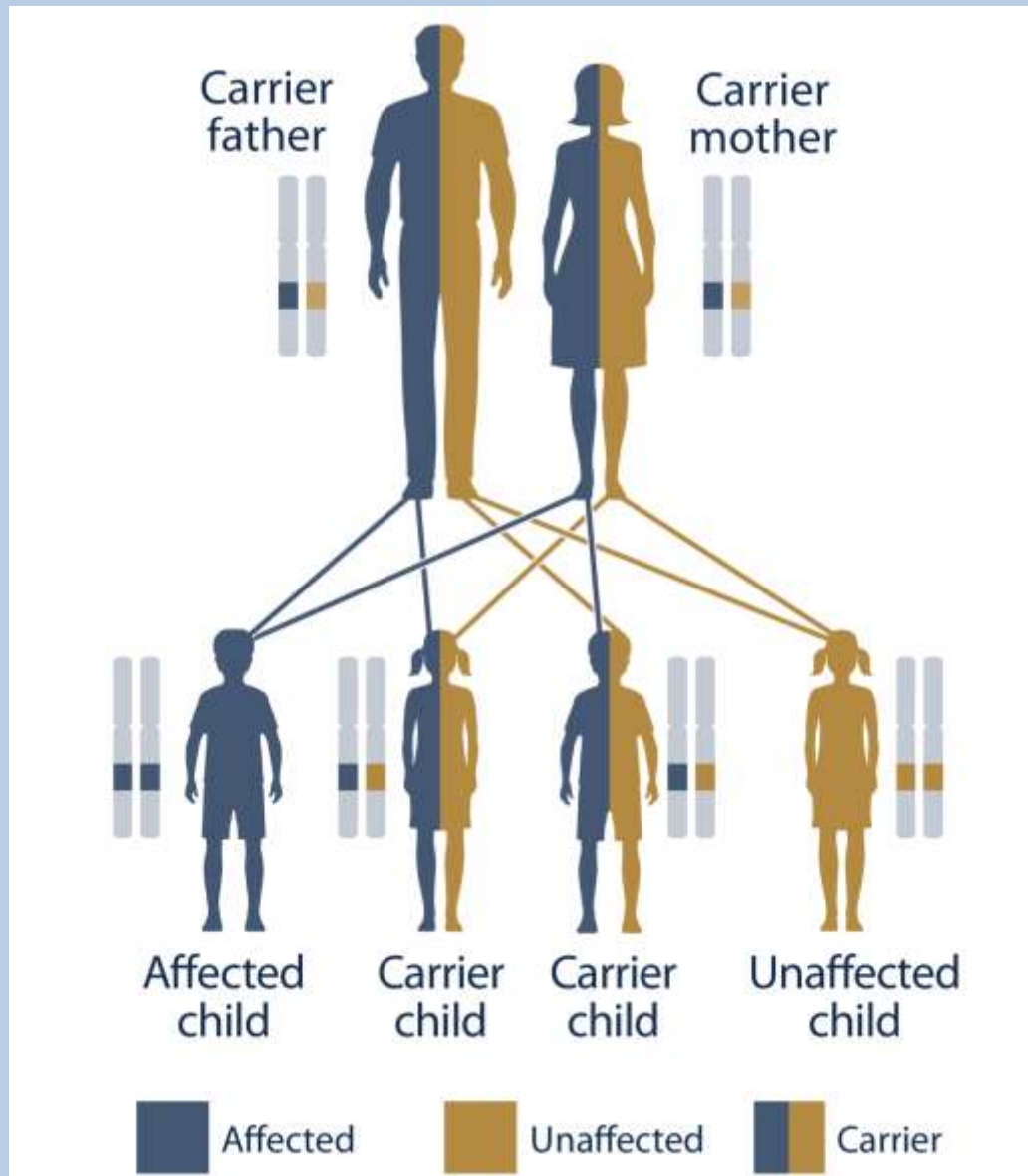
One X chromosome is inactivated in each cell. Which one is by chance.

Coats of tortoiseshell cats have patches of orange and black.

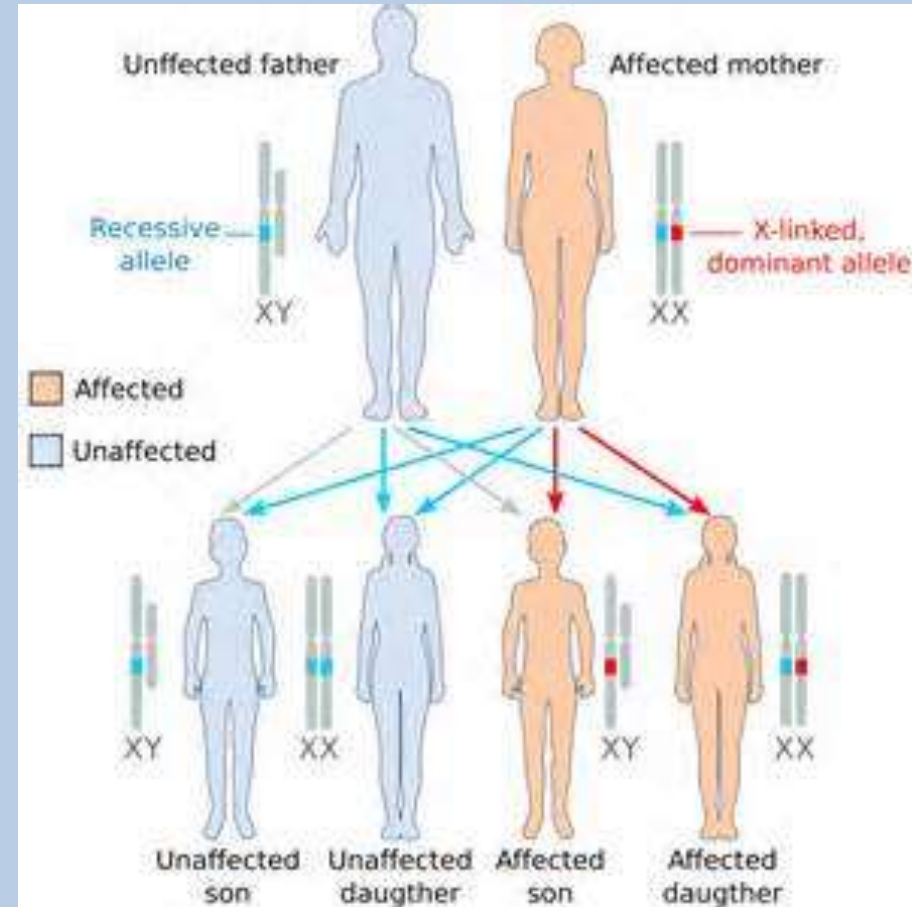
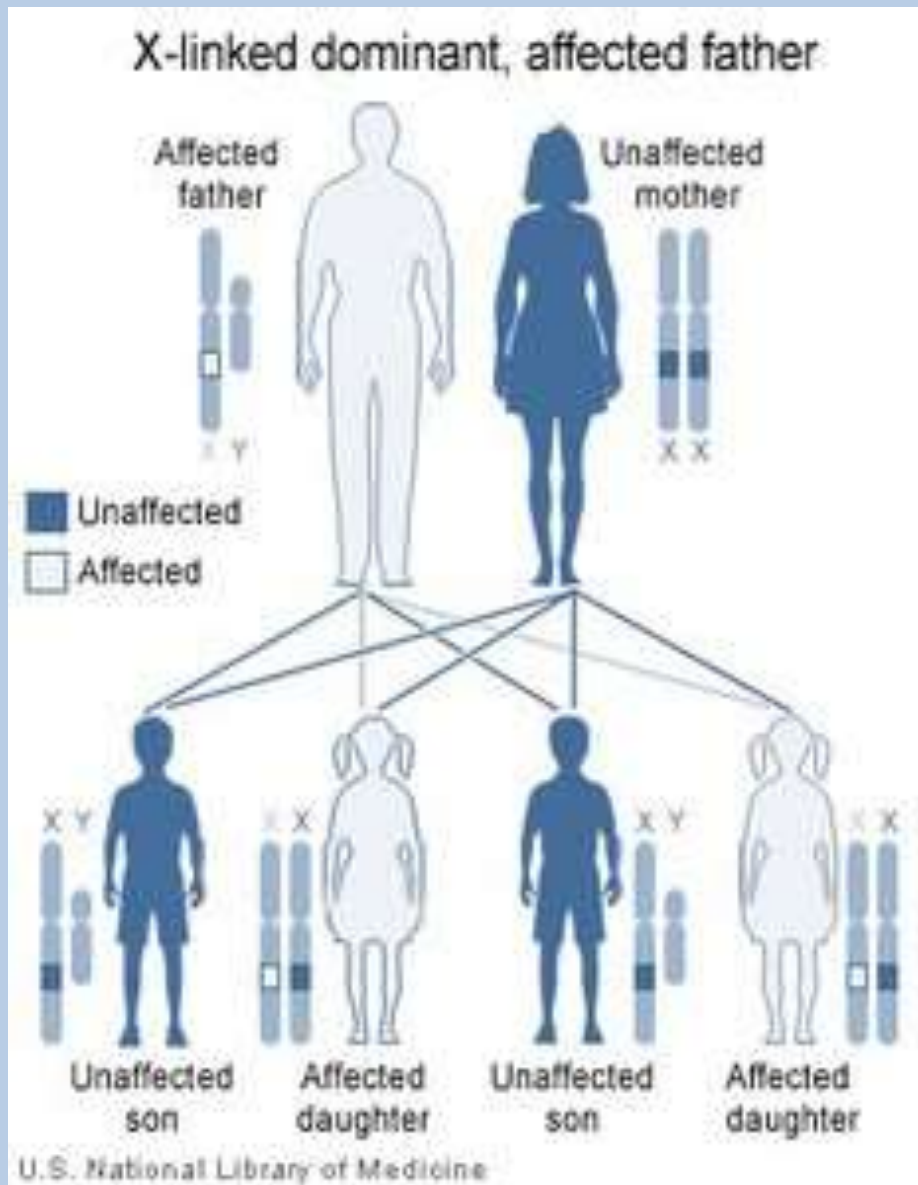
Autosomal Dominant



Autosomal Recessive

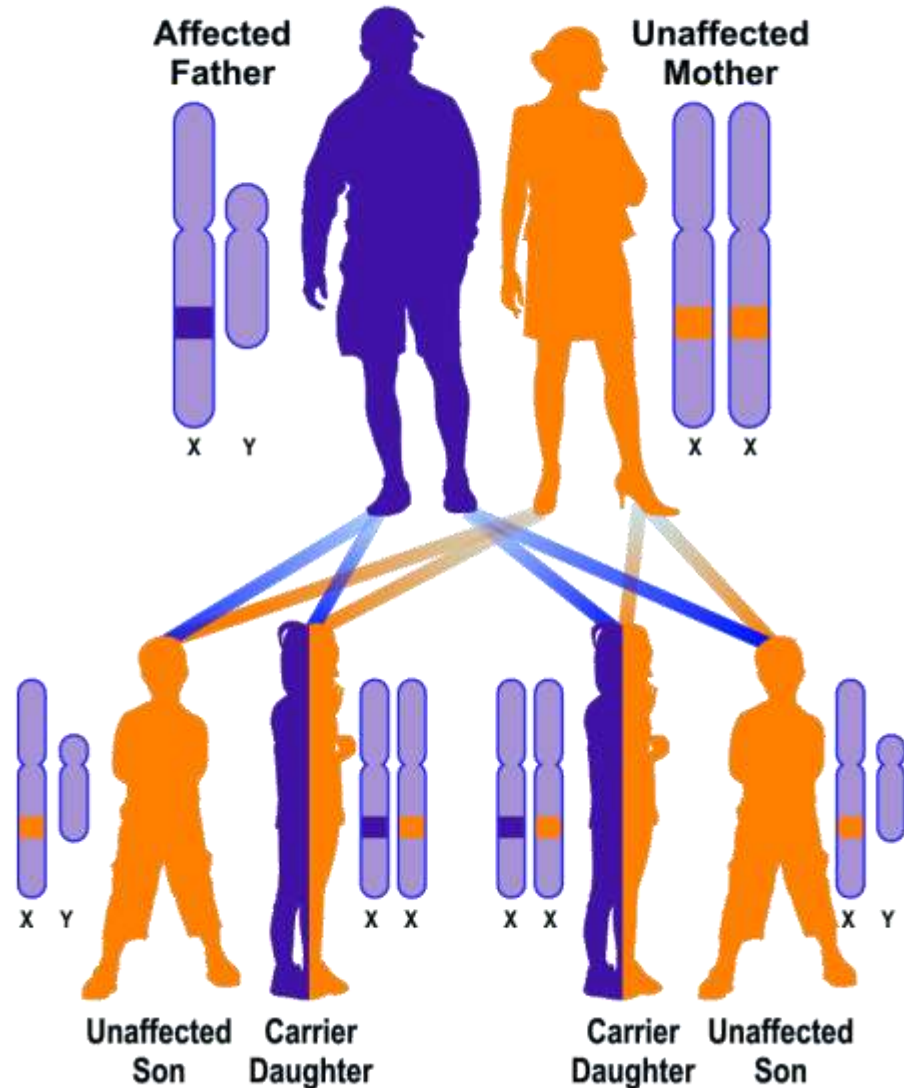


Sex-Linked Dominant

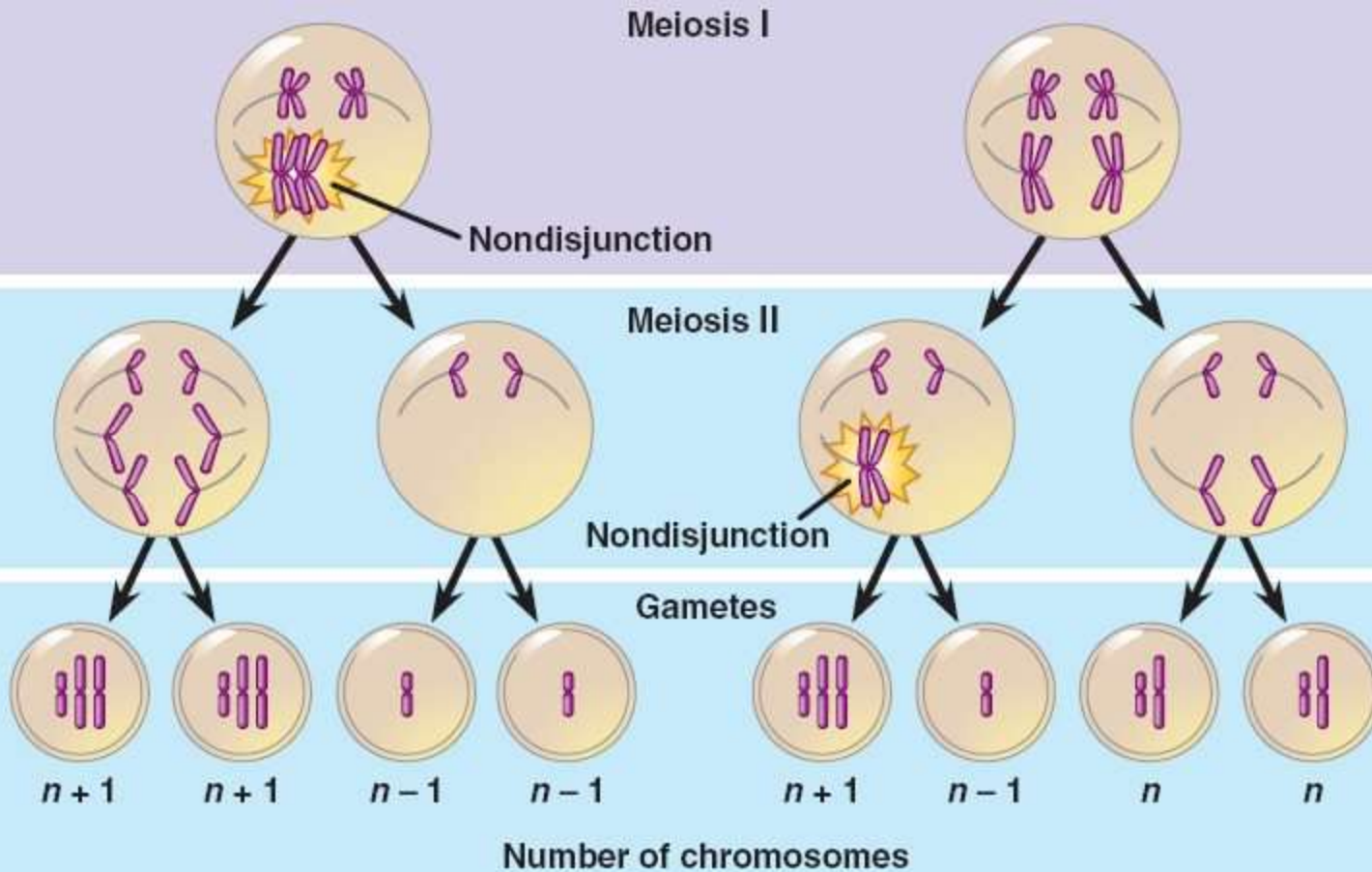


Sex-Linked Recessive

X-linked Recessive, Affected Father



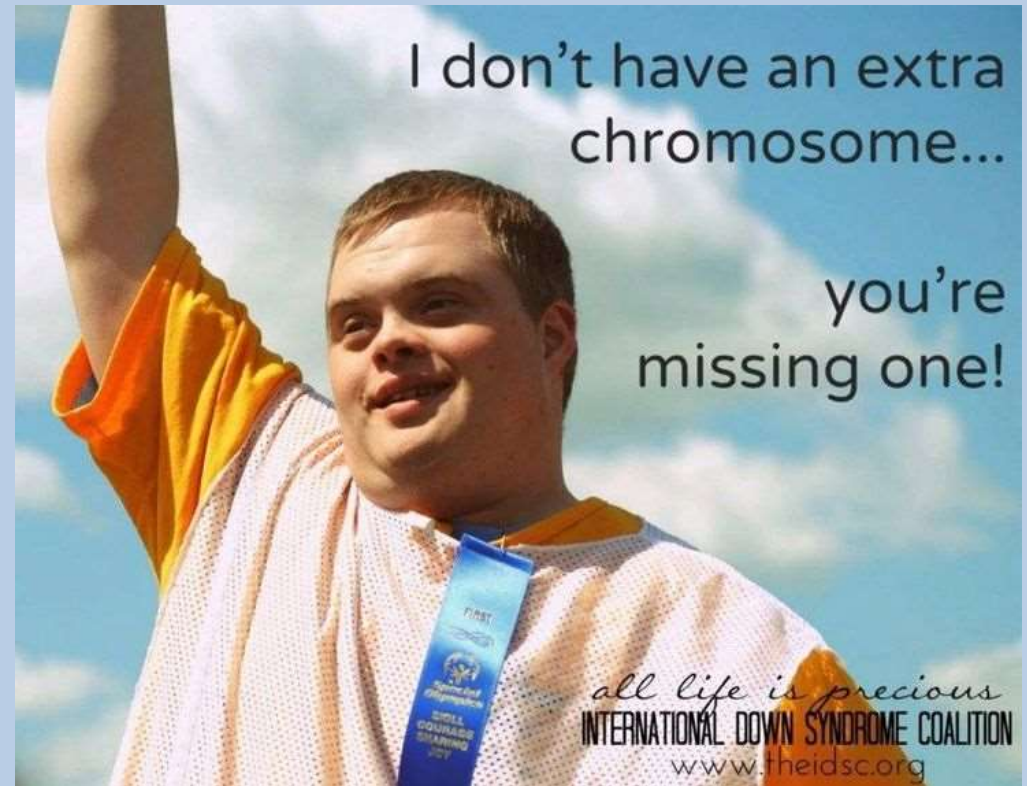
Nondisjunction



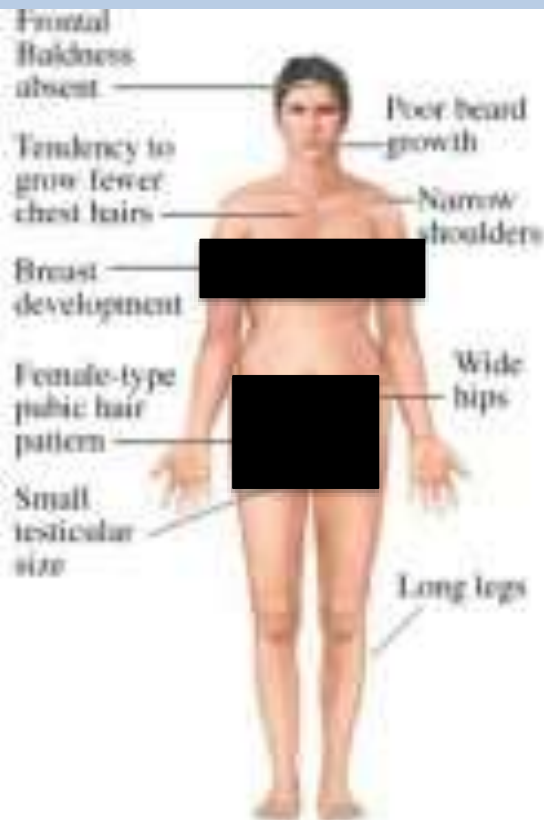
(a) Nondisjunction of homologous chromosomes in meiosis I

(b) Nondisjunction of sister chromatids in meiosis II

Trisomy 21 (Down's Syndrome)



Klinefelter Syndrome



- **Lower IQ than sibs**
- **Tall stature**
- **Poor muscle tone**
- **Reduced secondary sexual characteristics**
- **Gynaecomastia (male breasts)**
- **Small testes/infertility**



www.angelfire.com/wy/XXY/

Turner Syndrome



Incidence of Phenotypes in Turner Syndrome

◆ Short stature	100%
◆ Infertility	98%
◆ Primary gonadal failure	95%
◆ Osteoporosis	50%
◆ Cubitus valgus	45%
◆ Low posterior hairline	40%
◆ Carbohydrate intolerance	30-40%
◆ High blood pressure	25-40%
◆ Short metacarpals	35%
◆ High arched palate	35%
◆ Structural abnormalities in kidney	35%
◆ Hypothyroidism (Hashimoto thyroiditis)	35%

Activity

- **At your groups there are two beakers**
 - **Male and Female**
- **These are your parents!**

Activity

- **When you are told to do so you will draw 1 card from the male and one from the female**
- **We will discover what genes when everyone has drawn**

Activity

- **Based on your genotype, are you affected by any of these genetic disorders?**

Activity

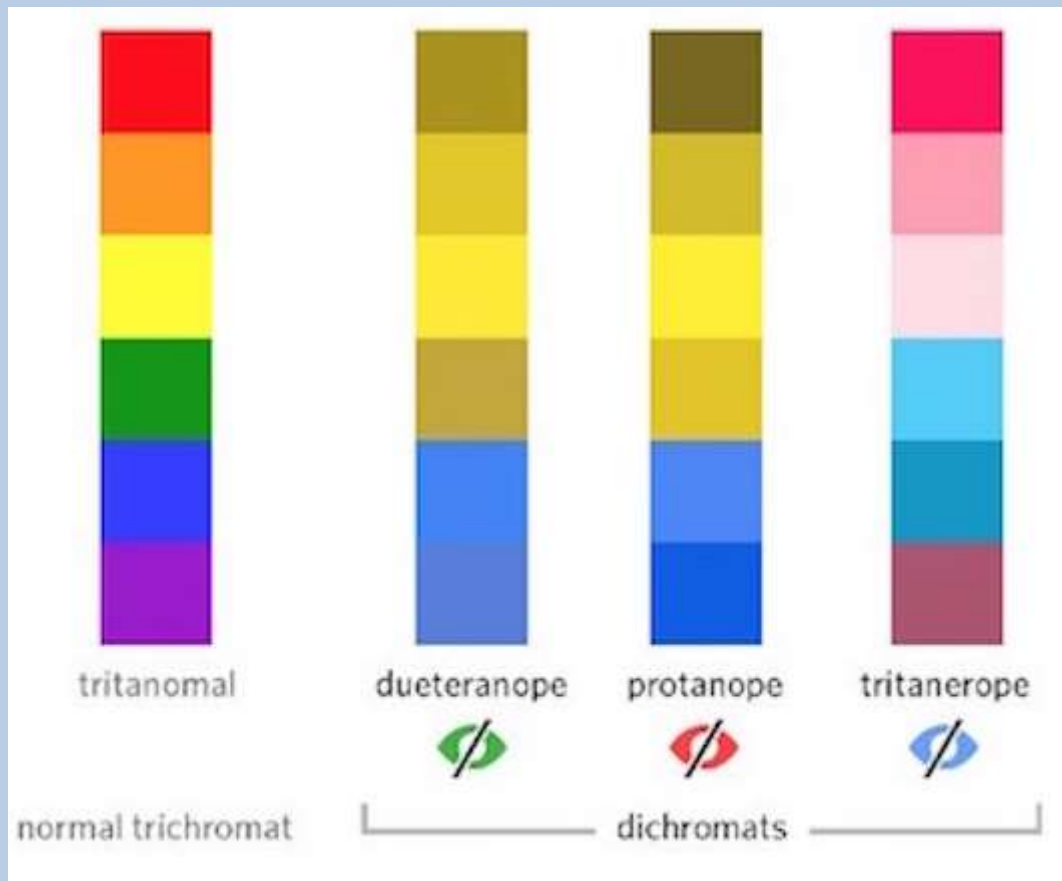
- **Genotypes:**
 - **D/d= Duchenne muscular dystrophy, sex-linked recessive**
 - **H/h= Hemophilia A, sex-linked recessive**
 - **R/r= Rett syndrome, sex-linked dominant**
 - **V/v= Vitamin D resistant Rickets, sex-linked dominant**

Example

- **Is color blindness more common in males or females?**
- **Based on that information is color blindness an autosomal, or an x-linked disorder?**

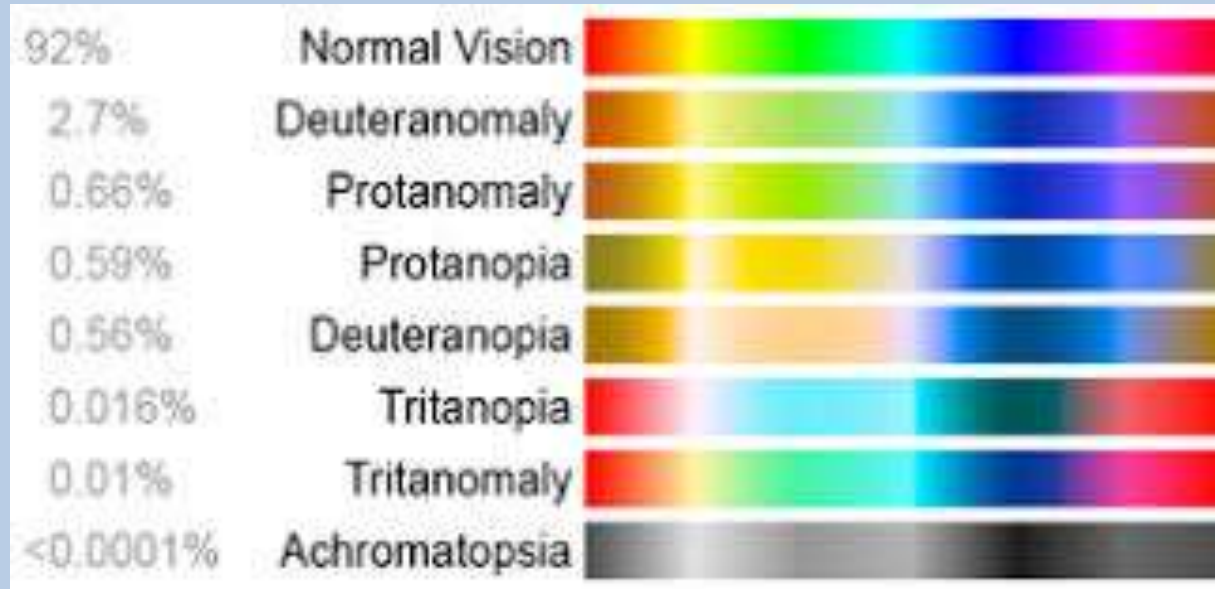
X-Linked Recessive Example

- Color blindness



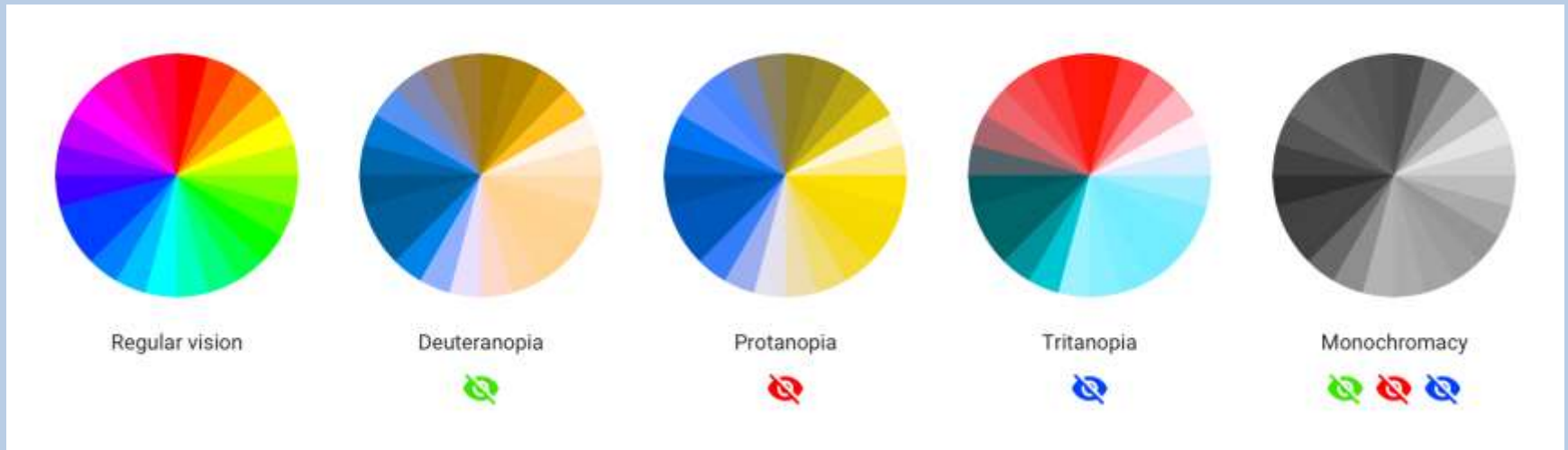
X-Linked Recessive Example

- Color blindness



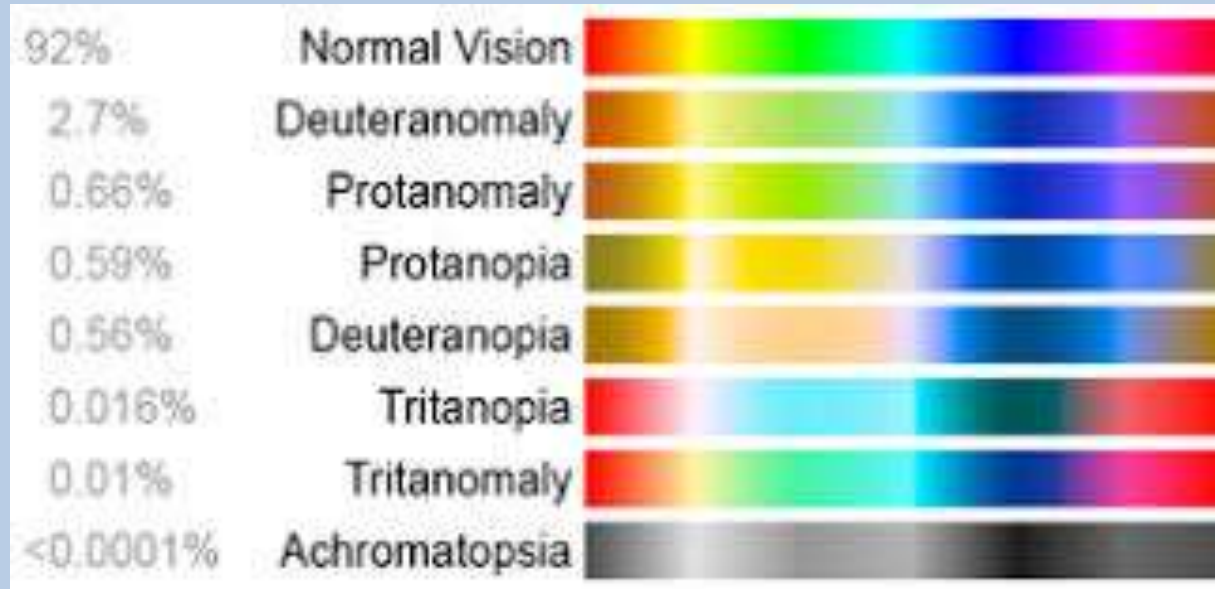
X-Linked Recessive Example

- Color blindness



X-Linked Recessive Example

- Color blindness



X-Linked Recessive Example

- Color blindness

