

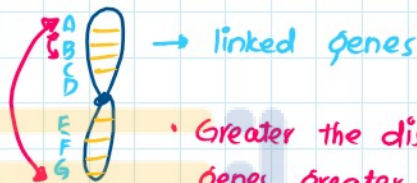
## Gene Linkage and Crossing Over

### Gene Linkage

- Staying together of genes on a chromosome.
- Physical relationships of genes.

Chromosome → 46 → Thousands of genes

Homologous chromosomes



- Greater the distance b/w genes greater will be the chances of separation.



### Detection of Gene Linkage

→ Test Cross

Dihybrid Cross

A, B

(F<sub>1</sub>) Heterozygous

Back Cross  
(Recessive Parent)

Phenotypic Ratios

• 1 : 1 : 1 : 1 (No linkage)

• Parental Types, Recombinant

↑↑

↓↓

(Partial linkage)

• Only Parental Types  
(Tight linkage / Complete linkage)

### Autosomal Linkage

Chromosome # 1 → 22

→ Chromosome # 11

• Sickle Cell Anemia

• Leukemia (Blood Cancer)

• Albinism

(No pigment at all)

### Sex Linkage

Homologous Chromosome # 23

X - Chromosome

• Colour Blindness

• Haemophilia

• Gout

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### Crossing Over

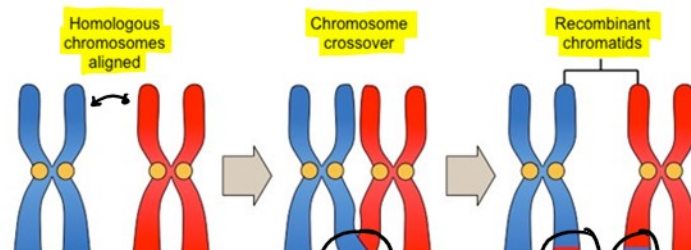
→ Exchange of genetic material b/w Non-Sister chromatid.

MEIOSIS

(Gametogenesis)

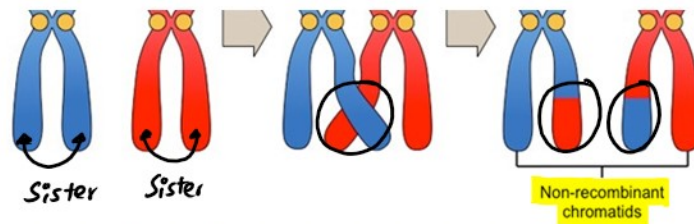
Spermatogenesis

Oogenesis



- Closer the genes lesser will be the crossing over

genesis



**Recombinant Frequency** → Population level

- Population (100)
- Recombinant individuals (20)

$$RF = \frac{\text{Recombinants}}{\text{Total Population}} \times 100$$

Cross Over =  $RF = \frac{20}{100} \times 100 = 20\%$

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