Biology *clil*

Presented by Aurora Vacca and Ylenia Citoli

The determination of sex

Important

Females have two copies of genes (XX)

Males often have only one copy (XY)

That's why some genetic diseases are more common in males.

Humans have special chromosomes for sex: X and Y

Females = XX, males = XY

The Y chromosome decides sex:

If there is Y → male

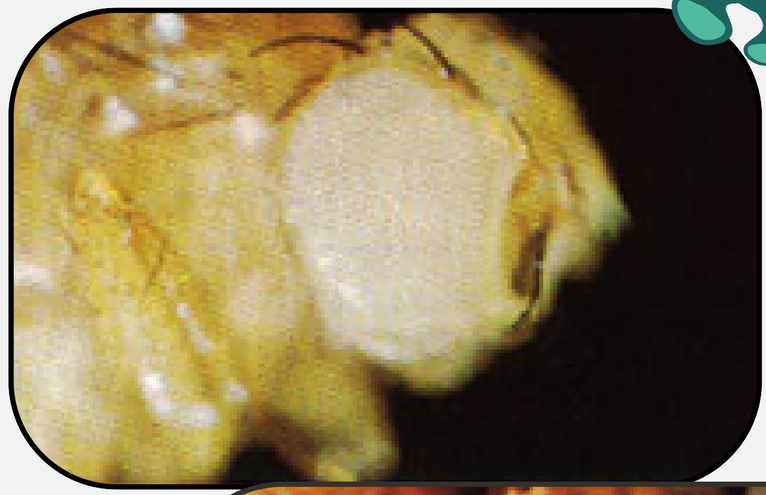
If there is no Y → female

X is big (many genes)

Y is small (few genes)

Sex-linked characteristics

Sex-linked traits are characteristics controlled by genes on sex chromosomes (X and Y).
Thomas Hunt Morgan studied this using Drosophila melanogaster.



- Fruit flies are easy to study and reproduce fast
- Females = XX, males = XY (like humans)

He found a male fly with white eyes and discovered:

- The gene for eye color is on the X chromosome
- Some traits are linked to sex chromosomes

So, sex-linked traits depend on whether the gene is on X or Y.

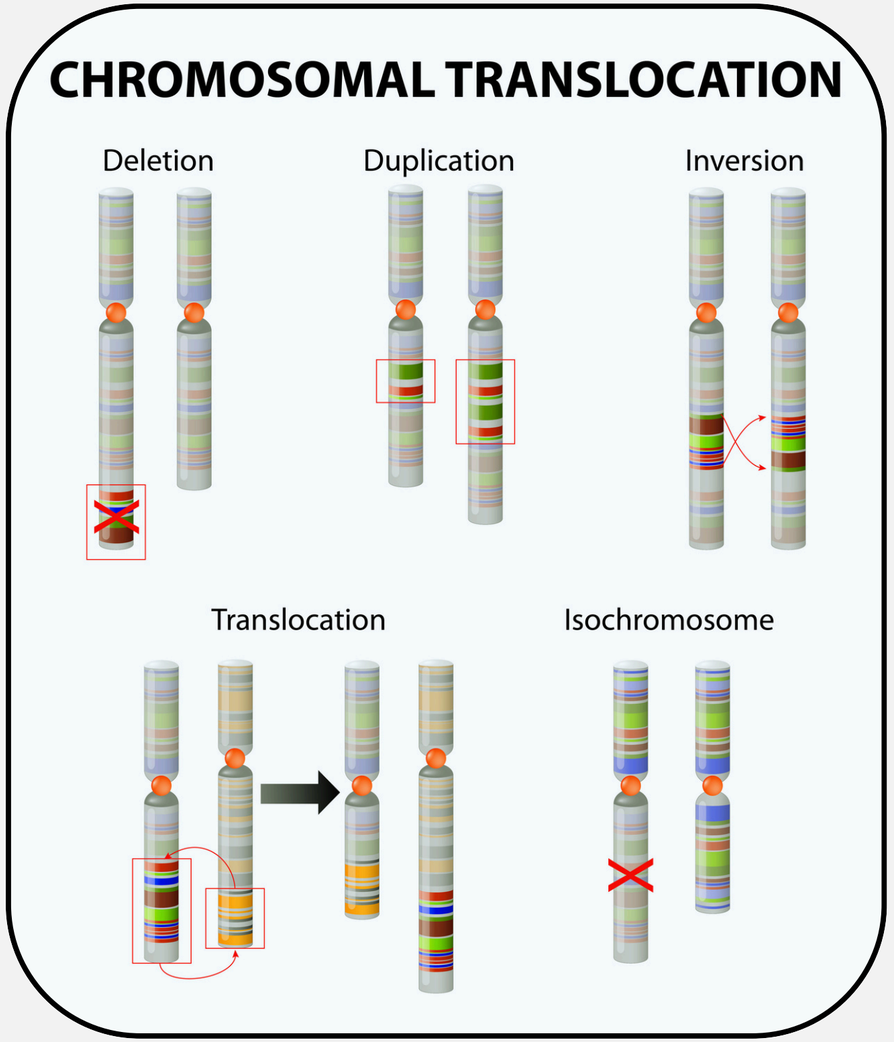
Anomalies in chromosome structure

Chromosome changes happen when DNA parts are mixed incorrectly.

Types:

- Deletion: loss of a chromosomal fragment
- Duplication: a chromosomal segment is repeated twice
- Translocation: material exchange between non-homologous chromosomes
- Inversion: a segment detaches and reattaches in reverse.

These can cause miscarriage or serious diseases.



Multifactorial genetic diseases

These conditions are not caused by a single "broken" gene, but by the cumulative effect of many small genetic variations (**Polygenic Risk**).

- You don't inherit the disease itself, only a genetic predisposition.
- Only manifests when the combined "load" of genetic risk and environmental stress crosses a specific biological threshold.
- Lifestyle and environment are important

Because lifestyle is a major factor, many of these diseases can be delayed or even prevented through healthy choices, even if you have "bad" genes.

Thank You

Thank you for your attention