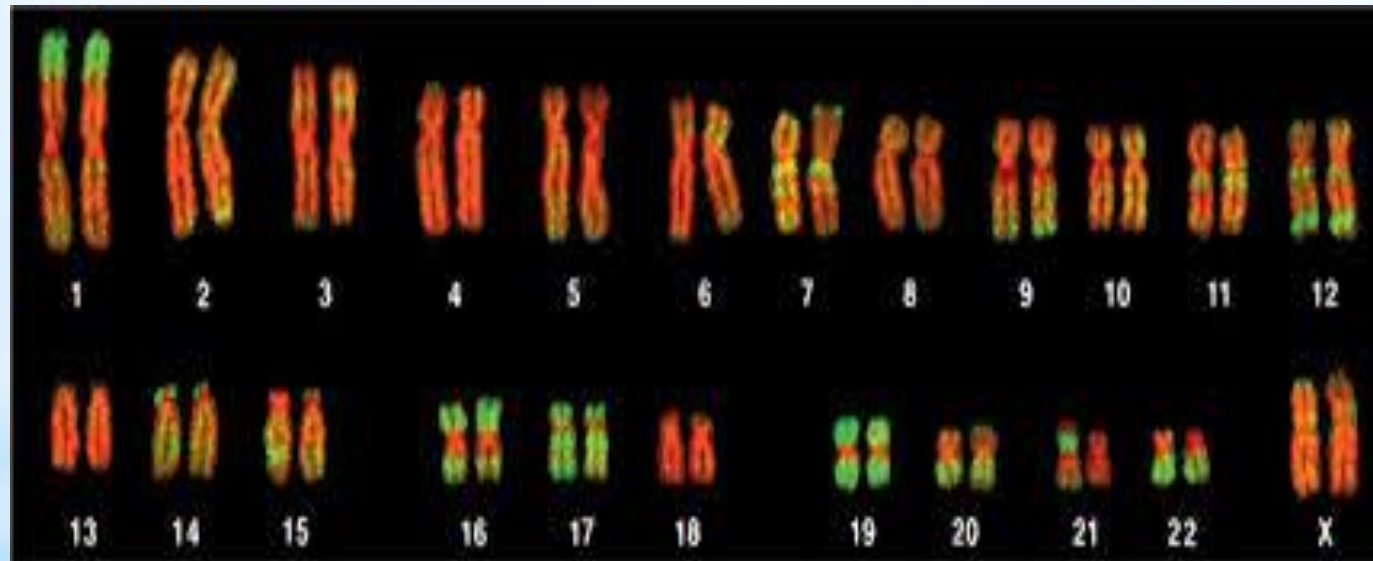


Lec 8 \ The Mutation



Structural Chromosomal mutations

Mutation is defined as a **change** *
occurring in the genetic **material** and
occurs at the **gene or chromosome level**
At the gene level, a mutation is defined
as any change in the **nitrogenous** bases
of DNA, which in turn leads to **harmful**
results

Natural

Induced

Types of mutations *

There are mutations that lead to several **changes** in the **parts** that make up the **internal structure** of one of the chromosomes, which leads to a defect in its functioning from the normal state, including:

structural Chromosomal mutations *

There are mutations that lead to several **changes** in the **parts** that make up the internal **structure of one of the chromosomes**, which leads to a defect in its functioning from the normal state, including:

Deletion :When a **piece** of a chromosome is **deleted**, this chromosome **loses part of its active genes** and becomes **smaller in size than its normal counterpart**

Insertion :Some mutations lead to the **separation** of one of the pieces from a specific chromosome, and it happens to be **attached** to another chromosome, which adds new genetic content to this chromosome.

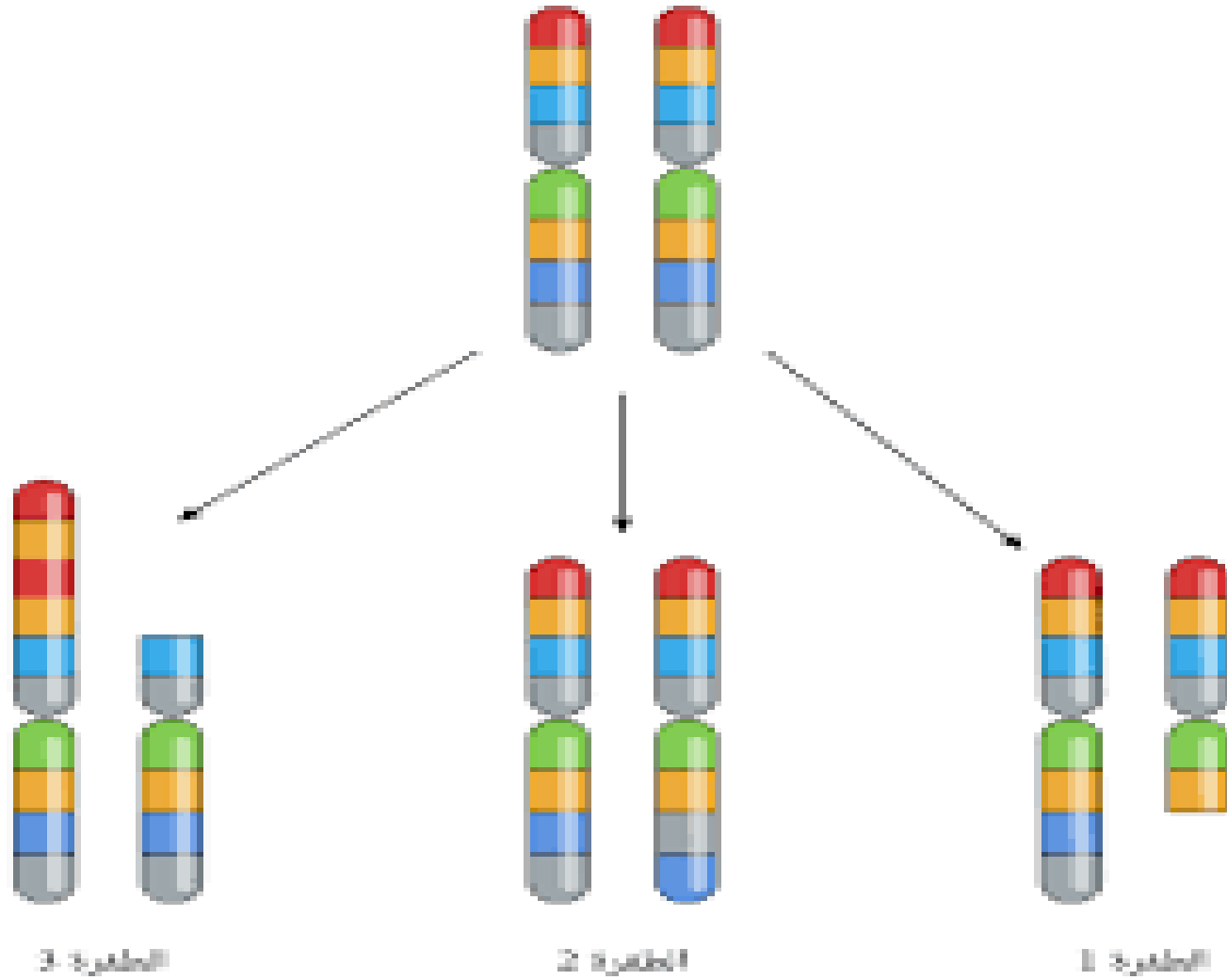
1\ structural Chromosomal mutations *

Duplication :Duplication of one of the same chromosome segments occurs, which leads to an **increase** in the **expression** of these duplicated genes beyond the normal limit

Inversion :Some mutations cause a change in the **arrangement** of genes, making it inverted compared to the normal form and arrangement

Translocation :The **transfer** of segments **between chromosomes** occurs when a segment of one chromosome is lost and attached to another chromosome, leading to the appearance of genes in places other than their normal places.

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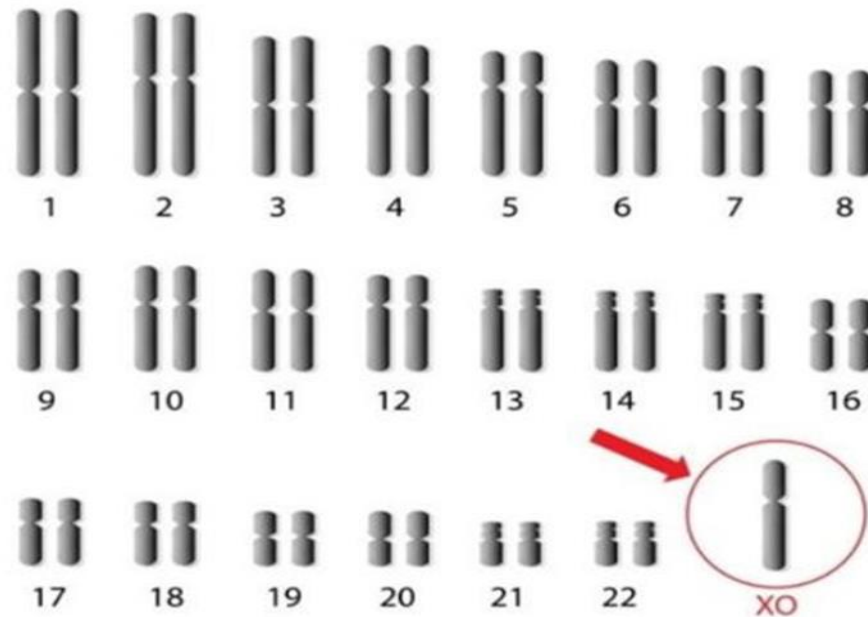


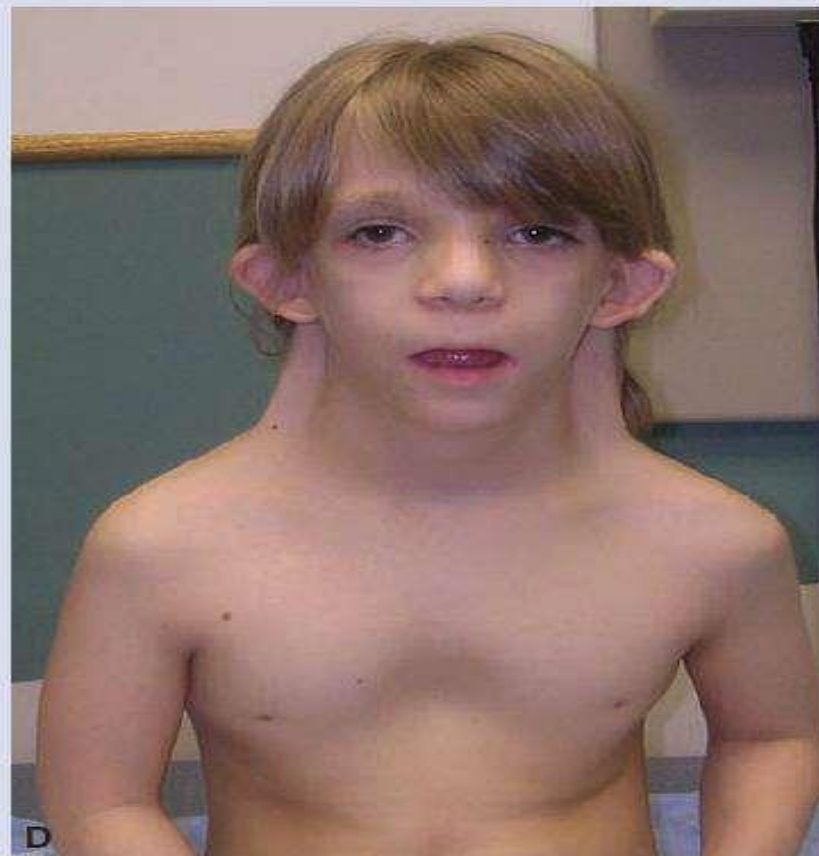
Numerical chromosomal mutation

It means mutations that lead to an *
increase or decrease in the number of
chromosomes, not their structure, and
can be divided, depending on the variable
number, into:

1- Chromosome decrease occurs when
the female loses one of the sex
chromosomes number 23 (45X) Turner
syndrome

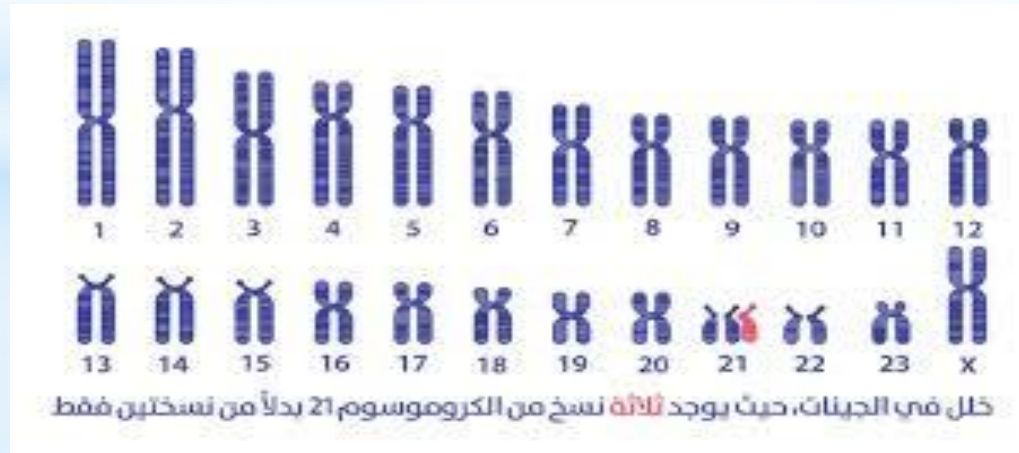
Turner syndrome*

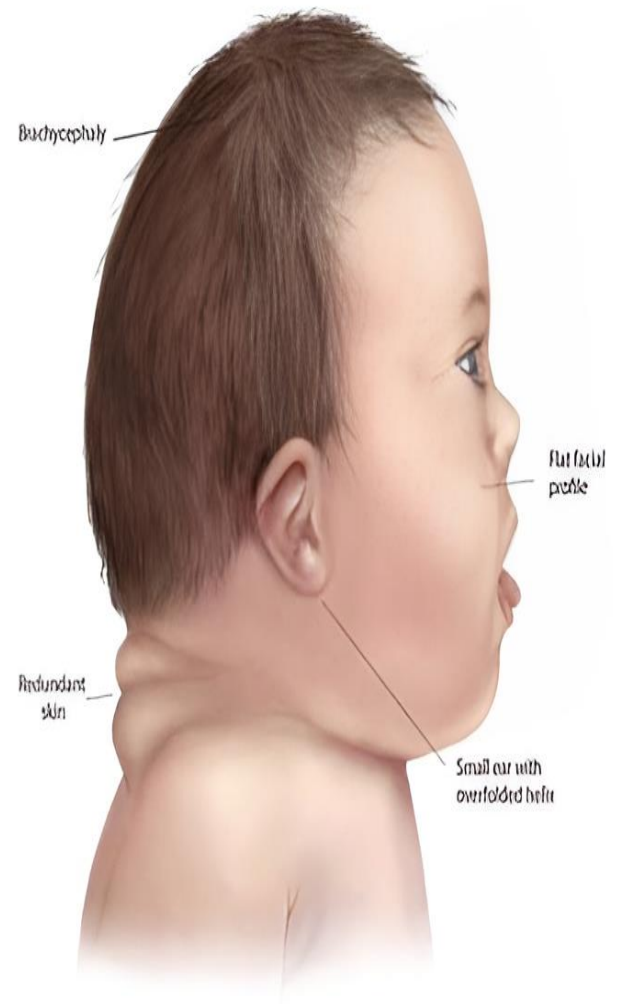
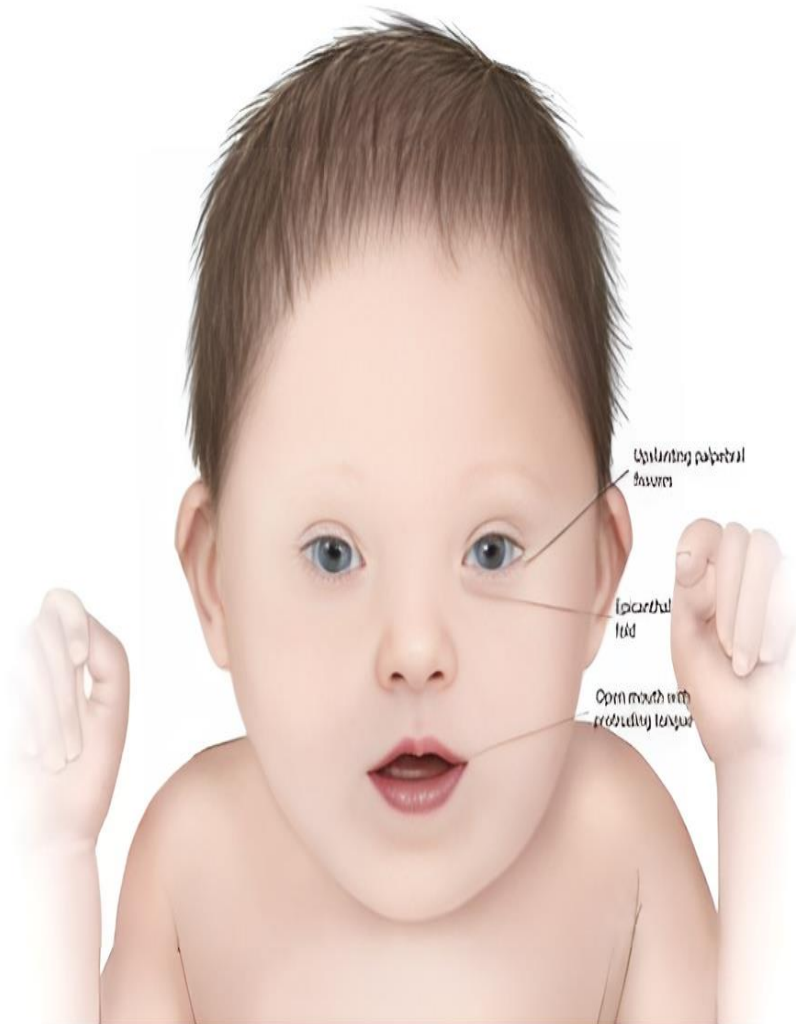




Down syndrome*

2- An increase in one chromosome is called a triple condition, as in Down syndrome (Mongolian), where an increase in body chromosome number 21 (47) occurs **Down syndrome**





Klinefelter syndrome *

3- An increase in the X sex chromosome 23 found in males, as in Klinefelter syndrome (47XXY)

