

**Ministry of Higher Education**  
**Al-Mustaqbal university collage**  
**Intelligent of Medical Systems Department**



# **Bioinformatics/Practical**

## **Lecture (1)**

### **Human Karyotypes**

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## Human Karyotyping

A karyotype is an individual's complete set of chromosomes. The term also refers to a laboratory-produced image of a person's chromosomes isolated from an individual cell and arranged in numerical order. A karyotype may be used to look for abnormalities in chromosome number or structure.

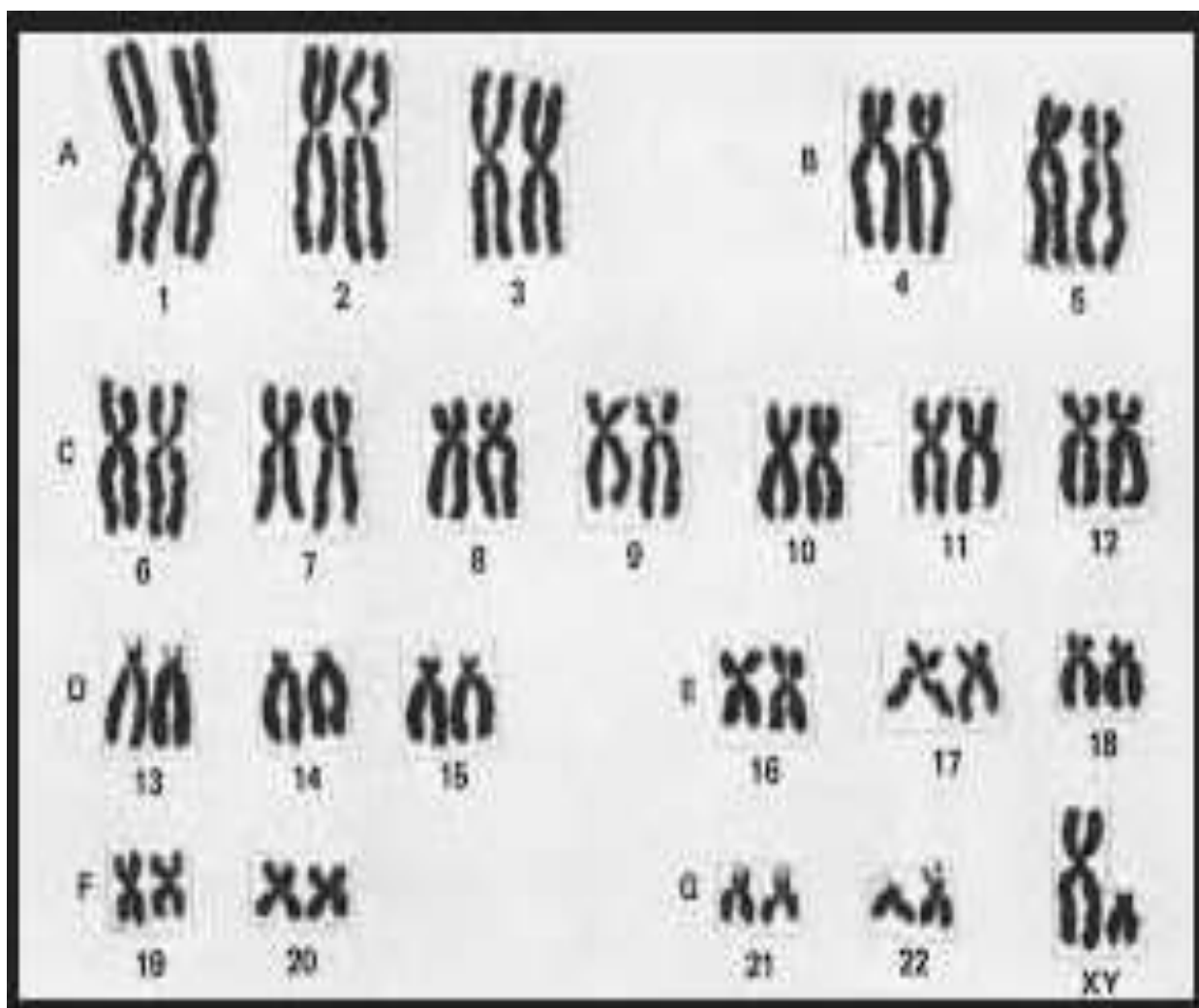


Figure (1). Human karyotype.

To make a karyotype, scientists take a picture of the chromosomes from one cell, cut them out, and arrange them using size, banding pattern, and centromere positions as guides.

### **Karyotype benefit**

1. Karyotype describes the amount of chromosome count and morphology of an organism under the light microscope.
2. The study of karyotypes is part of cytogenetic studies.
3. Studies of chromosomal iterations in prenatal diagnostics or tumor studies.
4. To understand cellular function, taxonomic relationships, and providing information about past evolutionary events.

### **Autosomes and Sex Chromosomes**

The typical human karyotype contains 22 pairs of autosomal chromosomes and one pair of sex chromosomes. The most common karyotypes for a female contain two X chromosomes and are denoted for the sex XX. Males usually have both an X and a Y chromosome, denoted for the sex XY.

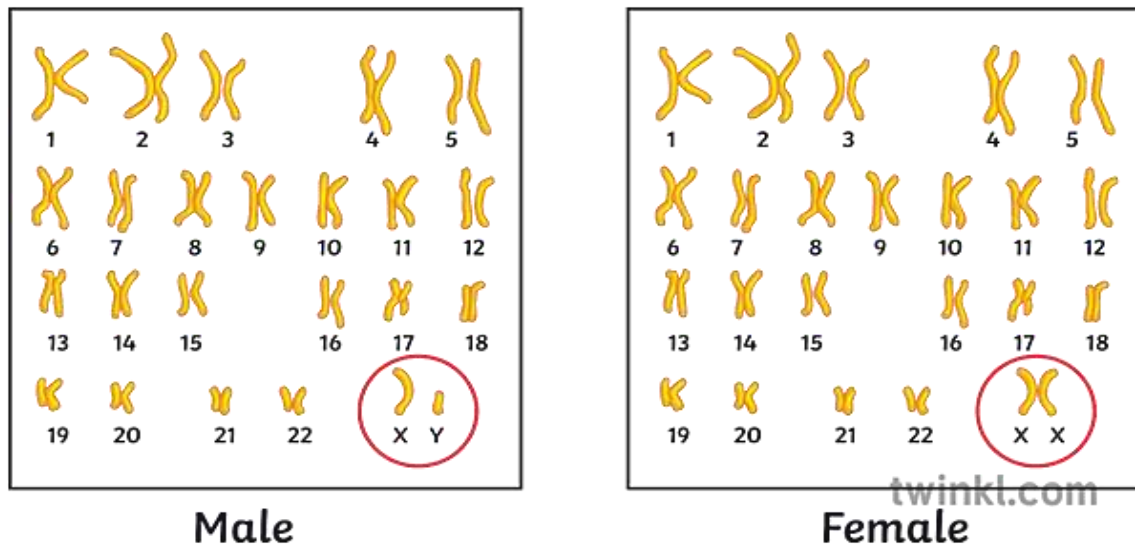


Figure (2). Male and Female karyotype.

### An example of a chromosomal abnormality

Babies with Down syndrome have an extra copy of one of these chromosomes, chromosome 21. A medical term for having an extra copy of a chromosome is 'trisomy.' Down syndrome is also referred to as Trisomy 21.

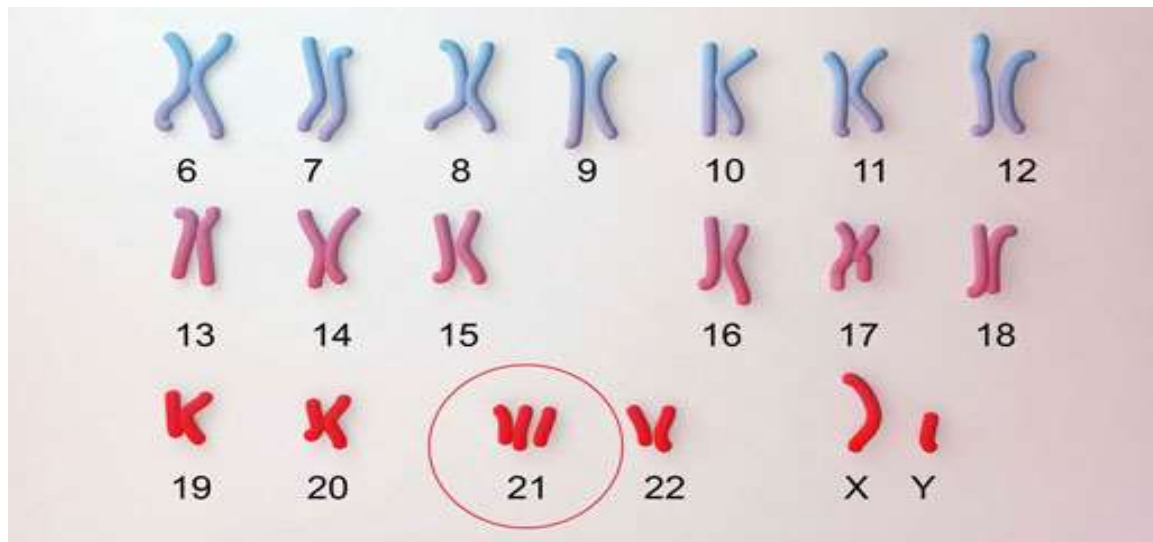


Figure (3). Dawn syndrome.