

Abnormal Meiosis

Syndromes

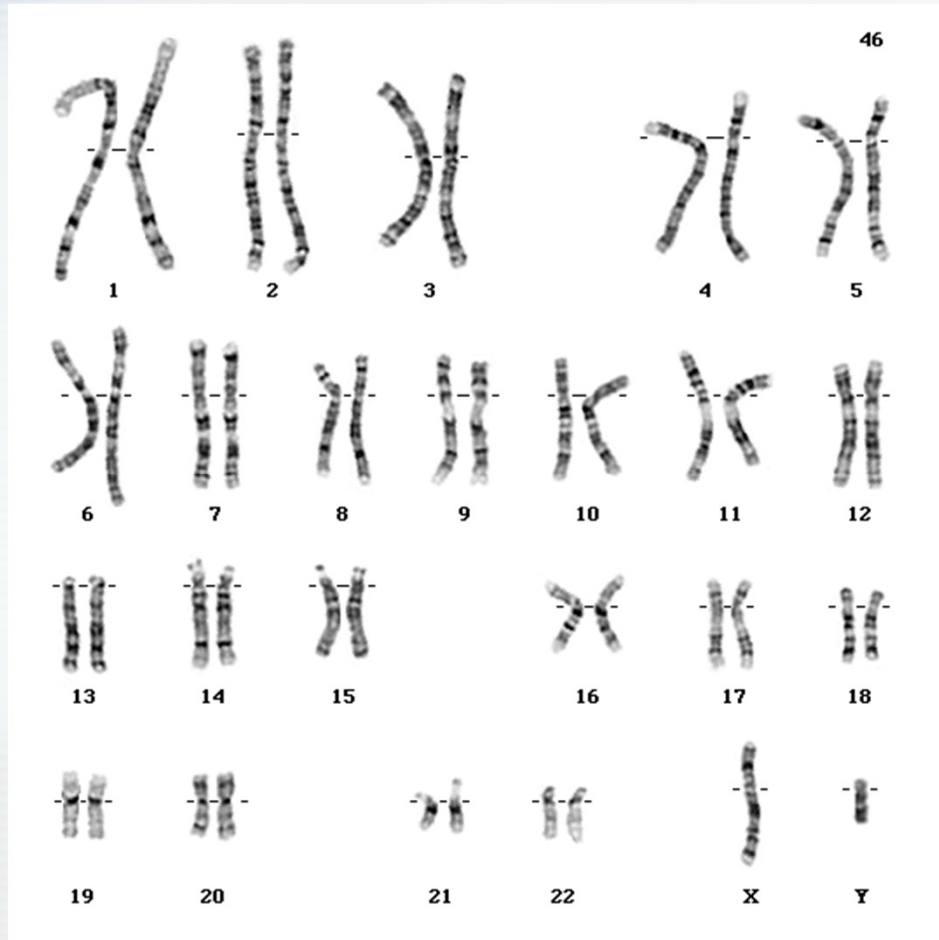
Learner Outcomes:

- **Describe the process of crossing over and non-disjunction and evaluate their significance to organism inheritance and development**

Abnormal Meiosis

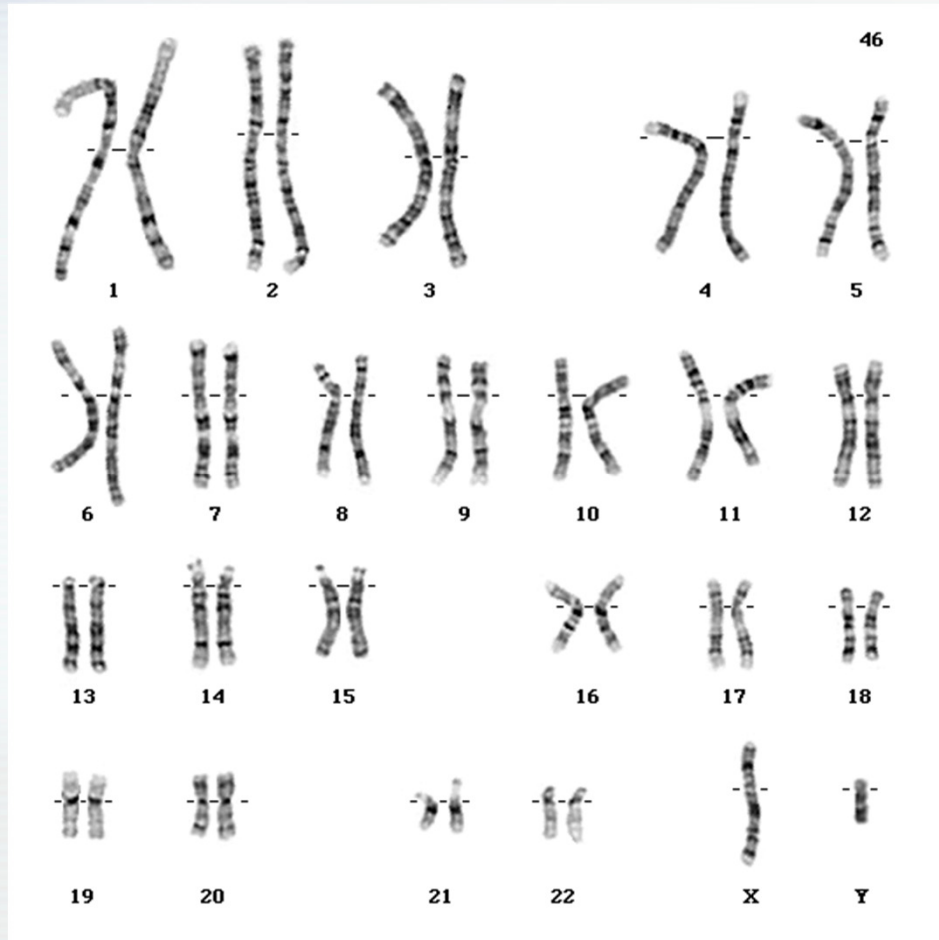
- **Non-disjunction:**
 - when homologous chromosomes do not separate (segregate) during meiosis I
 - When sister chromatids do not separate during meiosis II
- **Trisomy: Having an extra chromosome**
- **Monosomy: having only one of a particular chromosome**

Karyotyping



- **A chart of chromosomes put together by a clinical geneticist**
 - **Based on chromosome size**
 - **Based on chromosome banding pattern**

Karyotyping

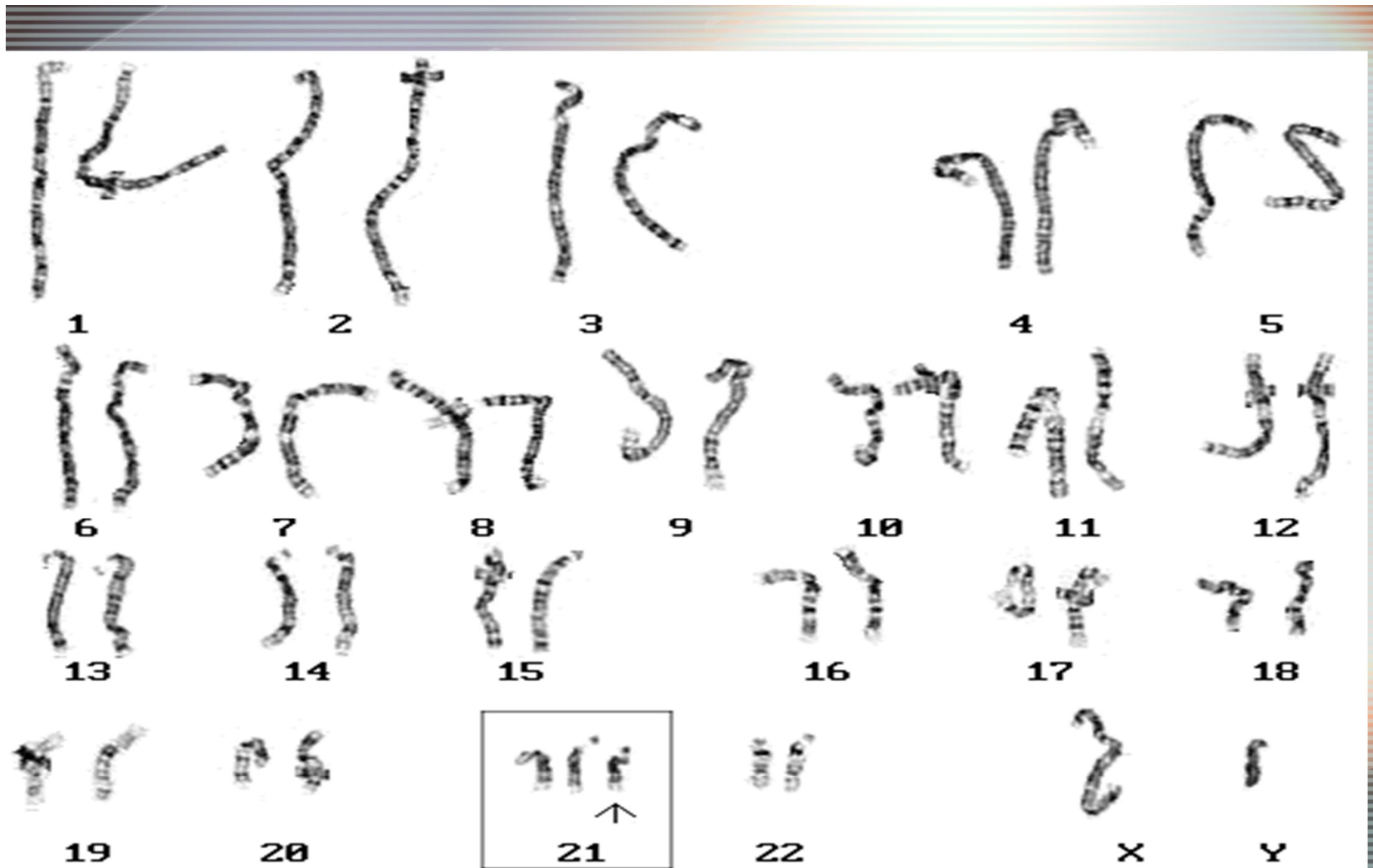


- **Humans have 22 pairs of *AUTOSOMES***
 - **Chromosome not involved in sex differentiation**
- **And 1 pair of sex chromosomes**
 - **Either XX or XY**

Downs Syndrome

- **1/750 live births**
- **Trisomy 21**
- **Characteristics:**
 - **round face**
 - **large creased tongue**
 - **shorter in height**
 - **large forehead**
 - **varying degrees of mental retardation**
- **Chance of Down's syndrome increases as a woman ages**

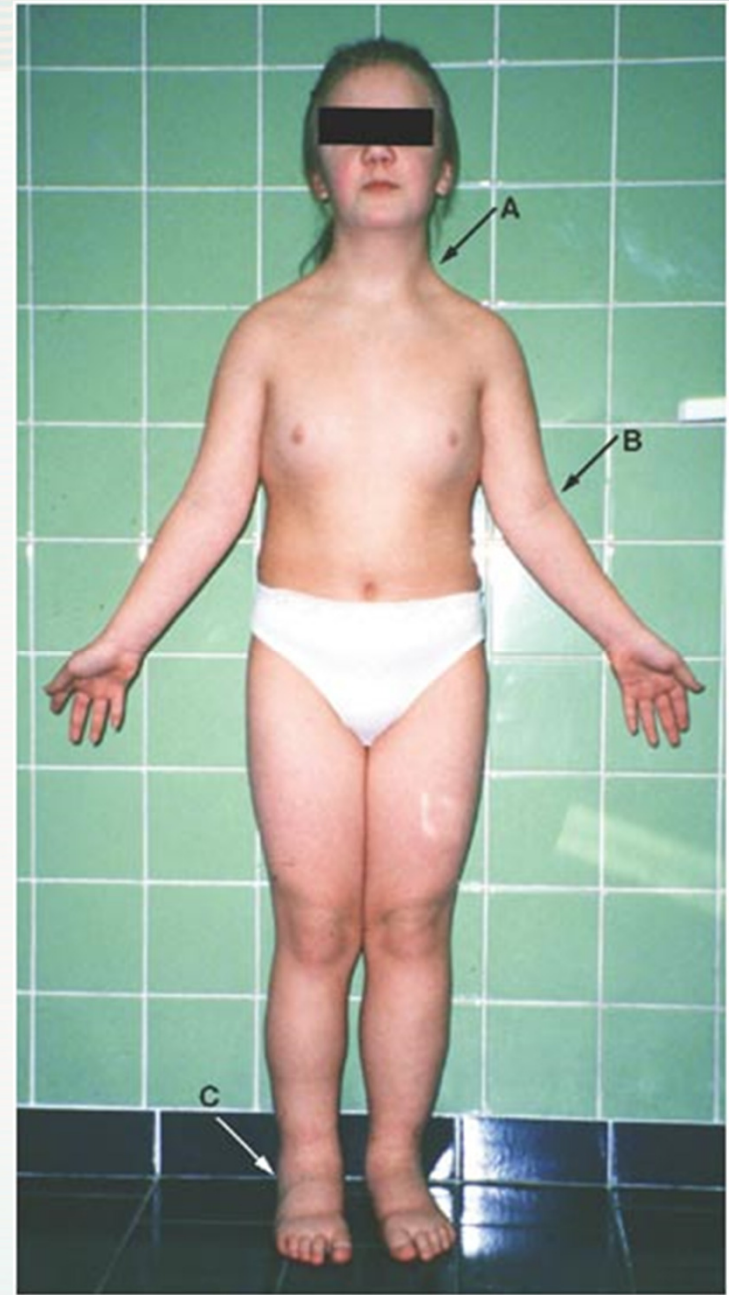


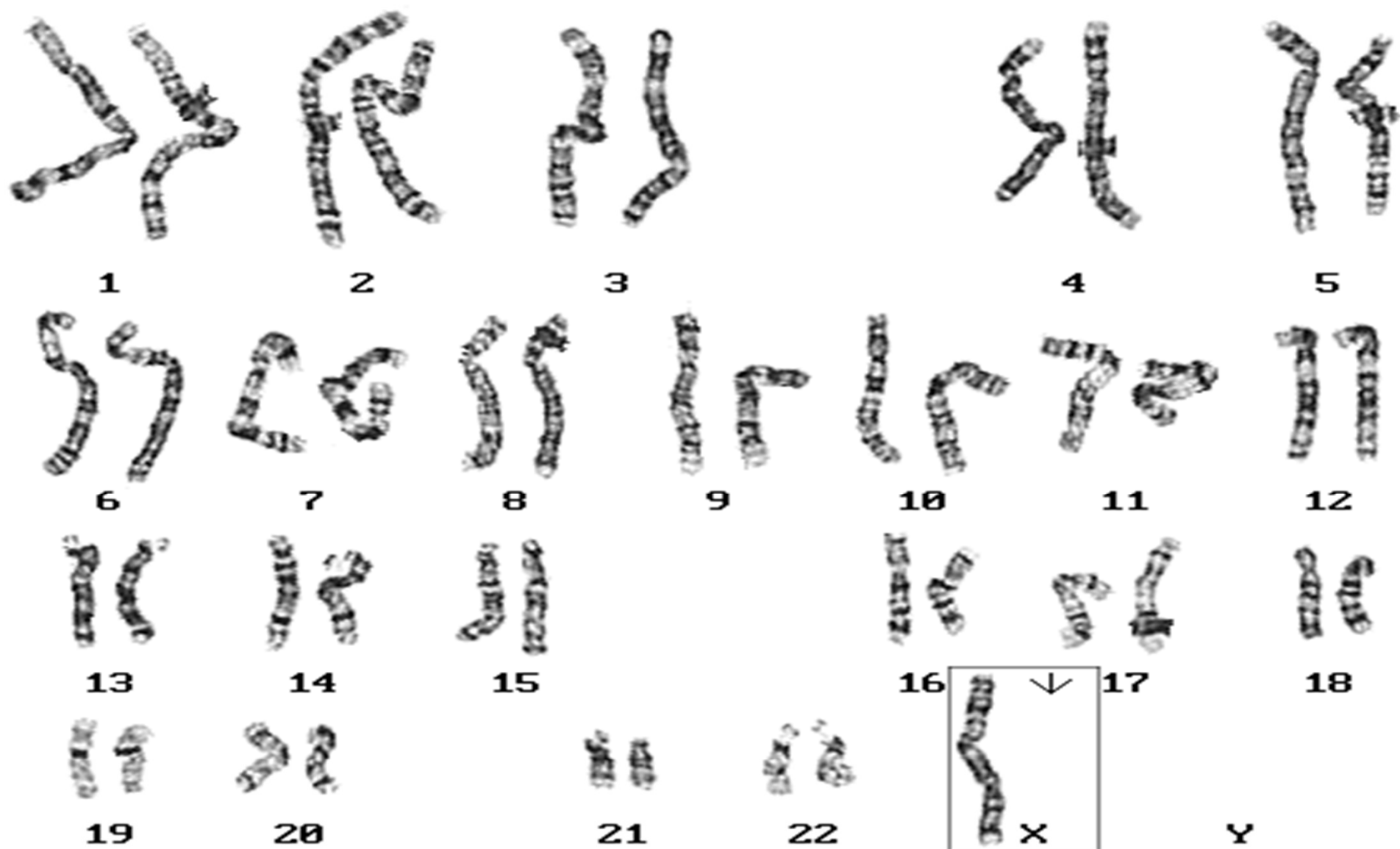


Karyotype: 47,XY,+21

Turner's Syndrome (X₀)

- Affects x-chromosome (single x chromosome)
- 1/5000 live born females
- Most turner fetus' miscarry in 20th week
- Can live relatively normal lives
- **Characteristics:**
 - abnormal sexual development
 - short
 - widening of neck
 - IQ close to normal

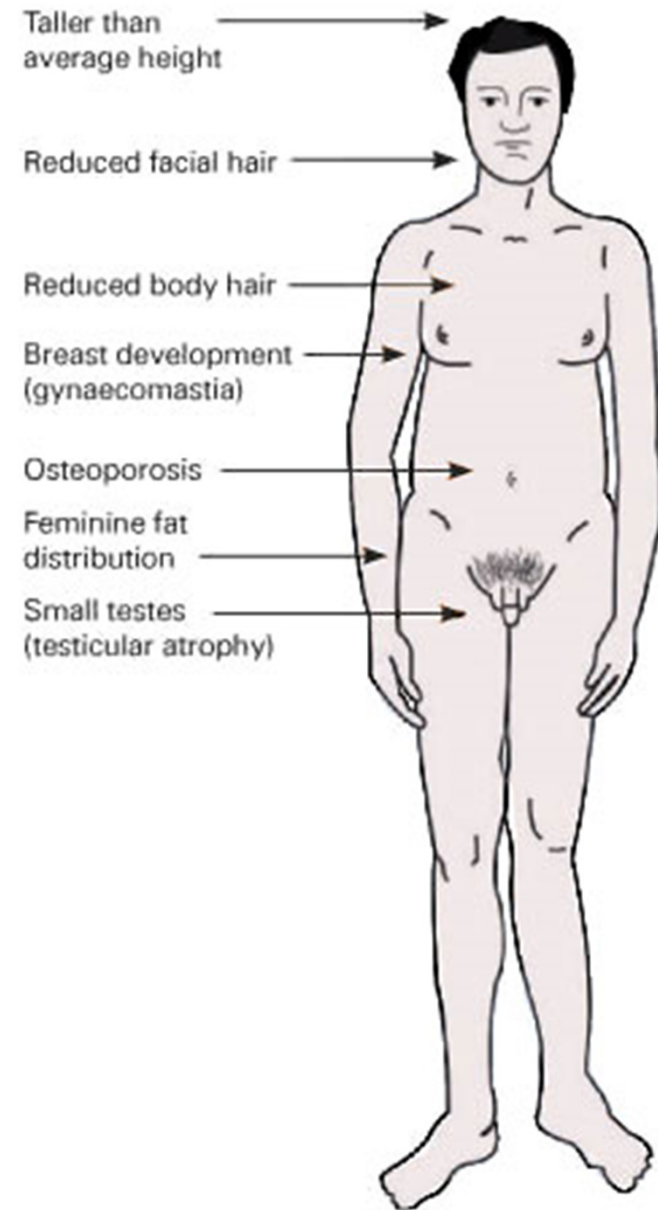


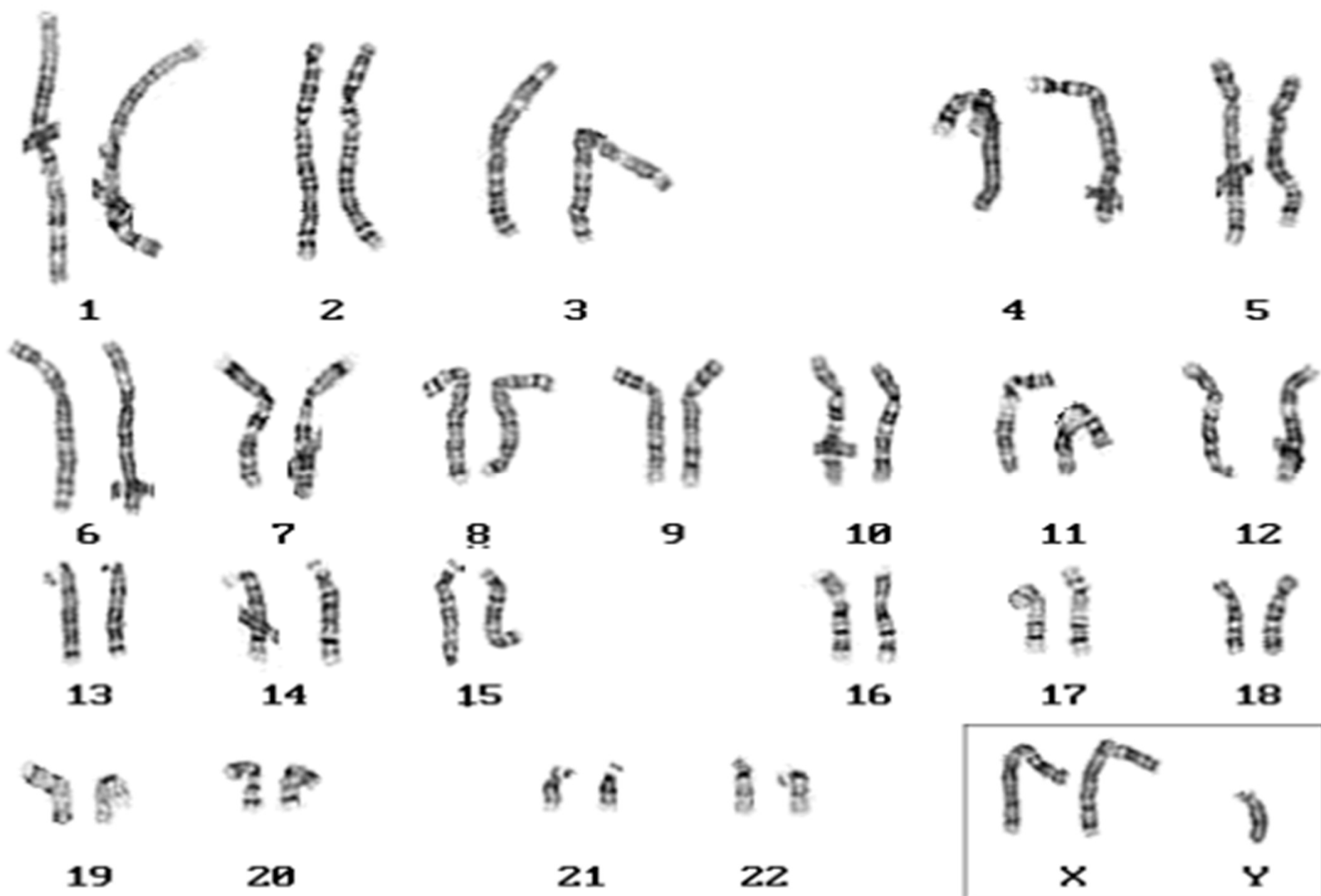


Karyotype: 45,X

Klinefelters (XXY)

- **1/1000 live born males**
- **Appear normal at birth**
- **Characteristics:**
 - long arms
 - long legs
 - tall for their age
 - sterile (no sperm)



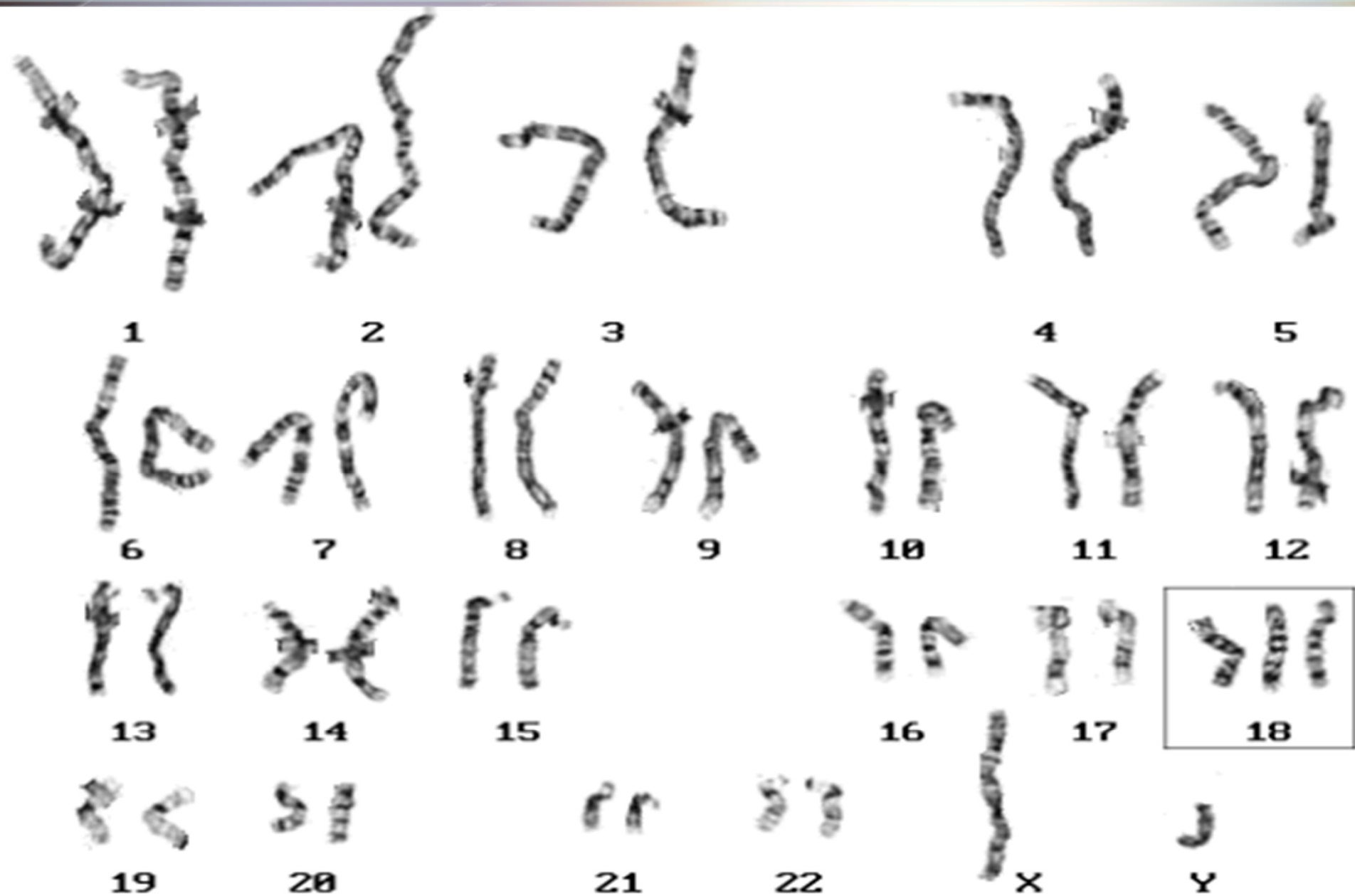


Karyotype: 47,XXY

Edward's Syndrome

- **1/6500 live births**
- **Trisomy 18**
- **Greater risk as woman ages**
- **Characteristics:**
 - **severe physical and mental retardation**
 - **Low set, pointed ears**
 - **Heart defects**
 - **Life expectancy 3-9 months**



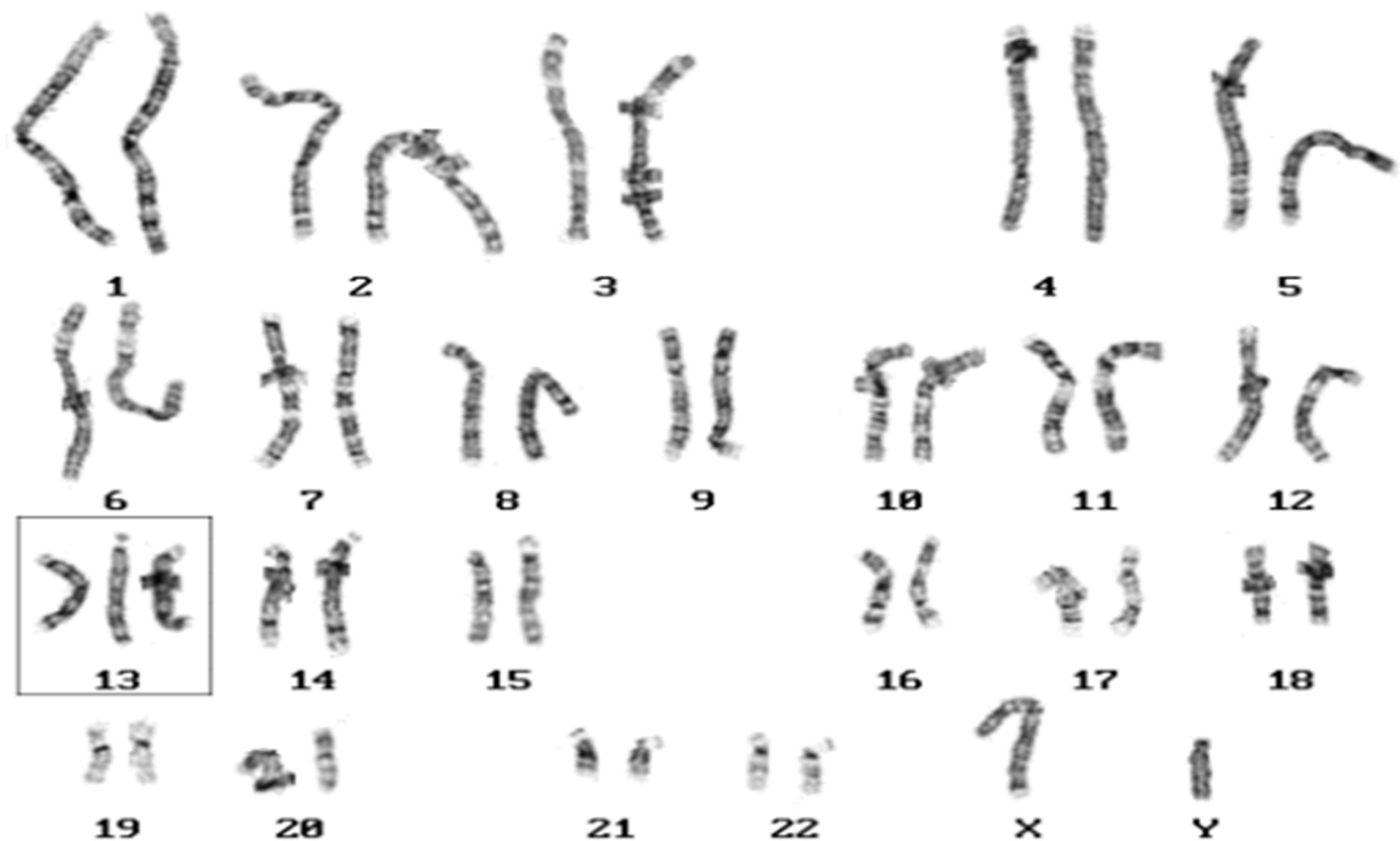


Karyotype: 47,XY,+18

Patau's Syndrome

- **Trisomy 13**
- **1/5000 live births**
- **Characteristics:**
 - **Small skull**
 - **Deaf**
 - **Cleft palate**
 - **Extra digits**
 - **Heart defects**
 - **Life expectancy: 3-4 months**

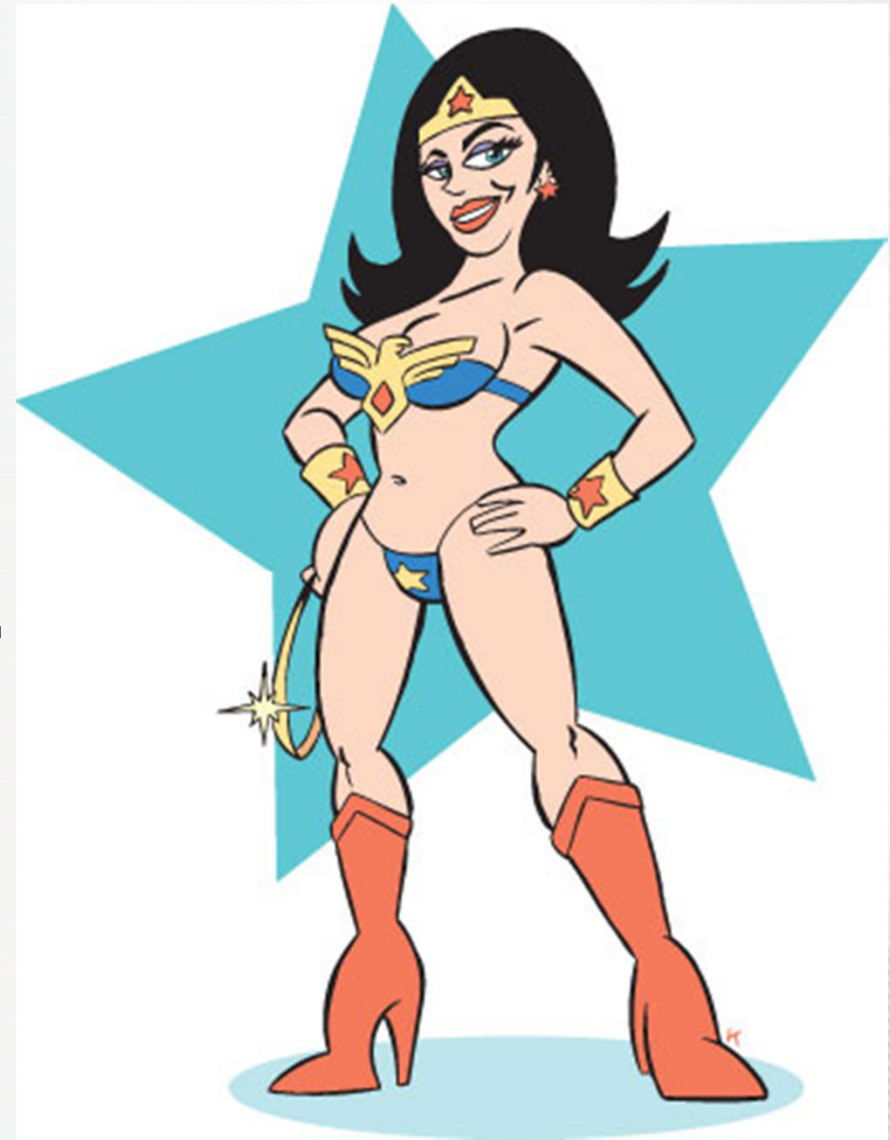


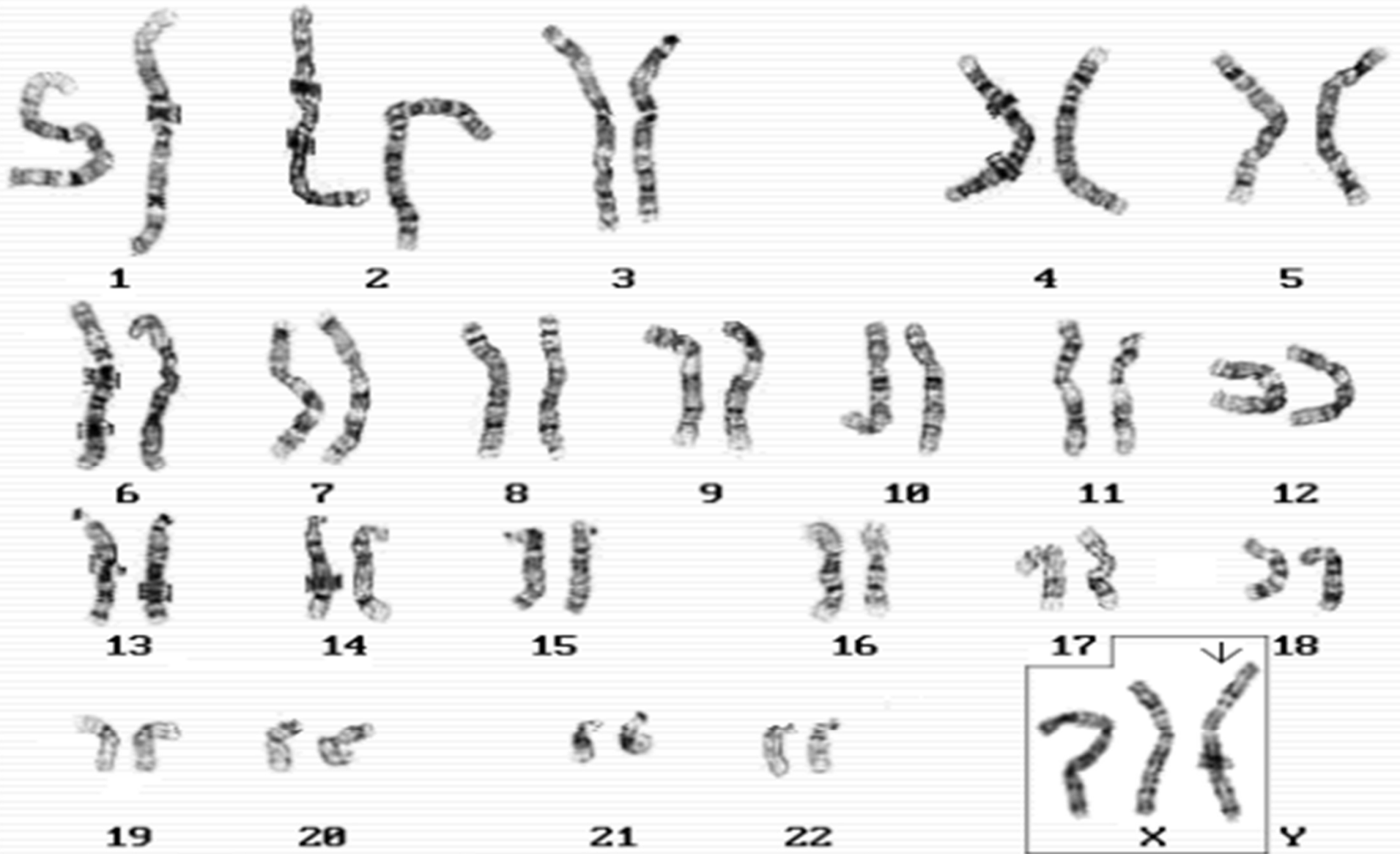


Karyotype: 47,XY,+13

Trisomy X

- **Super female**
- **1/950 live births**
- **Characteristics:**
 - appear physically normal
 - usually able to bear children
 - severe menstrual irregularities
 - normal IQ

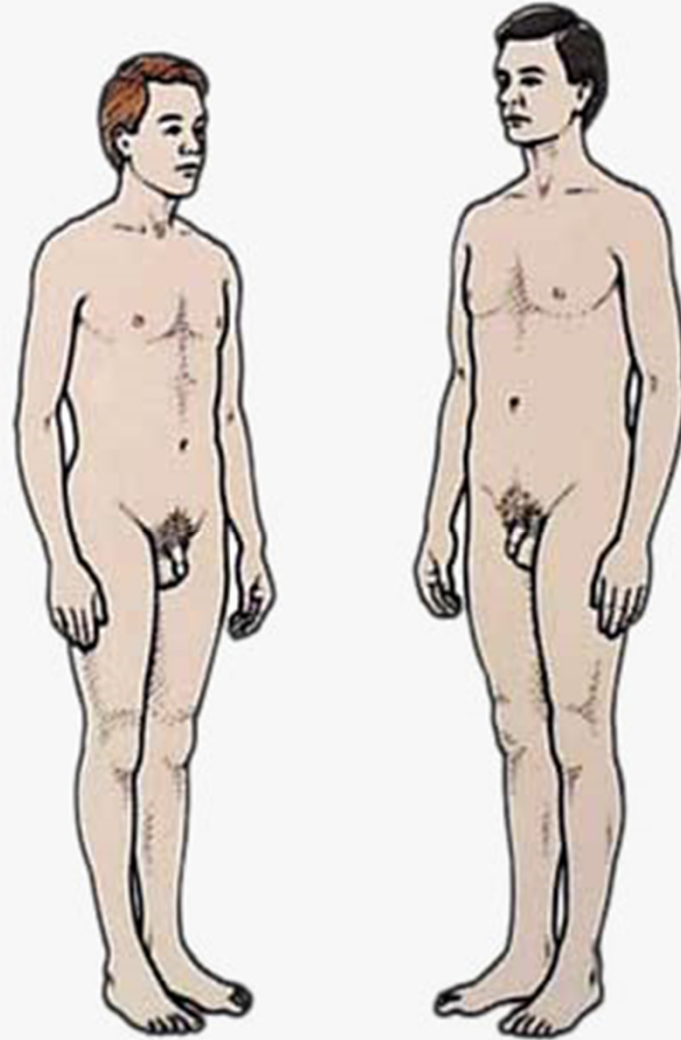


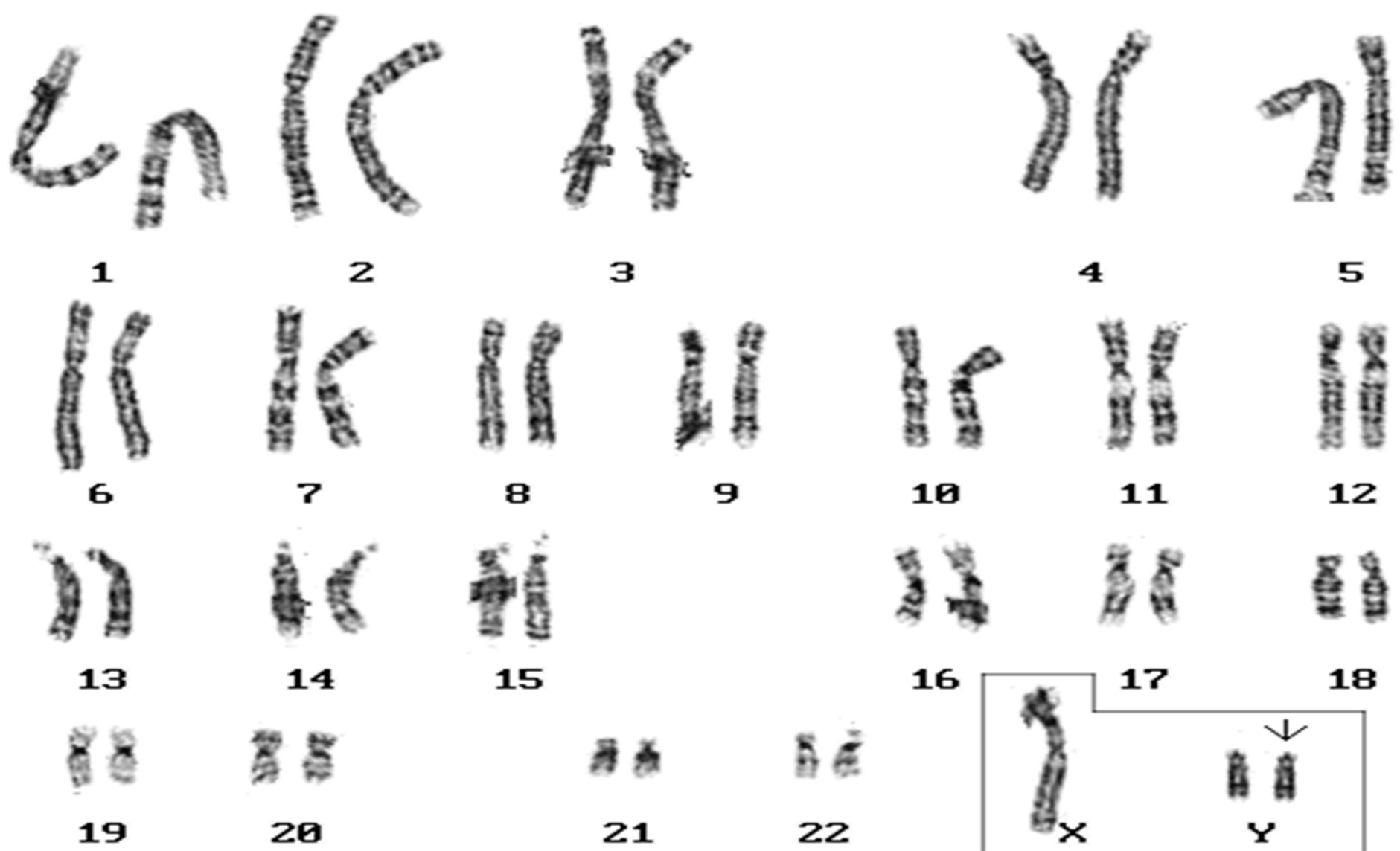


Karyotype: 47,XXX

Double Y Syndrome

- **Males (XYY)**
- **1/950 live births**
- **Characteristics:**
 - **fertile**
 - **taller**
 - **normal to slightly below normal IQ**





Karyotype: 47,XYY

Learner Outcomes: *computers*

- **Use prepared slides of onion root tip cells to identify the stages of a cell cycle and calculate duration of each stage**
- **Prepare and interpret models of human karyotypes by using hard-copy or online resources**
- **Compare the processes of mitosis and meiosis.**