

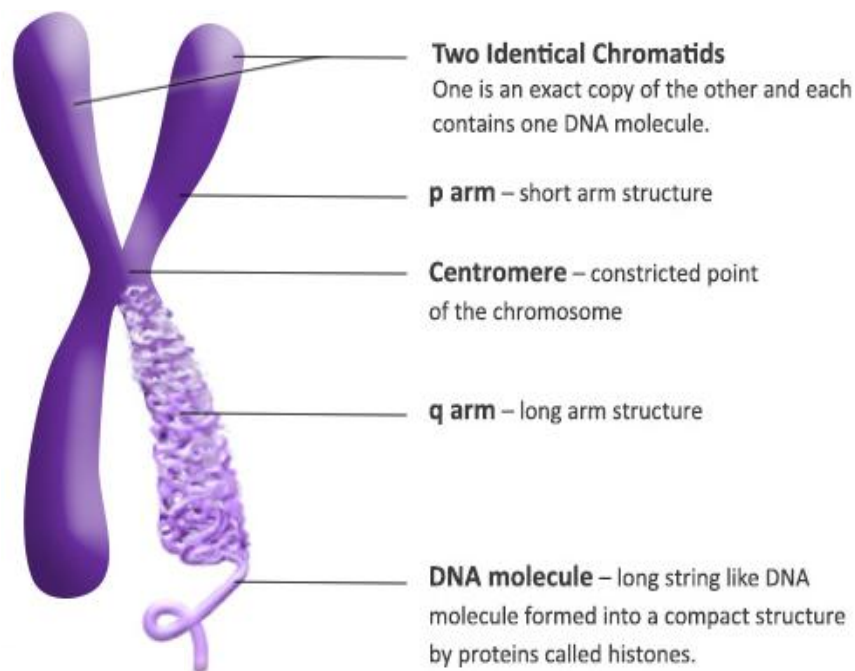


- Humans have 46 chromosomes in their cells:

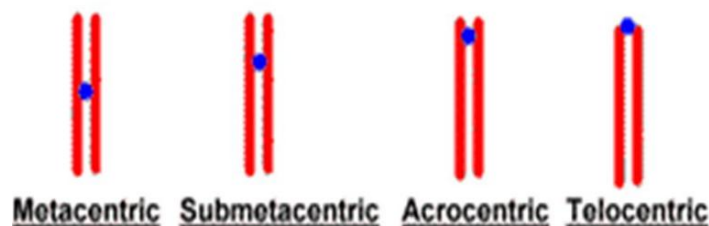
- 22 pairs of these are somatic chromosomes.
- While 1 pair is considered to be sex chromosomes (XX in females; XY in males).

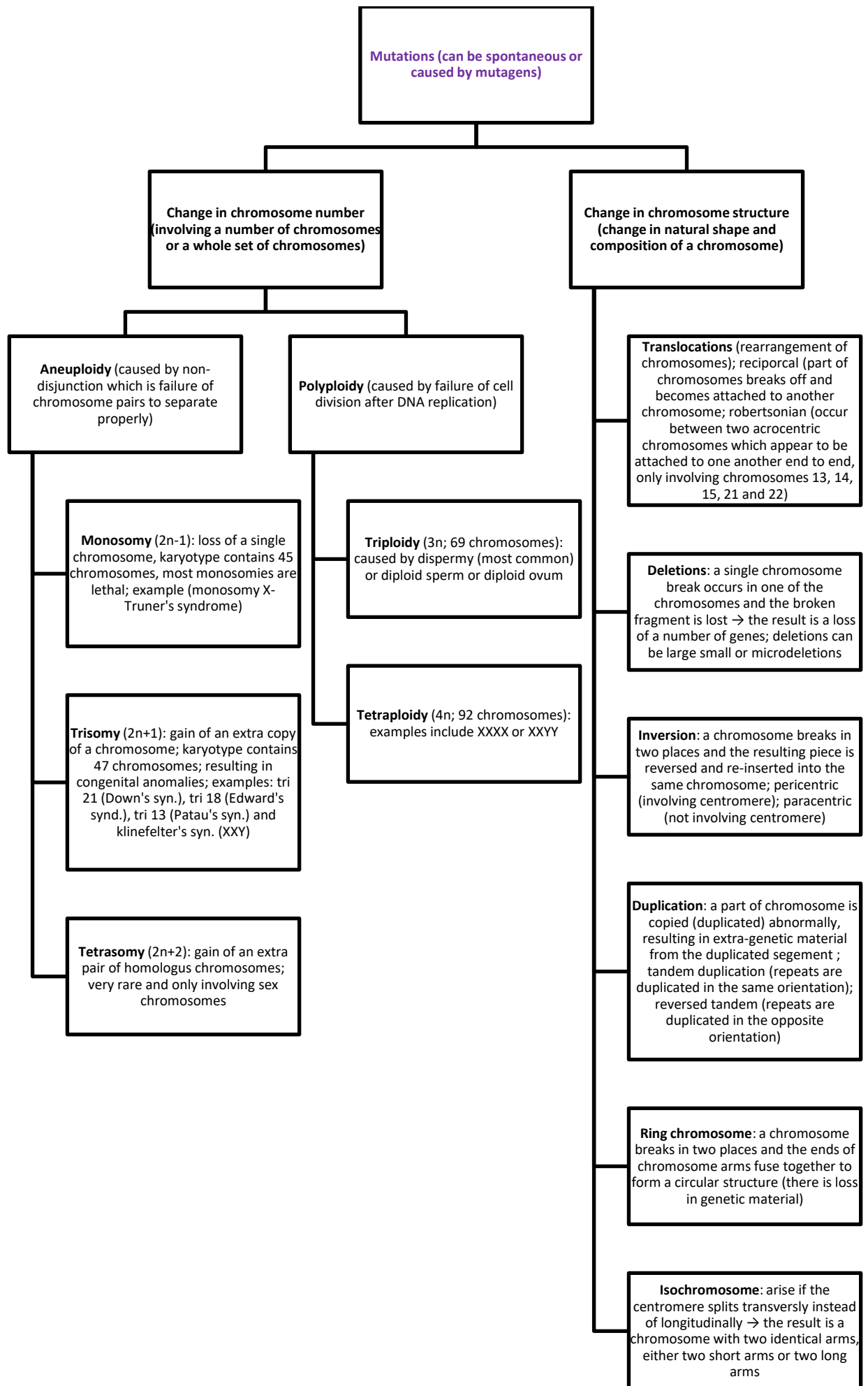
- Structure of the chromosome:

- Each chromosome consists of 2 sister chromatids joined at the center by centromere. Notice that each chromatid contains the complete set of genes.
- The centromere is the site at which the kinetochore attach to the spindle fibers (allows each copy to be pulled to the new cell which is being formed).
- **The chromosome has two arms:**
 - ✓ Short arm (p).
 - ✓ Long arm (q).
- **Telomeres:** are regions of repetitive nucleotide DNA sequences at each end of a chromosome. They are considered to be specialized structures which cap chromosomal ends (why?):
 - ✓ Protect chromosomes from end-to-end fusion, recombination and degradation.
- **Chromatin:** nucleosome (50% DNA coiled around histones and 50% of proteins).
- **How are chromosomes formed?**
 - ✓ Double helix DNA will wrap around histones to form nucleosomes → each six nucleosomes will give you one chromatin fiber → which will form what is known as scaffold → and then scaffolds will form loops of chromatid → that eventually will give you two sister chromatids.

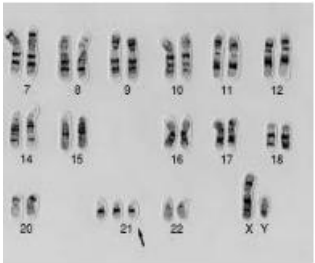
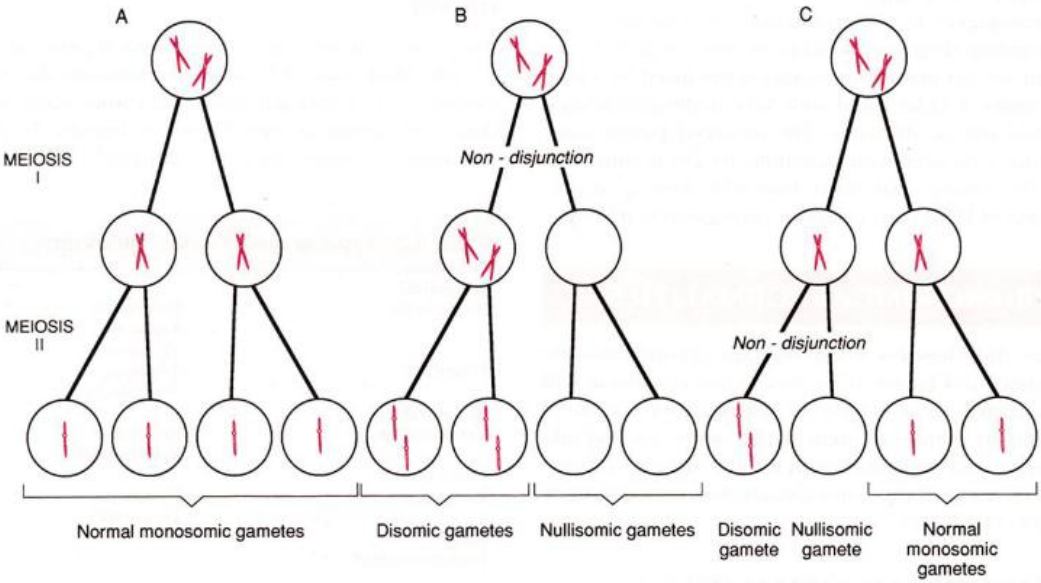


Centromeric position and arm length

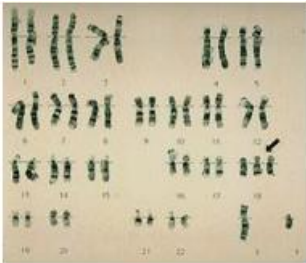




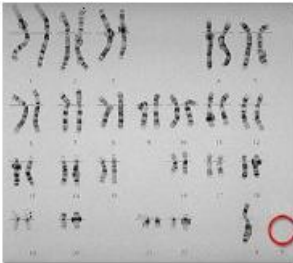
Non-disjunction during meiosis



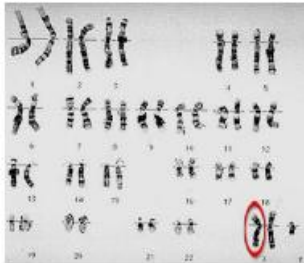
Down's syndrome



Edward's syndrome



Turner's syndrome



Klinefelter's syndrome