

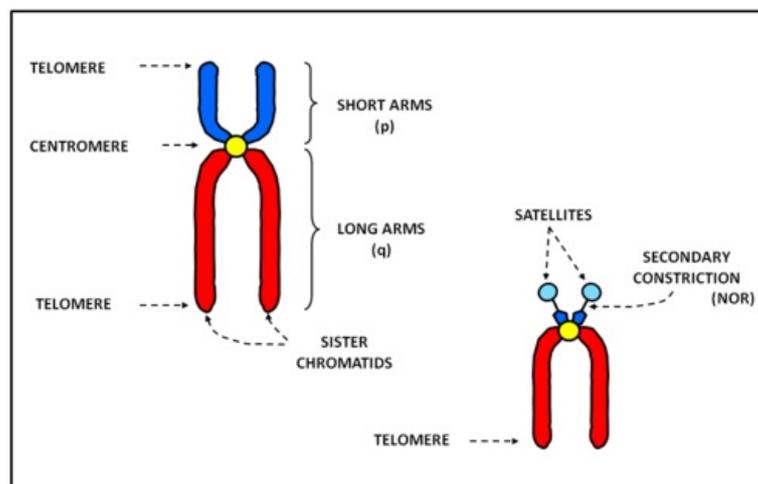
# Structure and types of the eukaryotic chromosomes

**Chromosome** = DNA molecule + proteins; in interphase decondensed in tiny fibers, during mitosis condensed in visible particles (metaphase chromosomes in light microscope)

## Chromosome condensation (multilevel spiralisation)

- interaction with different types of proteins
- shortening of chromosome 50 000x in mitosis
- nucleosome fiber („beads on a string“, 11 nm in diameter) - nucleosome core of 8 histone molecules (2xH2A, 2xH2B, 2xH3, 2xH4), DNA turns around in one and  $\frac{3}{4}$  loops and is fixed by histone H1
- solenoid - 6 nucleosomes per one turn; solenoid loops form chromatin fiber (diameter 30 nm)
- chromatin fiber loops are attached to the protein scaffold (300 nm in diameter) and the whole structure is again spiralsised (700 nm in diameter) with different density along the chromosome
- metaphase chromosome consists of two sister chromatids (total diameter 1400 nm)

## Structure of eukaryotic chromosomes



## Chromosome types

- **metacentric** (mediocentric) - centromere in the middle of the chromosome length
- **submetacentric** - centromere divides chromosome into short (p) and long arms (q)
- **acrocentric** - very short p-arms, secondary constriction (NOR - nucleolar organizing region with many copies of rRNA genes) and terminal structure of satellites
- **telocentric** - only centromere and long arms; not in human beings, typical for example for mice and rats
- **holocentric** - multiple sites of attachment to the spindle along the chromosome; in insects or worms.

## Links

## Related articles

- Eukaryotic Chromosomes