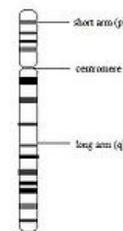


# Eukaryotic Chromosomes

The **eukaryotic chromosomes** are more complicated than prokaryotic. They encode more information (coding and non-coding parts) so we recognize bigger count of chromosomes in Eukaryota. Their count depends on the evolution of the species. But their structure is pretty similar.

DNA contains millions and millions of nucleotides and it is necessary *to compress* them. In eukaryotic chromosomes we recognize a process similar to supercoiling in Prokaryota. This is made possible by special proteins - **histones** - which packed the DNA strand. Complex of DNA and these proteins is called **chromatin**.

DNA is turning around the histones. Sometimes it is said that it looks like the **beads on a string**. This is a principle, which allows to get so long DNA strand (human DNA has more than 2 metres) into the cell and chromosomes.



Chromosome structure

## Structure of Chromosomes

We recognize few parts of chromosomes. But it is necessary to say, that the shape of the chromosomes is changing during the cell division. The classic shape which is well-known is typical just for the short part of the division - for **mitosis**, especially its metaphase. In this phase the chromosomes are the most compact. During the interphase they are pretty hackney and they look like very long and thin fiber.

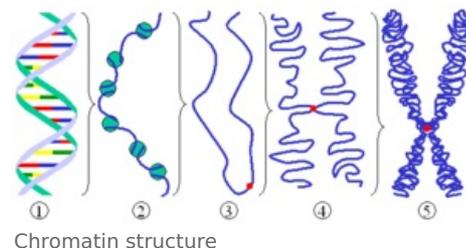


Karyotype

Compact chromosome has *3 main parts*. Centromere and two arms:

### Centromere

- is a middle part that connects both arms together. It is very important also during cell division because it is the place where kinetochore is binding. It is a very important complex which binds a mitotic spindle. All of this serves to the separation of chromosomes.



Chromatin structure

### Short and long arms

- *short arm* of the chromosome is also marked by letter **(p)**, according to French "*petit*" (means small)
- *long arm* of the chromosome is marked by **(q)** - according to the letter which follows (p)
- the terminal parts of arms have their own name - they are called **telomeres**

## Sorting of Chromosomes

Chromosomes are normally *colorless* but we are able to dye them (Giemsa dye). Then we get the picture of striped chromosomes. Why? The dye binds more to parts which are rich of *adenin* (A) and *thymine* (T) bases. This should be very useful for scientists who are looking for some chromosomal abnormalities. The shift of some segments is connected with the change of banding.

We should recognize individual chromosome also in another way - with the **fluorescent** colors. We should choose a different color for specific parts of the chromosome. Then each pair of homologous chromosome is getting different color. Then it is very easy to sort them.

## Links

### Related articles

- Prokaryotic Chromosomes
- Histone
- Chromatin
- DNA
- Mitosis
- Human Chromosomes (Karyotype)

## Bibliography

- ALBERTS,, et al. *Základy buněčné biologie*. 2.vydání edition. 1998. ISBN 80-902906-2-0.

