

Chromosome Forms

Many terms are used to refer to different groupings and organizations of chromosomes during cell replication and division. Humans expectedly have 22 pairs of autosomes and 1 pair of sex chromosomes. A chromosome is the condensed form of chromatin, which is DNA wound around histones. One chromatid can be referred to as a chromosome. Sister chromatids consist of an original chromatid and its copy joined at the centromere, and are present in meiosis I and mitosis. Homologous recombination occurs when two chromosomes (two sister chromatid pairs; four chromatids total) group together during meiosis I. They code for the same genes but have different alleles, leading to variation in offspring. Finally, the tetrad is a formation where two homologous chromosomes overlap, and it is named because of the four chromatids in close proximity. This form occurs in meiosis I, during prophase, and is briefly seen in metaphase before the homologous chromosomes are separated.



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Characteristics

Chromosome

Chrome-chromosome

A chromosome is the condensed form of chromatin. Chromatin is DNA wound around histones. Humans expectedly have 23 pairs of chromosomes: 22 numbered pairs called autosomes and one pair of sex chromosomes labeled X and Y.

Sister Chromatids

Sister Chrome-kids

Sister chromatids consist of one chromatid and a replicated copy connected at the centromere. They are typically homozygous with similar traits but may have slight differences due to mutation or crossing over (meiosis I). They only exist during cell reproduction and division. During mitosis and meiosis II, sister chromatids are pulled apart into separate daughter cells.

Homologous Recombination

Home-of-logs Re-combination lock

Homologous recombination occurs during meiosis when genetic material from the egg and sperm are recombined, forming paired or homologous chromosomes. The homologous chromosome pairs code for the same genes at similar loci but have allelic variance as one chromosome is from the mother and the other from the father. During meiosis I, crossing over is an important point after recombination when the homologous chromosome synapses and exchanges genetic information, leading to variation of similar ancestral traits among offspring.

Tetrad

Tetris-chromosomes

The tetrad is formed by two chromosomes (each chromosome consisting of two sister chromatids) grouped together. It only occurs in meiosis I, as homologous chromosomes do not synapse in mitosis or meiosis II.