

Fig: Trihybrid cross and its result by forked line method.

A cross between two organisms differing in more than three pairs of contrasting characters is called polyhybrid cross. In case of genes increasing beyond three, the numbers of possible phenotypes and genotypes show exponential increase. In such cases, the rules of probability are to be applied. Probability implies the likelihood of the occurrence of event. The probability of simultaneous occurrence of two or more independent events is summation of the probability of their occurrence as independent events. The types of gametes of F₁ and kinds of genotypes, phenotypes in F₂ and their ratios may be predicted in polyhybrid cross according to the Table.

❖ **2. CHROMOSOMAL BASIS OF MENDEL'S LAWS:**

Sutton and Boveri (1902-1904) formulated Chromosome Theory of Mendelian inheritance in which they showed clearly that, the chromosomes exhibit a behaviour during meiosis and fertilization which is exactly parallel to the behaviour of Mendelian factors in segregation and recombination.

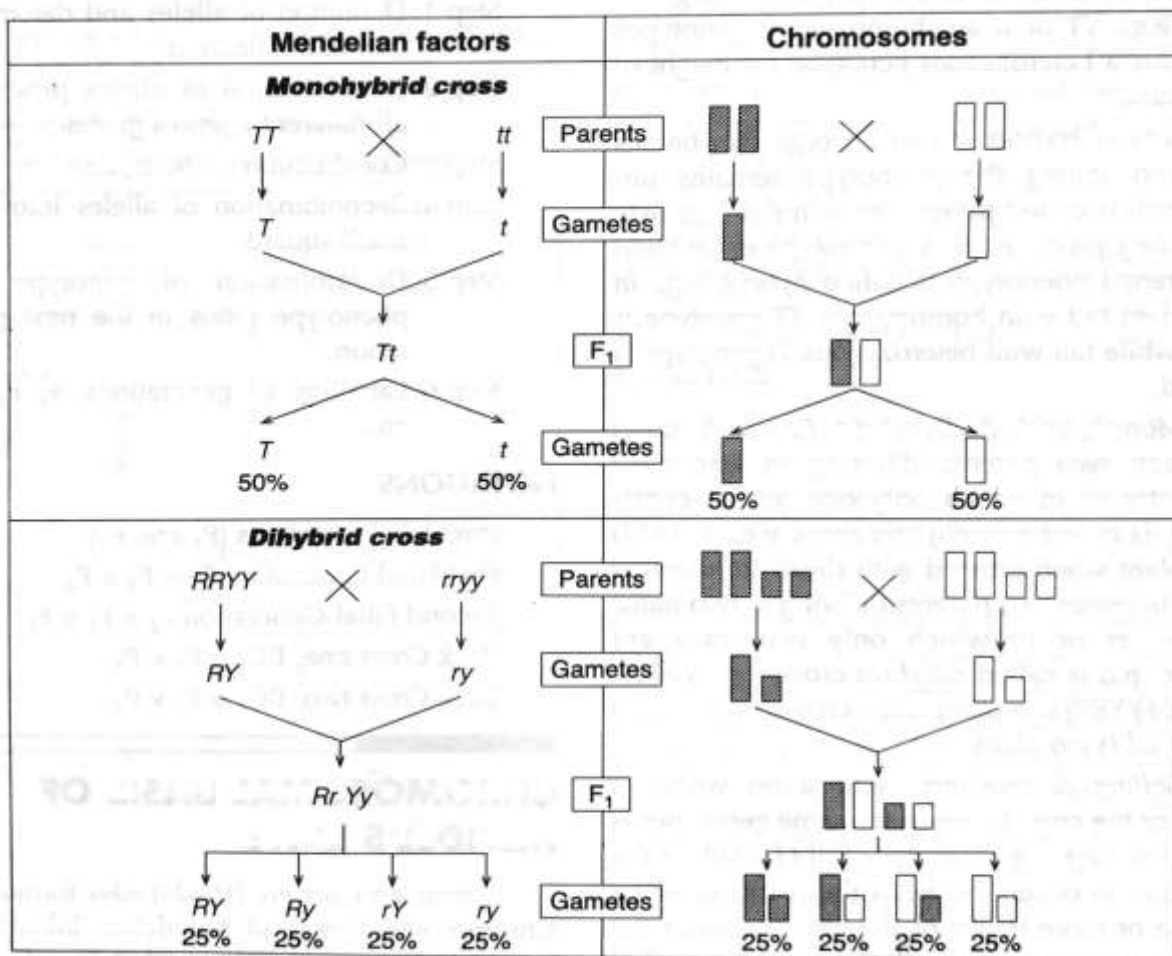


Fig: Parallelism between Mendelian factors and chromosomes.

In view of the existence of a complete parallelism between the behaviour of Mendelian factors and the behaviour of chromosomes in cell division, it is confirmed that Mendelian factors are located on chromosomes and chromosomes are the bearer of hereditary factors pendent of each other (Law of independent assortment).

Alleles are present in chromosomes and are transmitted from one generation to the next through them.

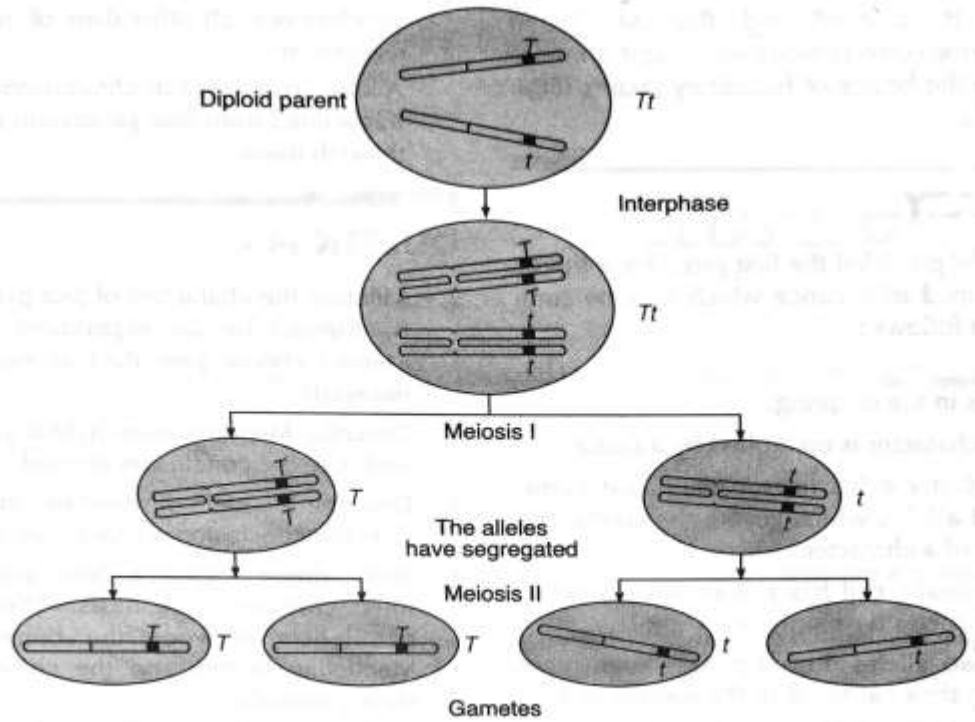


Fig: The inheritance of the *T* and *t* alleles explained in the light of meiosis. Image from Purves et al., Life: The Science of Biology, 4th Edition, by Sinauer Associates (www.sinauer.com) and WH Freeman (www.whfreeman.com), used with modification.

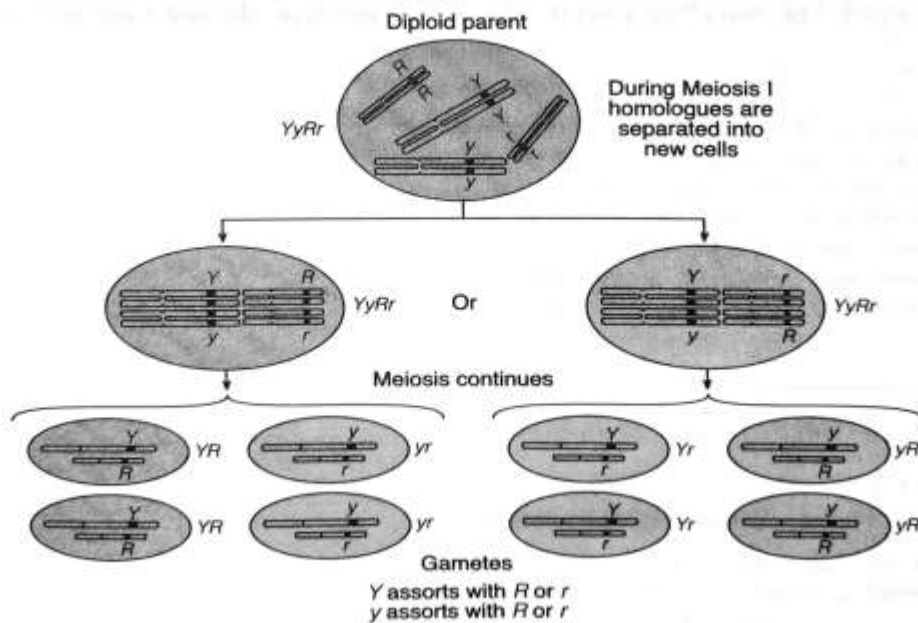


Fig: The inheritance of two traits on different chromosomes can be explained by meiosis. Image from Purves et al., Life : The Science of Biology, 4th Edition, by Sinauer Associates (www.sinauer.com) and WH Freeman (www.whfreeman.com), used with modification.



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(All the above mentioned information including the figures are collected from the above references and will be solely used for teaching and learning purposes).