

# Laws of inheritance-7

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10+2 BIOLOGY LAWS OF INHERITANCE-6 BARUN PRABHAT

## Chromosomal Theory of Inheritance

Mendel published his work on inheritance of characters in 1865 but it remained unrecognised till 1900.

Causes:

1. Firstly, lack of communication - due to this, his work could not be widely publicised
2. Secondly, concept of factors, or genes as stable and discrete units -
  - i. Stable - factors controlled the expression of phenotypes and,
  - ii. Discrete - pair of alleles 'blend' with each other

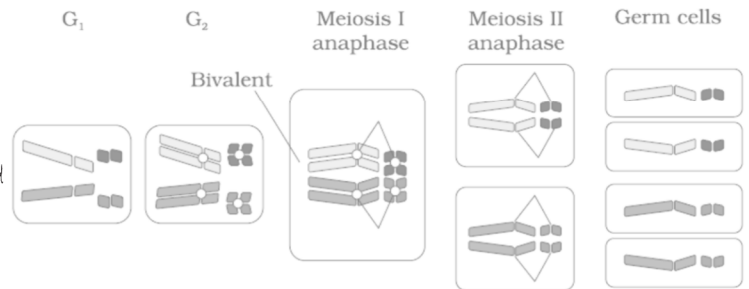
These concepts were not accepted by the then geneticists

3. Thirdly, Mendel's attitude of using mathematics in explaining biological phenomena was completely new and very uncommon which was insupportable for many of the then biologists.
4. Finally, Mendel's work suggested factors (genes) as discrete units, but he was not able to provide any physical proof for the existence of factors.

In 1900, three Scientists residing in different parts of the world reached similar conclusions and rediscovered Mendel's result independently. The three scientists were:

1. Hugo de Vries (Holland)
2. Carl Correns (Germany)
3. Eric von Tschermak (Austria)

These scientists independently rediscovered Mendel's results on the inheritance of characters.



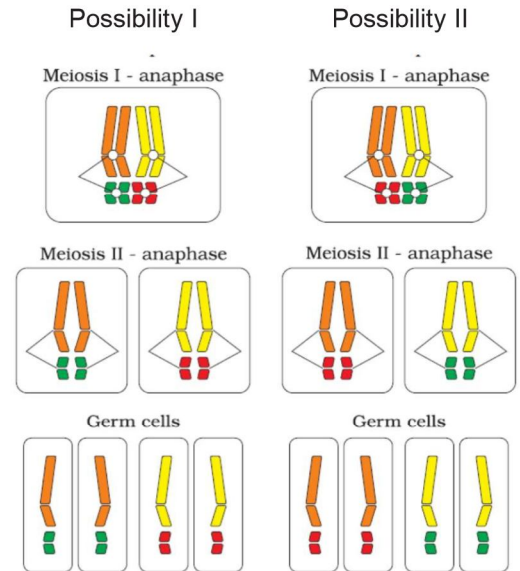
Walter Sutton & Theodore Boveri found that behavior of chromosomes was parallel to the behavior of genes

They used chromosomal movement to explain Mendel's laws

In Anaphase of meiosis I,  
 2 homologs align at the metaphase plate  
 independently of each other.

In the left column (Possibility I) orange and green  
 is segregating together. But in the right hand  
 column (Possibility II) the orange chromosome is  
 segregating with the red chromosomes.

Possibility I	Possibility II
1 long orange & 1 short green chromosome and 1 long yellow & 1 short red chromosome at the same pole	1 long orange & 1 short red chromosome and 1 long yellow & 1 short green chromosome at the same pole



According to Sutton and Boveri,

pairing and separation of a pair of chromosomes would lead to the segregation of a pair of factors they carried.

Sutton integrated the knowledge of chromosomal segregation and Mendelian principles and called it the chromosomal theory of inheritance.



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