

Classical Genetics Summary

- ❖ Gregor Johann Mendel, father of Genetics unraveled the mystery of heredity through his experiments on garden peas.
- ❖ Mendel's laws, analytical and empirical reasoning endure till now guiding geneticists to study variation.
- ❖ The monohybrid cross of Mendel proved his particulate theory of inheritance. In F₂ the alternative traits were expressed in the ratio of 3 dominant and 1 recessive. The characteristic 3 : 1 segregation is referred to as Mendelian ratio. Parents transmit discrete information about the traits to their offspring which Mendel called it as "factors". To test his experimental results Mendel devised a powerful procedure called the test cross.
- ❖ Test cross is used to determine the genotype of an individual when two genes are involved. In Mendel's dihybrid cross, the two pairs of factors were inherited independently. From the results of dihybrid cross Mendel gave the Law of Independent Assortment.

- ❖ Mendel's dihybrid ratio of 9 : 3 : 3 : 1 with the representation of two new recombinations appeared in the progeny, i.e. round green peas or wrinkled yellow peas.
- ❖ Molecular explanation of Mendel's gene for monohybrid cross, dihybrid cross were explained. Extension of Mendelian Genetics was dealt with examples for interaction among genes.
- ❖ Incomplete dominance is not an example for blending inheritance. Incomplete dominance exhibits a phenotypic heterozygote intermediate between the two homozygous. In plants codominance can be demonstrated by the methods of electrophoresis or chromatography for protein or flavonoid substances.
- ❖ Lethal genes with an example are explained. Pleiotropy a single gene which affects multiple traits was explained with an example of *Pisum sativum*.
- ❖ Dominant epistasis in summer squash with 12 : 3 : 1 ratio was discussed. Polygenic inheritance is an example for inheritance of continuous traits which is compatible with Mendel's laws.

❖ The inheritance of mitochondrial and chloroplast genes were explained with examples which does not follow the rules of nuclear genes.