



**FACULTY OF AGRICULTURAL SCIENCES AND ALLIED INDUSTRIES**

## History of Genetics

The history of genetics started with the work of Gregor Johann Mendel on pea plants, published in 1866, known as Mendelian Inheritance. 1900 marked the "rediscovery of Mendel" by Hugo de Vries, Carl Correns and Erich von Tschermak, and by 1915 the basic principles of Mendelian genetics had been applied to a wide variety of organisms—most notably the fruit fly *Drosophila melanogaster*. Led by Thomas Hunt Morgan and his fellow "drosophilists", geneticists developed the Mendelian model, which was widely accepted by 1925.

### HISTORICAL DEVELOPMENTS IN GENETICS

1485 L. da Vinci: Recommended the use of lenses for viewing small objects

1665 R. Hooke: Introduced the term "cell" and described cork cells.

1668 F. Redi: Disproved the theory of spontaneous generation of maggots.

1672 Malpighi: Classified the tissues.

1674 A. Van Leeuwenhoek: Improved lens system of microscope by grinding.

1682 N. : Described bladders and pores in wood and pith.

1694 J.R. Camerarius: Conducted early experiments on pollination and reported the existence of sex in plants.

1700 R. Linnaeus: Classified the biological organisms.

1761 J.C. Kolreuter: Hybridized various species of tobacco and concluded that each parent contributed equally to the characteristics of the progeny.

1779 C.F Wolff: Founder of embryology.

1809 J.B. Lamarck: Coined the word "biology" and stressed the importance of cell in living organisms. He put forth the theory of inheritance of acquired characters.

1837 R. : Discovered the nucleus in cells of flowering plants.

1838 M.J. Schleiden and T. Schwann: Formulated the cell theory in plants and animals.

1840 J.E. Purkinje: Gave the term "protoplasm".

1846 K. Nageli Showed that plant cells arise from the division of preexisting cells.

1846 G.B. Amici Showed that egg in the ovary is stimulated to develop into an embryo by the entrance of pollen tube.

1858 R. Virchow Showed that animal cells arise from the division of preexisting cells.

1859 C. Darwin: Put forth the theory of natural selection.

1862 Kolliker: Used the term "cytoplasm" for the living material surrounding the nucleus.

1865 G. Mendel: Developed the fundamental principles of heredity.

1871 F. Meischer: Isolated nucleic acids from pus cells.

1875 E. Strasburger : Discovered cell division in plants and gave the terms "cytoplasm" and "nucleoplasm".

1879 W. Flemming: Introduced the term “ chromatin ”.

1881 E.G. Balbiani: Discovered giant chromosomes in salivary glands of *Drosophila*.

1882 W. Flemming: Coined the term “ mitosis ” .

1885 A.F.W. Schimper: Introduced the term “ plastids ”.

1888 Th. Boveri: Coined the term “ centrosomes ”.

1888 W. Waldeyer: Coined the term “ chromosomes ”.

1892 O. Hertwig: Proposed the protoplasm theory of inheritance.

1892 J. Ruckert: Described lamp brush chromosomes in oocytes of shark.

1892 W. Weisman: Stated that chromosomes are the most important part of the nucleus.

1892 Th. Boveri: Described meiosis in *Ascaris*.

1898 C. Golgi: Described the golgi apparatus in nerve cells.

1898 C. Benda: Discovered mitochondria in spermatozoa and other cells.

1899 S. Altman: Introduced the term “ nucleic acid ”.

1900 C.E. Correns, H. de Vries and E. Tschermak: Re-discovered Mendel’s laws of inheritance.

1901 E. Strasburger: Introduced the term “ plasmodesmata ”.

1902 C.E. McClung: Identified sex chromosomes in bugs.

1902 H. de Vries: Coined the term “ mutation ”.

1902 W.S. Sutton Th. Boveri : Proposed the chromosome theory of heredity and identified chromosomes as carriers of genetic material.

1903 W. Waldeyer: Proved centromeres are the chromosomal regions with which the spindle fibers become associated during mitosis

1905 J.B. Farmer and J.E. Moore: Coined the term “meiosis ”.

1906 W. Bateson: Coined the term “Genetics”and proposed the concept of allele.

1906 W. Bateson and R.C. Punnet: Discovered genetic linkage in sweet pea. Year Scientist Contribution

1906 W.L. Johannsen: Coined the terms “gene”, “genotype” and “phenotype”.

1909 W. Bateson: Coined the term “ epitasis ”.

1909 C. Correns: Reported cytoplasmic inheritance in *Mirabilis jalapa*.

1909 F.A. Janssens: Indicated that chiasmata are produced by exchanges between non - sister chromatids of homologous chromosomes.

1910 T.H. Morgan: Studied crossing over and recombination in *Drosophila* and coined the term “ crossing over ”.

1910 H. Nilsson-Ehle: Proposed the multiple factor hypothesis.

1911 A.H. Sturtevant: Constructed the first linkage map in *Drosophila*.

1915 T.H. Morgan: Correlated genetic studies with cytological studies. He put forth the theory of linkage and studied sex linked inheritance in *Drosophila melanogaster*.

1922 C.B. Bridges: Put forth the genic balance theory of sex determination.

1923 C.B. Bridges: Discovered duplications, deletions and translocations in chromosomes.

1923 Crew: Reported complete reversal of sex in hens.

1924 A.F. Blakeslee and J. Belling: Studied trisomics in Jimson weed (*Datura stramonium*).

1924 R. Feulgen : Described a test to confirm the presence of DNA.

1926 A.H. Sturtevant: Discovered inversions in chromosomes.

1927 G.K. Karpechenko : Synthesized Raphanobrassica.

1927 H.J. Muller: Induced mutations in *Drosophila melanogaster* by X-rays

1928 L.J. Stadler: Induced mutations in maize and barley by X-rays. Year Scientist Contribution

1928 F. Griffith: Conducted experiments on transformations in *Diplococcus pneumonia*.

1931 C. Stern: Gave cytological proof for crossing over in *Drosophila*.

1931 H. Creighton and B. McClintock: Gave cytological proof for crossing over in maize.

1935 R.B. Goldschmidt: Coined the term “ phenocopy ”.

1944 O.T. Avery, C.M. MacLeod and M. McCarty: Explained the significance of DNA and proved that it is the genetic material.

1948 K.R. Porter: Described the endoplasmic reticulum.

1950 B. McClintock: Discovered jumping genes in maize.

1952 A.D. Hershey and M.J. Chase : Provided experimental proof of DNA as genetic material.

1953 Robinson and Brown : Observed ribosomes in plant cells.

1953 J.D. Watson, F.H.C. Crick and M.H.F. Wilkins : Proposed the double helix model for DNA molecule.

1954 E.R. Sears : Produced monosomic series of “Chinese Spring ” variety of wheat.

1955 S. Benzer: Described the fine structure of gene –Cistron, Recon and Muton.

1955 C. De Duve :Coined the term “ lysosomes ”.

1955 G.E. Palade: Observed ribosomes in animal cells.

1958 G.W. Beadle, E.L. Tatum and J. Lederberg: Put forth the one gene – one enzyme hypothesis.

1958 F.H.C. Crick: Explained the central dogma of molecular biology.

1958 M.S. Meselson and F.W. Stahl: Proved experimentally that DNA replicates by semiconservative mechanism.

1959 A. Kornberg and S. Ochoa : Synthesized the DNA molecule in vitro.

1961 A.E. Jacob and J. Monod: Explained the genetic regulatory mechanism in protein synthesis – Operon concept.

1968 N.W. Nirenberg , H.G. Khorana and H. Holley: Deciphered the genetic code and polynucleotide synthesis.

1975 R. Dulbecco, H. Temin and D. Baltimore : Discovered the mechanism of reverse transcription – Teminism.

1975 N. Borlaug : development of dwarf wheat and green revolution.

1978 D. Nathans , H.O. Smith and W. Arber: Isolated restriction enzymes.  
1985 Potrykus: Used electroporation technique for direct gene transfer in plants.  
1987 K.B. Mullis: Developed polymerase chain reaction technique.  
1993 Sharp Roberts: Proposed the split gene concept.  
1993 Smith : Studied site directed mutagenesis.  
1997 I. Wilmut: Cloned sheep – Dolly.  
1997 Prusiner : Studied prions – Mad cow disease.  
1998 Delta & Pine Co. Developed the terminator gene technology.  
1998 Monsanto Co. Developed bollguard variety of cotton.  
1998 T. Wakayama and R. Yanagimachi Created the first cloned mice.  
2000 Roslin Institute Created the first cloned pigs.  
2001 Advanced Cell Technology, Birth of first cloned Asian ox called “Gaur”.