

# [Aristotle swammerdam (1679) proposed preformation theory and suggested](https://assignbuster.com/aristotle-swammerdam-1679-proposed-preformation-theory-and-suggested/)

Aristotle believed that female sex contributed something to define form of the embryo (like carpenter’s job is not to supply wood but to give shape to wood to form a chair). J.

Swammerdam (1679) proposed Preformation theory and suggested that the de­velopment of an organism is a simple enlargement of a minute but preformed individual called homunculus. I) Pre-Mendelian Era: Some of the scientists prior to Mendel (1900) tried to account for the differences existing among individuals and suggested theories to explain their inheritance.

#### 1. Lamarck’s theory of acquired characters (1744-1829):

The French Biologist Jean Baptiste de Lamarck stated that environmental changes cause’s modifications in organism and such modifications are transmitted from parent to off-springs.

He be­lieved that environment acts directly on plants and indirectly on higher animals. He further stated that variations are induced in organisms in response to urgent need as well as use or disuse of organs. So this type of thought which are acquired during the life time of an individual are inheritable called Lamarckism. Con­scious efforts of the animals to adopt environment tend to well develop certain organs than other e.

g. Giraffe. In jungles of Africa they compelled to feed on leaves of tall trees and hence neck and legs were increased in length and this character was inherited by progeny.

#### 2. Darwin’s theory of natural selection (1809-1882):

In 1858, English naturalist Charles Darwin proposed theory of “ Natural Selection”.

According to this theory, more individuals of each species are born that can possibly survive and conse­quently there is always struggle for existence. Variation, constant over production, struggle for existence, natural selection and survival of fittest are thus important prin­ciples of the theory of natural selection. He published the book ‘ Origin of Species’. Darwin put fourth theory of pangenesis. He tried to explain the physical basis of heredity and suggested that the heredity par­ticles pangens are produced by every part of body and transferred through blood stream to the sex organ and form germ cells and gives rise to new individuals.

#### 3. Schleiden and Schwann (1834-1914):

They proposed cell theory stating that all organisms are com­posed of one or more cells and cell is basic unit of life. Virchow (1858) made generalization that cells arise from pre-existing cell under ‘ Theory of cell lineage’.

#### 4. Weismann’s theory of germplasm (1834-1914):

German Zoologist suggested that reduction in chromosome number take since during formation of egg and sperm and the original number was restored when egg and sperm fused. In 1892, he suggested that maternal and paternal chromosomes separate during reduction division and recombine when the gametes united.

According to him, hereditary particles ‘ genes’ are situated on the chromosomes constitute germplasm which is transmitted from one generation to the other. It is independent of body cells or so­matoplasm which was not able to enter the sex cells. The indepen­dence of germplasm from somatoplasm was shown by ovary trans­plantation experiment. In guinea pig, when albino crossed with albino pig, albino progenies were produced. Castle and Philips re­moved ovaries of albino pig and grafted with those of black pig, when such pig mated with albino, all off-springs were found black. Thereby proving that germplasm is not affected by somatoplasm. According to Weismann’s acquired characters can’t be inher­ited e. g.

cutting of tails of mice for 22 generations be found that all progenies were with tail.

#### Others Contribution:

a) Robert Hooke (1655) described cell for the first time. b) Robert Brown (1833) described the nucleus for the first time. c) Hugo-de-Mohl (1846) showed that cytoplasm is made up of living things called protoplasm. d) Hertwig and Strausberger (1875) stated that nucleus as basis of heredity and fertilization in plants and animals. e) Flemming (1882) studied mitosis for first time. f) Van Beneden (1883) studied meiosis for the first time. g) Waldeyer (1888) coined the term chromosome.

II) Mendelian Era (1822-1884): a. Gregor Mendel performed some experiments on garden pea and his conclusions constitute the laws of heredity i. e. founda­tion of modern genetics. b. De Vries, Correns and Tschermak (1900) rediscovered Mendel’s work. Thus 20lhCentury was supposed to be dawn of birth of biological science ‘ Genetics’ (1900). c.

De Vries (1901) discovered mutation for the first time. d. C.

E. McClung (1902) described sex chromosome. e. Bateson in 1906 coined the term ‘ Genetics’ and also ‘ factor’ for determination and characters. f. Bateson and Punnet (1908) reported the interaction of factors and linkage in sweet pea.

g. Johannsen (1909) used the word ‘ gene’ for the first time. h. Nilsson and Ehle (1908) put forth multiple factor hypothesis. III) Recent advances (Post Mendelian Era): a.

E. B. Wilson developed chromosome theory. b. T. H. Morgan (1912) studied linkage in Drosophila. c.

Janssen (1909) explained mechanism of crossing over and for­mation of chiasmata i. e. exchange of segments between non- sister chromatids.

d. T. S. Painter discovered giant chromosome in salivary gland cells of Drosophila. e. H. J. Muller and Stadler (1927) discovered that ‘ X’ rays could be used to induce mutation in animals.

f. Blakeslee (1937) discovered that colchicine could be used to double the chromosome number. g. Beadle and Tatum (1958) established relationship between gene and enzyme and proposed ‘ One gene one enzyme’ hy­pothesis. h. Beadle, Tatum and Lederberg (1958) received Nobel Prize in biology and medicine for their contribution in physiological genetics. i. Ochoa and Korenberg (1959) received Nobel Prize for their studies on in-vitro synthesis of nucleic acids.

j. Watson and Crick (1962) awarded Nobel Prize for showing detailed structure of DNA. k. Khorana and Agarwal (1971) artificially synthesized gene which coded for alanine transfer RNA from yeast. l.

Bulbecco, Tamin and Baltimore (1975) got Nobel Prize for showing interaction between tumor virus and genetic material of cell. m. Danial Gajdusek (1976) got Nobel Prize for medicine and physiology i. e. neurological disease ‘ Kuru’ by slow virus in New Guinea where tribal men smear blood and body tissues and eats rein tissues during funeral meal.