Fundamental Basis of the Genetic Science

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Description

The fundamental characters which easily transmit generation to generation from their parents are called genetic character and the processes of transmission of such heredity and the studies of their causes are called Genetics. Gregor John Mendel is known as 'Father of Genetics' who made the scientific study of heredity and genetic theory. The fundamental characters which easily transmit generation to generation from their parents are called genetic character and the processes of transmission of such heredity and the studies of their causes are called Genetics [1]. Gregor John Mendel is known as Father of Genetics who made the scientific study of heredity and genetic theory. He established the principles of segregation, dominance and independent assortment which became the most fundamental basis of the science of genetics. His method was based on cross breeding of various kinds of the garden peas that had the opposing pairs of obvious traits. He established the principles of segregation, dominance and independent assortment which became the most fundamental basis of the science of genetics. Gene (factor by Mendel) is the core component of chromosome which carries heredity characteristics [2].

X-Rays and Other Mutagens

The non-inheritance of acquired traits does not mean that the genes cannot be changed by environmental influences; X-rays and other mutagens certainly do change them, and the genotype of a population can be altered by selection. It simply means that what is acquired by parents in their physique and intellect is not inherited by their children. Related to these misconceptions are the beliefs in "prepotency"—i.e., that some individuals impress their heredities on their progenies more effectively than others—and in "prenatal influences" or "maternal impressions"—i.e., that the events experienced by a pregnant female are reflected in the constitution of the child to be born [3]. How ancient these beliefs are is suggested in the Book of Genesis, in which Jacob produces spotted or striped progeny in sheep and goats by showing the flocks striped rods while the animals are breeding. Gregor J Mendel studied the various pea plants through the cross breeding and propounded a comprehensive theory on the basis of genetic heredity which is called Mendel's law of Inheritance. He had randomly selected seven pairs of pea's species in which it was seen the inheritant characteristic of the one pair suppressed the inheritant characteristic of another pair in his experiment. The first pair he called as Dominant written with a capital letter like for tallness 'T' and another pair as Recessive written with small letter as for Dwarfnes 't' which are responsible for the heredity as genetic symbol.

Sex Chromosomes

X-rays and other mutagens your chromosomes contain the blueprint for your body – your genes. Almost every cell in the human body contains a copy of this blueprint, mostly stored inside a special sac within the cell called the nucleus. Chromosomes are long strands of a chemical substance called Deoxyribonucleic Acid. A DNA strand looks like a twisted ladder. The genes are like a series of letters strung along each edge. These letters are used like an instruction book. The letter sequence of each gene contains information on building specific molecules (such as proteins or hormones – both essential to the growth and maintenance of the human body)[4].

The alleles of the same gene can have a dominant or recessive relationship with one another. If both alleles are different (heterozygous) and at least one of these two alleles is dominant, it is the dominant one that will be expressed (i.e., that we will observe as a trait in an individual). Hereditary traits are determined by genes, and a single gene can have several variants called alleles. There are two copies of each gene in our cells (with the exception of genes located on sex chromosomes). One of the copies comes from the sperm, the other from the egg. In an individual, these two copies (or alleles) are not necessarily identical. If the two copies of a gene are identical, we say that the individual is homozygous for that gene [5]. If the two copies are different, the gene is heterozygous. Conversely, a recessive allele (non-dominant) will not be expressed in an individual if both parents pass down the same allele (homozygote). During reproduction, the genes of biological parents combine to form a new unique individual. This shuffling of genes is the reason all of us are different. Gregor Mendel, a monk and botanist, conducted experiments in the 19th century. He experimented on different characteristics of garden pea plants which always presented two alleles: white or purple flowers, yellow or green peas, etc. He discovered the laws by which genes are passed on from one generation to the other. These are known as Mendel's laws [6].

As a result, even if a recessive allele is present in a genotype (the genetic constitution of an individual), it will not be observable in the phenotype (the set of observable traits of an individual) if the other copy of the gene is a dominant allele.

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