



Chapter – 8

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Heredity

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The transmission of characters (or traits) from the parents to their offsprings is called heredity. In most simple terms, heredity means continuity of features from one generation to the next.

Variation

The differences in the characters (or traits) among the individuals of a species is called variation.

RULES FOR THE INHERITANCE OF TRAITS : MENDEL'S CONTRIBUTION

Mendel used a number of contrasting visible characters of garden peas – round/wrinkled seeds, tall/short plants, white/violet flowers and so on. He took pea plants with different characteristics – a tall plant and a short plant, produced progeny by crossing them, and calculated the percentages of tall or short progeny

there were no halfway characteristics in this first generation, or F1 progeny – no 'medium-height' plants. All plants were tall.

This meant that only one of the parental traits was seen, not some mixture of the two. So the next question was, were the tall plants in the F1 generation exactly the same as the tall plants of the parent generation

Mendelian experiments test this by getting both the parental plants and these F1 tall plants to reproduce by self-pollination. The progeny of the parental plants are, of

course, all tall. However, the second-generation, or F₂, progeny of the F₁ tall plants are not all tall. Instead, one quarter of them are short. This indicates that both the tallness and shortness traits were inherited in the F₁ plants, but only the tallness trait was expressed.

In this explanation, both TT and Tt are tall plants, while only tt is a short plant. In other words, a single copy of 'T' is enough to make the plant tall, while both copies have to be 't' for the plant to be short. Traits like 'T' are called dominant traits, while those that behave like 't' are called recessive traits.

Acquired and Inherited Traits

A trait (or characteristic) of an organism which is 'not inherited' but develops in response to the environment is called an acquired trait.

The acquired traits of organisms cannot be passed on to their future generations.

the traits (or characteristics) of parents are passed to their offsprings through genes in reproductive cells (or gametes) during the process of reproduction. So, for the trait of an organism to be passed on, it must have been caused by a change in the genes (or DNA) present in the reproductive cells of the organism. In other words, only those traits can be transmitted to future generations in which changes have occurred in the genes (or DNA) present in the reproductive cells (or gametes) of parent organisms. The changes in the non-reproductive body cells of an organism cannot be inherited by its offsprings.

A trait (or characteristic) of an organism which is caused by a change in its genes (or DNA) is called an inherited trait. Inherited traits can be passed on to the progeny of the organism because they have produced changes in the genes (or DNA) of the organism.

If we breed a group of mice, all their progeny will have tails, as expected. Now, if the tails of these mice are removed by surgery in each generation, do these tailless mice have tailless progeny? The answer is no, and it makes sense because removal of the tail cannot change the genes of the germ cells of the mice

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