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A Short Note on Genetics

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DESCRIPTION

Genetics is a branch of biology that studies genes, genetic diversity, and heredity in living things. Mendel looked on “trait inheritance,” or how qualities are passed down from parents to offspring over time. He discovered that organisms inherit features in separate “inheritance units.” This word, which is still in use today, is an imprecise definition of what is known as a gene. In the twenty-first century, trait inheritance and molecular inheritance mechanisms of genes are still essential aspects of genetics, but modern genetics has evolved beyond inheritance to include the study of gene function and behaviour. The structure and function of genes, as well as their variation and distribution, are investigated in the context of the cell, the organism, and a population. Molecular genetics, epigenetics, and population genetics are only a few of the subfields of genetics. Organisms examined in this broad field come from all walks of life. Nature versus nurture refers to how genetic processes interact with an organism’s environment and experiences to influence development and behaviour. A living cell’s or organisms intracellular or extracellular environment can turn gene transcription on or off. Two genetically identical maize seedlings, one in a temperate region and the other in an arid climate, are a famous example (lacking sufficient water or rain). While the average height of the two corn stalks may be genetically equivalent, due to a lack of water and nutrients in its surroundings, the one in the arid climate only grows to half the height of the one in the temperate zone. Although genes were known to exist on chromosomes, scientists didn’t know which of the two is responsible for inheritance because chromosomes are made up of both protein and DNA. Frederick Griffith observed the transformation phenomena in 1928. Hämmerling established the nucleus as the reservoir of genetic information in eukaryotes in 1943 in his work on the single celled algae *Acetabularia*. In 1952, the Hershey–Chase experiment established that DNA is the genetic material of viruses that infect bacteria, adding to the growing body of evidence that DNA is the molecule that controls heredity. Their double-helix model consisted of two strands of DNA with nucleotides facing inward, each of which matched a complementary nucleotide on the other strand to form rungs of a twisted ladder. This structure revealed that genetic information is encoded in the nucleotide sequence on each strand of DNA. The structure also provided a straightforward replication method: if the strands are separated, new partner strands may be created for each strand using the old strand’s sequence. This feature is responsible for DNA’s semi-conservative nature, which occurs when one strand of new DNA is derived from an original parent strand. Although the structure of DNA revealed how heredity works, it remained unknown how DNA affects cell behaviour. Scientists spent the next few years trying to figure out how DNA regulates protein creation. It was revealed that the cell uses DNA as a template to make messenger RNA, which has nucleotides that are highly identical to those found in DNA. The genetic code is a translation between nucleotide sequences and amino acid sequences that uses the nucleotide sequence of messenger RNA to build an amino acid sequence in protein.