

# Genetic relations



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DNA is mnemonic for deoxyribonucleic acid. The chemical structure of DNA is a double helix made up of two complementary strands, which are long chains of four different kinds of nucleotides: adenine (A), cytosine (C), guanine (G), and thymine (T). The genetic information embodied in DNA accounts for three fundamental aspects of life. First, DNA holds the genetic information that directs all processes. Second attribute of DNA is that it accounts for the precision of biology heredity with both two strands in DNA carry the same genetic information. And lastly the fundamental property of DNA is mutation, which makes it possible for the evolution of organism (Ayala, 2010). Simply DNA is a blueprint for all cellular structures and functions in a genome of an organism. From the given amino acid sequence; (3'TACCCTTTAGTAGCACT-5), the first codons is an instruction to start the synthesis protein of chain while the last codon is an instruction to stop the synthesis. Also the first codon gives an instruction of the site of protein synthesis and the end codon is a stop synthesis that specifies the final amino acid in the encoded protein.

Genetic code is a set of encoded instruction in genetic material. The codes sequence has three nucleotides called codons. These codons specify which amino acids will be added during protein synthesis (Ayala, 2010). Therefore a three nucleotides codons specifies a single amino acid 3'-T A C C C T T T A G T A G C C A C T-5. From the coding sequence; TAC represents (Tyr/Y) (Tyrosine), CCT (Proline), TTA (leucine), GTA (Valine), GCC (Alanine), and ACT (Threonine). AUGGGAAAUCAUCGGUGA-5 will be the translation or an amino acid. The sequence: AUG GGA AAU CAU CGG UGA represents Methionine, Glycine, Asparagine, Histidine, Arginine and Stop instructions. The first given

mutated gene is: 3'-T A C G C T T T A G T A G C C A T T-5'. The sequence represents: TAC (Tyr/Y) Tyrosine, GCT (Ala/A) Alanine, TTA (Leu/L) Leucine, GTA (Val/V) Valine, GCC (Ala/A) Alanine and ATT (Ile/I) Isoleucine. Its translation or an amino acid sequence is: AUG CGA AAU CAU CGG UAA. This coding represents: Methionine, Arginine, Asparagine, Histidine, Arginine and Stop respectively. The second mutated gene sequence is 3'-T A A C C T T T A C T A G G C A C T-5' the coding represents TAA Stop (Ochre), CCT (Pro/P) Proline, TTA (Leu/L) Leucine, CTA (Leu/L) Leucine, GGC (Gly/G) Glycine and ACT (Thr/T) Threonine. The translation amino acid sequence is AUU GGA AAU GAU CCG UGA this translation represents: Isoleucine, Glycine, Asparagine, Aspartic, Proline and Stop respectively.

Gene corresponds to a region within DNA; a molecule is composed of four different types of nucleotides. The sequence of nucleotides in a gene is translated by cell to produce chains of amino acids, creating proteins. In the given mutations does not the protein sequence in the two cases this is because in both mutations the amino acid being synthesized is isoleucine. Also the start is the same irrespective of the DNA amino acids. The amino acids in a protein determine how it folds into three dimension shape. This structure is responsible for protein function. Changing amino acids changes its shape function causing adverse effect to the cell. Also if the start and end codons are changed the protein synthesized will have either long or short structure or if they are excluded there will be replication of the protein. If Bob and Sally are both heterozygous, we expect them to have both normal and cystic fibrosis allele. Letting normal allele be represented by C (upper case) and cystic fibrosis be represented by c (lower case), we can get the set

of all possible genotype of their siblings. This is as shown in the punnett square.

The probability of a child being healthy is: this gives 25%. Secondly from the table the chances that the child is a carrier for cystic fibrosis trait are: this gives 50%. And lastly the probability for the siblings to have cystic fibrosis is: this gives 25%

Reproduction is the process by which plants and animals give rise to offspring. This is usually done by two methods; asexual reproduction and sexual reproduction (Lakowiz & Geddes, 2005). There are also two methods of cell division that enhances reproduction. These are; mitosis which is a cell division that leaves the daughter cell capable of dividing again and meiosis which is also a cell division process that a cell is permanently transformed into a gamete and cannot divide until fertilization. Before a cell splits it undergoes DNA replication. Replication is a process that occurs in living organisms that involves copying of the DNA content. The copied DNA contains the hereditary information from the parent cell. Living things are made up of physical substance or element. This substance forms the structures of living things and are also involved in the growth of the living organism. The growth is seen through various organizational processes. For this process to work living things use energy, they do obtain their energy in many ways