The history of dna biology essay

Science, Biology

Early scientists thought that protein was the cell’s hereditary material because it was complexer than DNA. Basically proteins are made up of combination of 20 different amino acids in long chains of polypeptides that’s why scientists take them as the most complex structure and considered them the hereditary material. After that Fred Griffith (1928) worked with virulent S and non-virulent R strain. He studied Streptococcus pneumonia, the bacterium that causes pneumonia. The smooth outer core of the bacterium is known as strain S and the rough outer core of the bacterium is known as strain R. Griffith injected both strains into mice and found that only strain S bacteria were deadly. Then he injected live strain R bacteria and strain S bacteria that had been killed by heat but the mice died and he found a bug that living strain S bugs suddenly appeared. Then he injected only heated killed strain S bacteria and mice didn’t die. He concluded that something from the dead strain S bacteria and converted strain R bacteria into strain S bugs. He called it the " transforming principle." Thus Bacteria are capable of transferring of genetic material through a process known as transformation. griffith. pngAfter that in 1943 Oswald T. Avery put killed strain S in a test tube. When he added enzymes that destroy proteins the strain S bacteria were still able to transform strain R bacteria but when he added DNA-destroying enzymes the strain R bacteria couldn’t be transformed. Thus he concluded that DNA was the transforming agent. After that in 1950 Edwin Chargaff an Austrian biochemist studied the chemical composition of DNA molecule and had revealed that it contained a type of sugar called deoxyribose, plus a phosphate group and four different

molecules or bases called adenine, thymine, guanine and cytosine. In a body or somatic cellA = 30. 3%T = 30. 3%G = 19. 5%C = 19. 9%

DNA

DNA stands for Deoxyribonucleic acid. It is the basic thing in all living organisms because all the hereditary material of an organism is stored in its DNA. Within a person’s body every cell has the same DNA. DNA present in the nucleus of the cell is known as nuclear DNA, but the DNA found in mitochondria is known as mitochondrial DNA or mtDNA. All the information stored in DNA is stored in the form of codes made up of four chemical basesguanine (G)adenine (A)cytosine (C)thymine (T)Human DNA consists of about 2. 9 billion bases, and about 99 percent of those bases are same in a specific organism. The order or sequences of these bases are responsible for the next generation or the further growth of the same organism. These Four DNA chemical bases pair up with each other in specific wayA must pair with T (forming double bond between them)G must pair with C (forming triple bond between them)Each pair form a unit thus called base pairs. Basically DNA is made up of subunits called nucleotides. Each base is also attached to a phosphate molecule and a sugar molecule. This sugar molecule, phosphate molecule and a base pair joined together which is called a nucleotide. So a nucleotide is made up of following things: Phosphate groupNitrogenous base5 – Carbon sugarDNAnucleotides1. gifThese nucleotides are arranged into two long strands forming a spiral called a double helix. The structure of the double helix is like a ladder, with the base pairs forming the ladder’s rungs and the sugar and phosphate molecules forming the vertical sidepieces of the ladder. DNA. gif

DNA Structure

In 1952 Rosalind Franklin took many diffraction x-ray photographs of DNA crystals but in 1953 Francis Crick & James Watson built the first model of DNA using Franklin's x-rays. DNA structure is made up of two coiled strands called double helix, forming a ladder like structure in which sides are made up of pentose sugar (deoxyribose) bonded to phosphate groups by phosphodiester bonds and the ladder rungs are made up of nitrogen bases by forming weak hydrogen bonds between them.

Structure of DNA

HELIX

DNA's are of two typesright−hand twistedleft−hand twistedUsually right−hand DNA is found with 10 base pairs in a complete turn of the double helix. Left−hand twisted DNA is called southpaw DNA or Z−DNA.

ANTIPARALLEL STRANDS

One strand of DNA goes from 5' to 3' (sugars) while the other strand is opposite to the first one going 3' to 5' (sugars)http://www. synapses. co. uk/genetics/dnastrn. gif

DNA Replication

REPLICATION RULES

Some of the basic rules of replication areSemi-conservativeStarts at the ' origin'Can be uni or bidirectionalSemi-discontinuousSynthesis always in the 5-3' directionRNA primers required

REPLICATION FACTS

DNA must have to be copied before a cell dividesDNA is copied during the synthesis phase or S−Phase of interphaseNew cells will need identical DNA strands

SYNTHESIS PHASE (S PHASE)

Synthesis phase or " S phase" occurs during the interphase of a cell cycle between the G1 and G2 stages. During synthesis phase, DNA replication takes place. DNA molecules " unzip" and each old strand attracts free nucleotides forming complementary new strands, leaving two strands of DNA identical to the original strand of DNA. http://schoolworkhelper. net/wp-content/uploads/2010/11/cell_cycle. jpg