

SBI4U - Unit 2: Molecular Genetics & Biotechnology

EXPECTATIONS

D2.1 Use appropriate terminology related to molecular genetics

D2.2 Analyze a strand of DNA to determine the genetic code and base pairing of DNA

D3.1 Explain the model of DNA replication and describe the different repair mechanisms that can correct mistakes in DNA sequencing

D3.2 Compare the structures and functions of RNA and DNA, and explain their roles in the process of protein synthesis

D3.3 Explain the steps involved in the process of protein synthesis and how genetic expression is controlled in prokaryotes and eukaryotes by regulatory proteins

D3.4 Explain how mutagens (radiation, chemicals, etc.) can cause mutations by changing the genetic material in the cells

D3.5 Describe some examples of genetic modification and how it is applied in industry and agriculture

D3.6 Describe the functions of some of the cell components used in biotechnology

D3.7 Describe on the basis of research some of the historical scientific contributions that have advanced our understanding of molecular genetics

IMPORTANT RESEARCHERS & THEIR DISCOVERIES

- Gregor Mendel discovered the fundamental laws of inheritance (Mendel's law)
- Frederick Griffith discovered the "transformation principle"; lead to discovery that DNA acts as a carrier for genetic information
- Joachim Hammerling discovered that the nucleus is the storehouse of hereditary material
- Oswald Avery, Maclyn McCarthy, and Colin MacLeod discovered that DNA is the material of which chromosomes and genes are made of
- Alfred D. Hershey and Martha Chase discovered that only the DNA of a virus needs to enter a bacterium to infect it
- Rosalind Franklin (and Maurice Wilkins) discovered the structure of DNA (photo 51)
- June Lindsey discovered the double-helix structure of DNA
- James Watson and Francis Crick discovered the double-stranded, twisted-ladder structure of DNA
- Friedrich Miescher identified DNA as a distinct molecule in 1869

DNA SYNTHESIS AND REPLICATION SUMMARY

- DNA replicates semi-conservatively; one coding strand and one newly synthesized strand
 - discovered by Meselson and Stahl (1958)
- step-by-step process

Molecular Genetics Section 4 Study Guide

Liyong Dong



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