

# Introduction

# Molecular Biology

- **The branch of biology that deals with the nature of biological phenomena at the molecular level through the study of DNA and RNA, proteins and other macromolecules involved in genetic information and cell function, characteristically making use of advanced tools and techniques of separation, manipulation, imaging and analysis.**
- **The study of biology on a molecular level including the structure , function and make up of biologically important molecules such as DNA, RNA and proteins.**

# Introduction and History of Molecular Biology

- **1869: Friedrich Miescher discovered DNA**
- **1941: Beadle and Tatum demonstrated that a gene codes for a single protein.**
- **1944: Avery proved that DNA is the genetic material.**
- **1953: Watson and Crick proposed the double helical structure for DNA.**
- **1958: Meselson and Stahl demonstrated that DNA replicates semiconservatively.**
- **1961: Messenger RNA was uncovered by Sydney Brenner and Matthew Meselson.**

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- **1961: Jacob and Monod proposed the operon model for gene regulation.**
- **1964: Nirenberg and Philip Leder, the triplet nature of the genetic code was discovered.**
- **1970: Temin and Baltimore reported the discovery of reverse transcriptase in retroviruses.**
- **1973: Type II restriction endonucleases were discovered.**
- **1974: Eukaryotic genes were cloned in bacterial plasmids.**
- **1976: Retroviral oncogenes were identified as the causative agents of cellular transformation.**

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- **1977:DNA sequencing became possible by Frederick Sanger .**
- **1977: Interrupted genes were discovered and splicing mechanism for their removal from the primary transcript was discovered.**
- **1979: Cellular oncogenes were discovered by transfection.**
- **1981: Catalytic activity of RNA was discovered.**
- **1981:Transgenic mice and flies were obtained by introducing new DNA into the genome.**
- **1997: A sheep was cloned from somatic cell genome, establishing the possible totipotency in animal cells.**

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- **2001: First draft of the human genome sequence.**
- **2001: Application of protein profiling in human diseases.**
- **2006: Andre Fire and Craig Mello share a Nobel Prize for their work on RNA interference.**
- **2013: DNA worldwide and their laboratory partners Eurofins Forensic were the first in the world to prove that twins have differences in their genetic make up**

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- **2014: More than 100 genes that play a role in the development of schizophrenia**
- **2014: Changes in the expression of genes involved in the inflammation, fat and glucose metabolism could be behind the development of type 2 Diabetes.**