

SCST Super Genetic Workshop  
February 3, 2010

# Introduction to Molecular Biology

GT - WORKSHOP  
Feb. 3, 2010

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## Overview

 Molecular Biology - Study of life at molecular level

- Taxonomic Domain
- Central Dogma of Mol. Biology
- Cell - Chromosome - DNA
- Structure of a nucleotide
- Base Pair Complimentarity
- Size of DNA molecule
- RNA
- DNA Replication
- Synthesis of RNA and Protein
- Classifications of Amino Acids
- *Take-Home Message*

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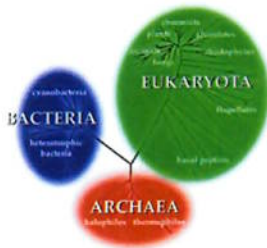
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## Taxonomic Domains



A domain – a level of classification above kingdom

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1827 - Brownian Movement  
1860s - Deoxyribonucleic acid discovered  
1951 - Molecular structure of Deoxyribonucleic acid (DNA)

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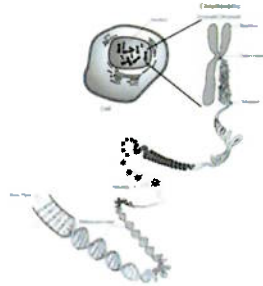
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**Chromosome**



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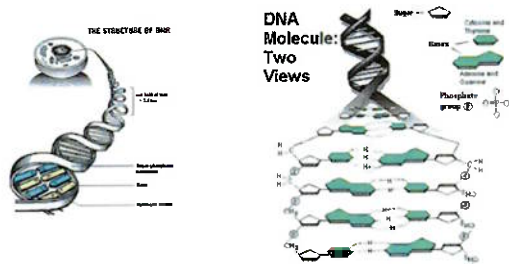
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**Structure of DNA**



The Watson-Crick Model of DNA (1953) – Nobel Prize (1962)

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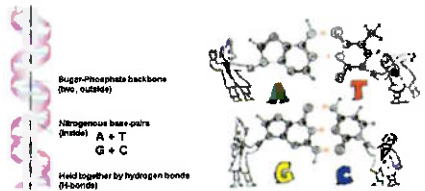
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- **Deoxyribonucleic Acid (DNA)**- a double-stranded, helical molecule
- Consists of two sugar-phosphate backbones on the outside, held together by hydrogen bonds between pairs of nitrogenous bases on the inside
- The bases are of four types (A, C, G, and T); pairing always occurs between A and T, and C and G.

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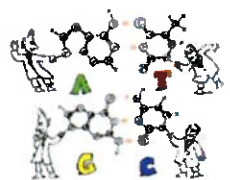
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- The authors realized that these pairing rules meant that either strand contained all the information necessary to make a new copy of the entire molecule, and that the order of bases might provide a "genetic code".

The Watson-Crick Model of DNA (1953) – Nobel prize (1962)

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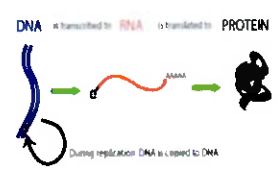
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### The Central Dogma



DNA is transcribed to RNA is translated to PROTEIN

During replication DNA is copied to DNA

**DNA = Deoxyribonucleic acid**  
**RNA = Ribonucleic acid**

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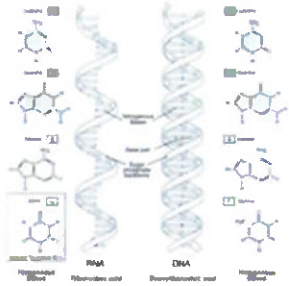
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### Structure of a Nucleotide



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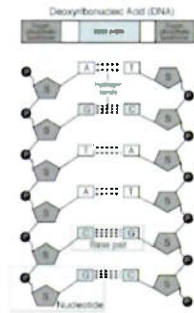
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### Base Pair Complimentarity



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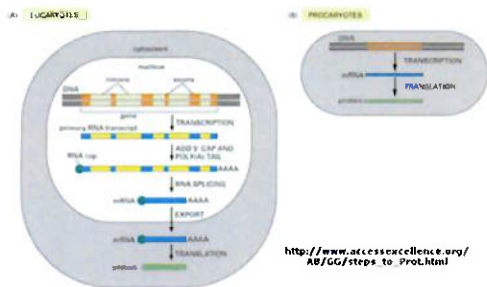
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### Replication/Transcription/Translation



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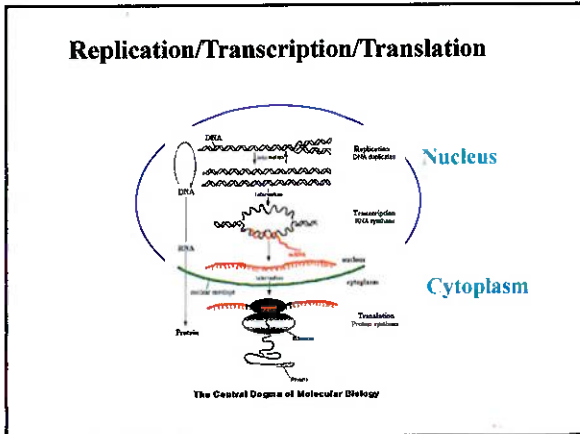
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**Cell Biology Animation.**

<http://www.johnkyrk.com/>

- Water
- Cell anatomy
- Cell function
- Chromosome
- DNA - Anatomy  
structure  
replication  
transcription  
translation

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**Take-Home Massage**

Transcriptions of DNA to RNA to protein: This dogma forms the backbone of molecular biology and is represented by four major stages.

1. The DNA replicates its information in a process that involves many enzymes
2. The DNA codes for the production of messenger RNA (mRNA)

<http://www.accessexcellence.org/RC/VLGG/central.php>

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**Take-Home Massage**

**Cont..**

3. In eucaryotic cells, the mRNA is processed (essentially by splicing) and migrates from the nucleus to the cytoplasm.

4. Messenger RNA carries coded information to ribosomes. The ribosomes "read" this information and use it for protein synthesis.

**Proteins do not code for the production of protein, RNA or DNA. They are involved in almost all biological activities, structural or enzymatic**

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**References**

Much of the material here comes from the following web sites

1. <http://www.accessexcellence.org/RC/VLJGG/index.php#Anchor-Biological-3800>
2. <http://www.johnkyrk.com/>
3. [http://www.mun.ca/biology/scarr/Watson-Crick\\_Model.html](http://www.mun.ca/biology/scarr/Watson-Crick_Model.html)

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**Thank you**

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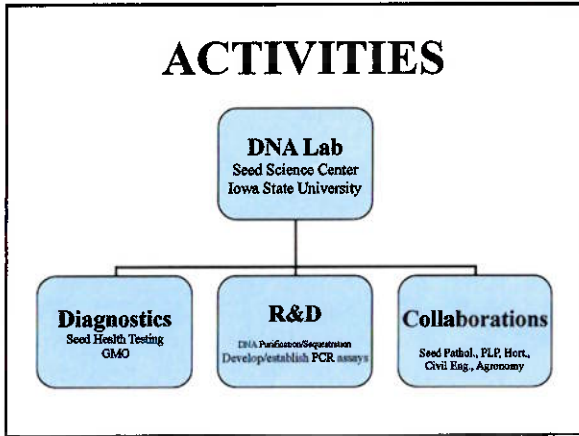
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