

NUCLEIC ACIDS

DNA = acid, carries information (about the synthesis of

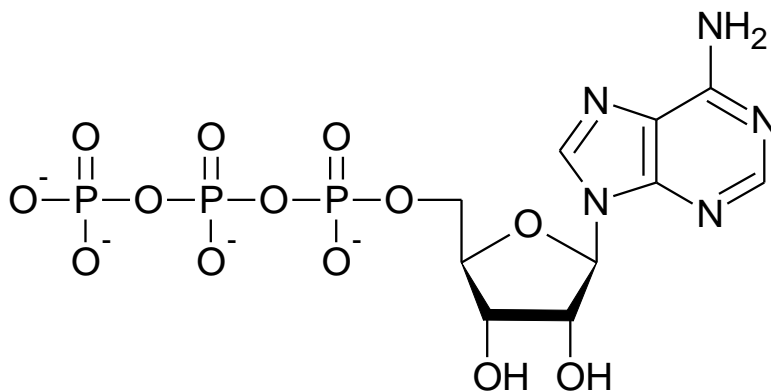
RNA = acid, assemble into proteins

= macromolecular substances, consist of:

1.: either ribose or
2.acid in the form of its ion:.....
3. Bases of two types:

<ul style="list-style-type: none"> • bases, derived from 	<ul style="list-style-type: none"> • bases, derived from

Base + sugar =, base + sugar + phosphate =



The function of nucleotides:

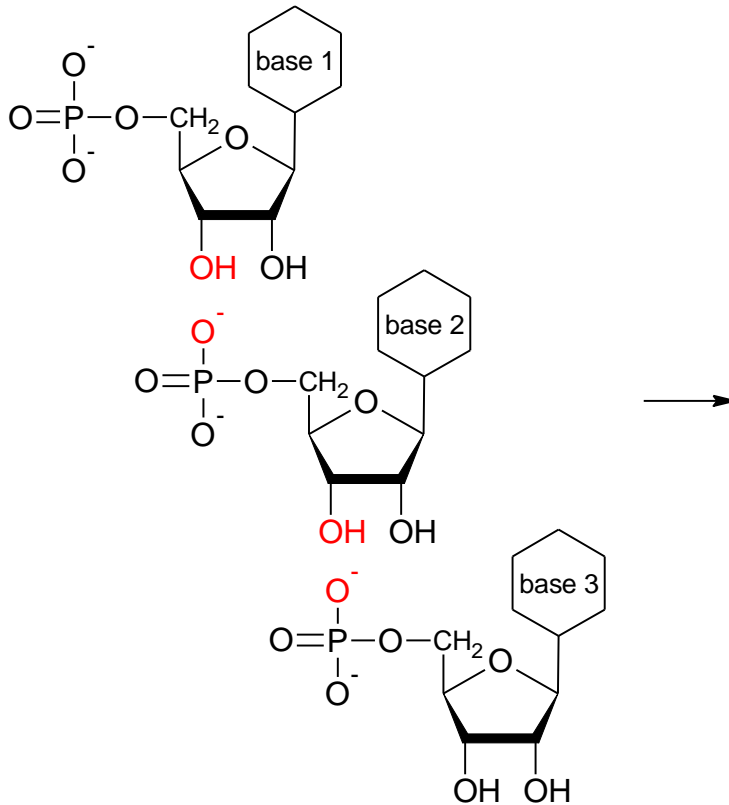
- Building units of nucleic acids – carry the genetic information
- Carry chemical energy in their easily hydrolysed acid-anhydride bonds (.....)
- With other groups they form coenzymes (.....,,)
- Act as specific cell signaling molecules for the cells

Nucleoside

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Nucleotide

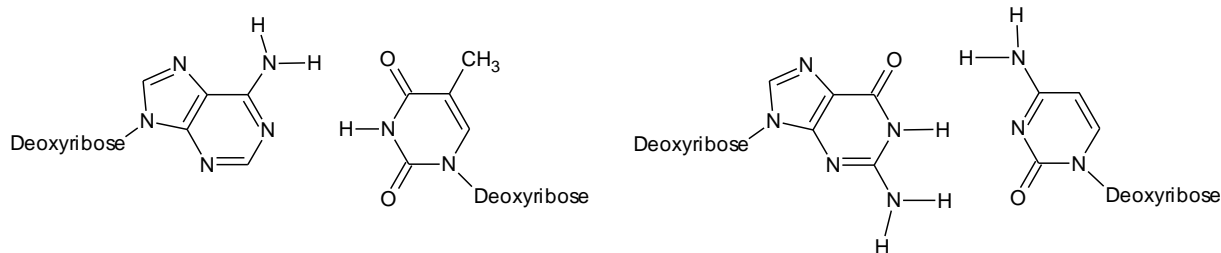
Nucleotides polymerise to form nucleic acids:



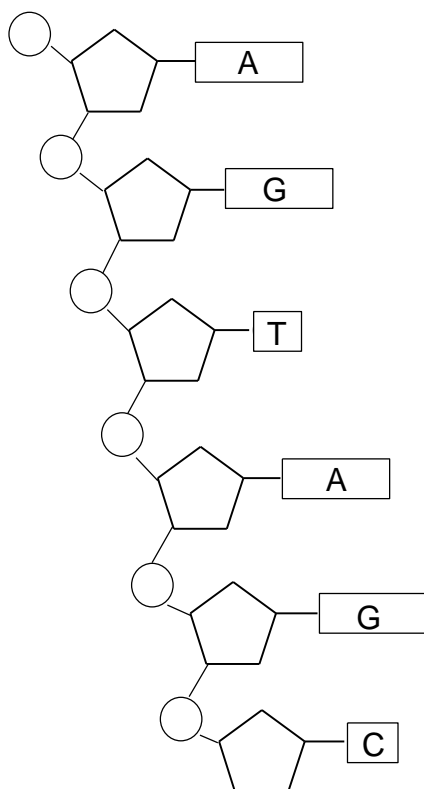
DNA

- Watson and Crick constructed a model of a DNA molecule consisting of 2 separate polynucleotide chains.
- Each chain has the form of a right-handed helical spiral and the two chains coil round each other to form a **DOUBLE HELIX**.
- Each chain has a sugar-phosphate backbone from which the bases project at right angles.
- **COMPLEMENTARY PRINCIPLE:**
2 bases form pairs – always..... and base together.
Making pairs is the most important process during the transcription of genetic information

NUCLEOTIDE PAIRING



1. Draw the complementary (antiparallel) strand to:



The replication of DNA

1. The double helix of DNA is unwound by the enzyme helicase to form two strands.
2. Each of the two strands bonds nucleotides with complementary bases to form new double helices.

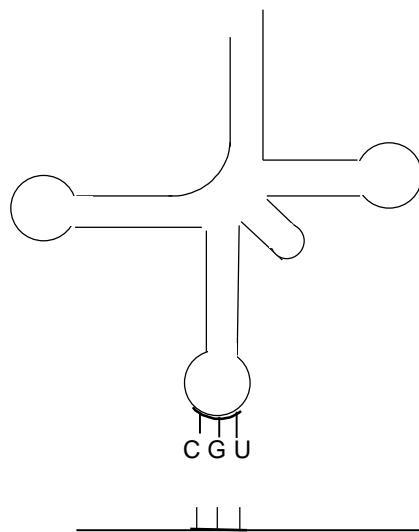
<http://www.youtube.com/watch?v=z685FFqmrpo&feature=related>

<http://www.youtube.com/watch?v=teV62zrm2P0&feature=related>

RNA

Three types, all of them play a role in the synthesis, usually consist of single strands, the bases are:,,

- **Messenger RNA (mRNA)**: synthesised in the nucleus on the basis of
- **Transfer RNA (tRNA)**: the carrier of during protein synthesis



- **Ribosomal RNA (rRNA)**: structural component of ribosomes

PROTEOSYNTHESIS = synthesis of proteins

<http://www.youtube.com/watch?v=NJxobgkPEAo>

Each aminoacid is coded by three bases = TRIPLET CODE

Why three?

- There may be more triplet codes for one aminoacid.
 - There cannot be two aminoacids for one triplet code.
 - A length of DNA (a sequence of triplet codes) which codes for a whole protein = GENE
 - Proteins are synthesised on the ribosomes in the cytoplasm
1. TRANSCRIPTION: messenger RNA is made on the template of DNA in the nucleus.
 2. mRNA travels through the pores of the nuclear membrane into the cytoplasm, where it attaches to a ribosome. Codon (triplet of nucleotides on the mRNA) AUG initiate a peptide chain.



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3. Transfer RNA bonds to its specific aminoacid and carries it to mRNA where its anticodon binds to a codon.
4. A second tRNA binds to a second codon on mRNA, the aminoacids carried by tRNA(1) and tRNA(2) are connected by a peptide link.
5. The ribosome moves to a third codon of mRNA, a tRNA(3) binds to a third codon, the aminoacid(3) binds to the aminoacid (2). tRNA is released from ribosome.
6. The process of TRANSLATION continues until mRNA separates from the ribosome

<http://www.youtube.com/watch?v=0248WyghCjc&feature=related>