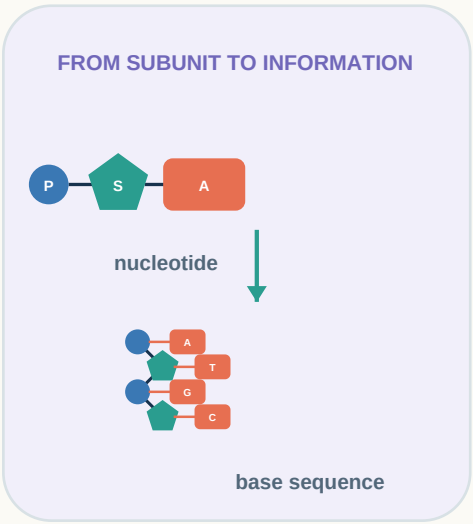
AP BIOLOGY | UNIT 1

TOPIC 1.6

Nucleic Acids

Nucleotide sequences store biological information and can guide the production of cellular molecules.



THE CORE CAUSAL CHAIN

3 PARTS
phosphate, sugar, base

→

NUCLEOTIDE
one monomer

→

NUCLEIC ACID
covalent backbone

→

SEQUENCE
information

BY THE END, YOU SHOULD BE ABLE TO...

1. Identify the three parts of a nucleotide.
2. Explain how nucleotides form an information-carrying strand.
3. Compare DNA and RNA structure and base pairing.

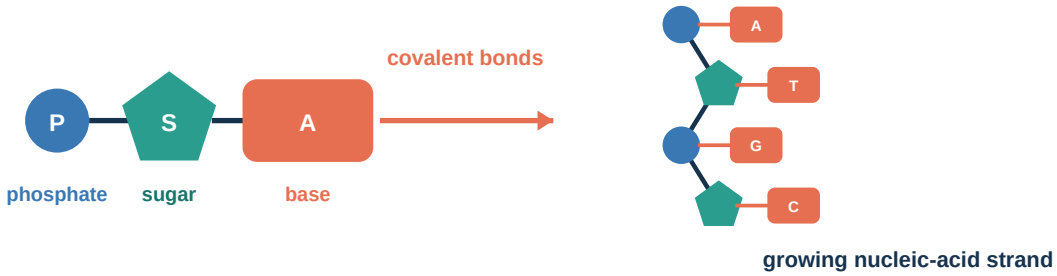
BIG IDEA

The sugar-phosphate backbone gives a nucleic acid structure; the order of its bases carries the information.

1 Nucleotide to nucleic-acid strand

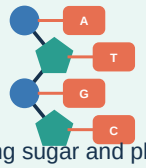
Covalent bonds link nucleotides into a strand with a repeating sugar-phosphate backbone.

ONE NUCLEOTIDE, THREE COMPONENTS



THE BACKBONE AND THE MESSAGE

SUGAR-PHOSPHATE BACKBONE



Alternating sugar and phosphate groups form the repeating structural chain.

BASE SEQUENCE

A T G C

The order of bases is variable and encodes biological information.

STRUCTURE SUPPORTS INFORMATION

MONOMER

A nucleotide contains phosphate, pentose sugar, and base.

DIRECTION

Each strand has distinct 5-prime and 3-prime ends.

SEQUENCE

Base order can be copied and used by cells.

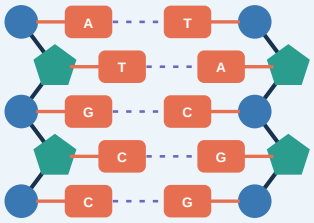
AP SCOPE NOTE

Know nucleotide components, covalent backbone formation, strand directionality, and how base sequence stores information.

2 DNA and RNA: related, not identical

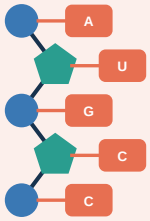
Both are nucleotide polymers, but they differ in sugar, one base, typical strand number, and cellular role.

DNA



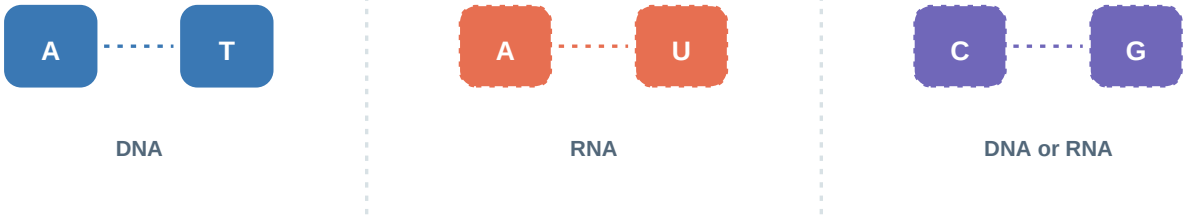
- Sugar: deoxyribose
- Bases: A, T, C, G
- Usually double-stranded
- Long-term information storage

RNA



- Sugar: ribose
- Bases: A, U, C, G
- Usually single-stranded
- Helps carry or use information

COMPLEMENTARY BASE PAIRING



ANTIPARALLEL DNA

The two DNA strands run in opposite 5-prime-to-3-prime directions. Complementary bases face inward and hydrogen bond.

COMMON ERROR

The backbone does not encode the message. Genetic information depends on the sequence of nitrogenous bases.