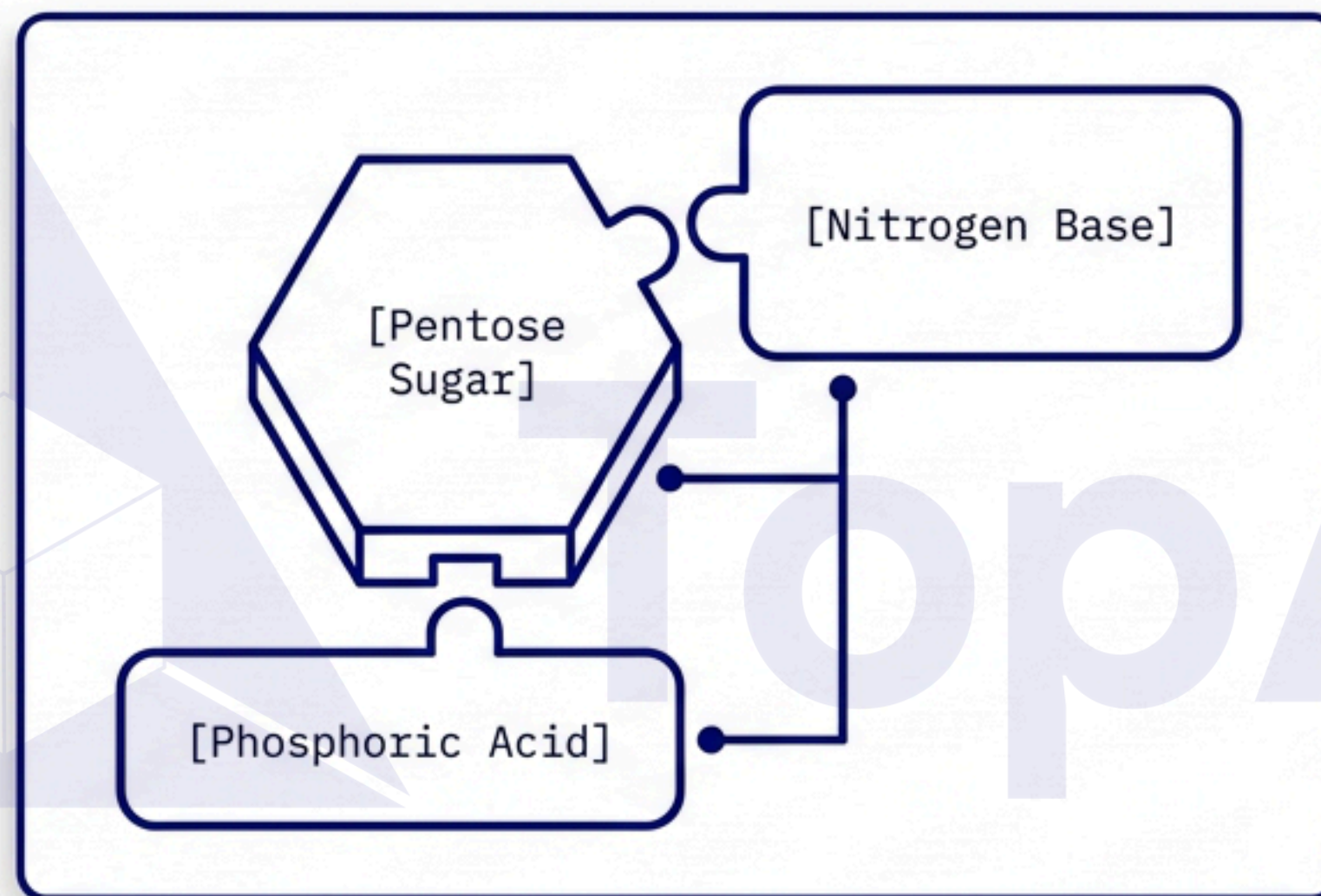
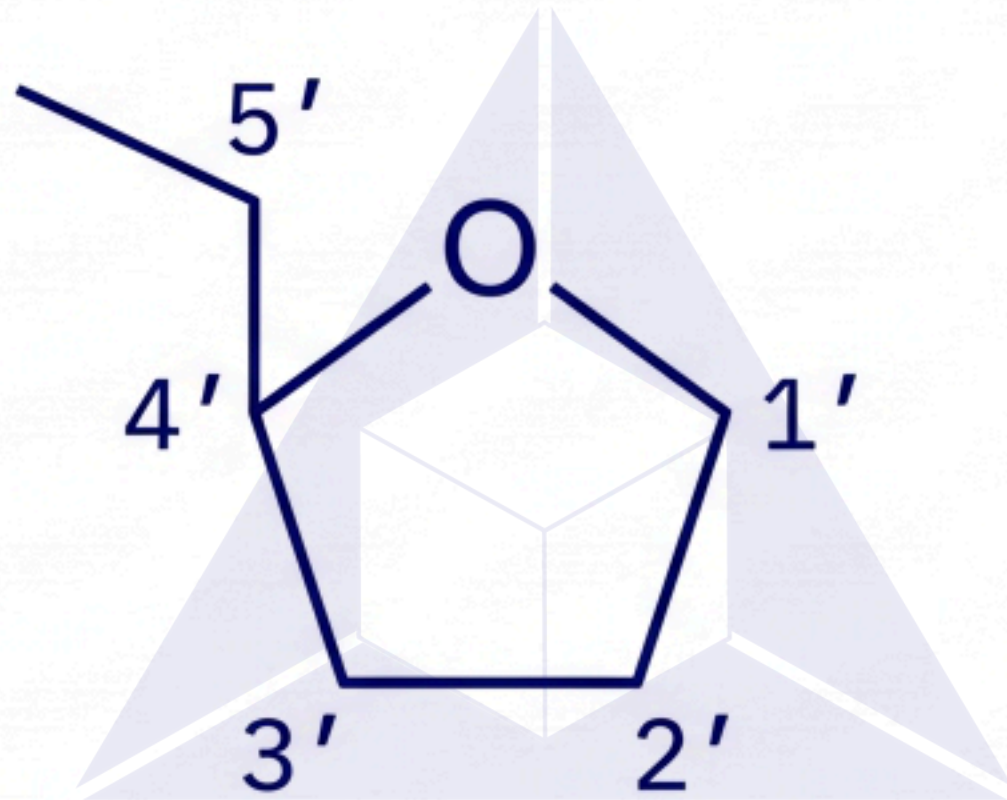


10.5.1 Chemical Composition of Nucleic Acids



Chromosomes are made up of proteins and nucleic acids. Deoxyribonucleic acid (**DNA**) and Ribonucleic acid (**RNA**) are long-chain polymers of nucleotides. This spec sheet deconstructs the three fundamental chemical components that build every nucleic acid.

The Pentose Sugar



[Backbone Foundation]

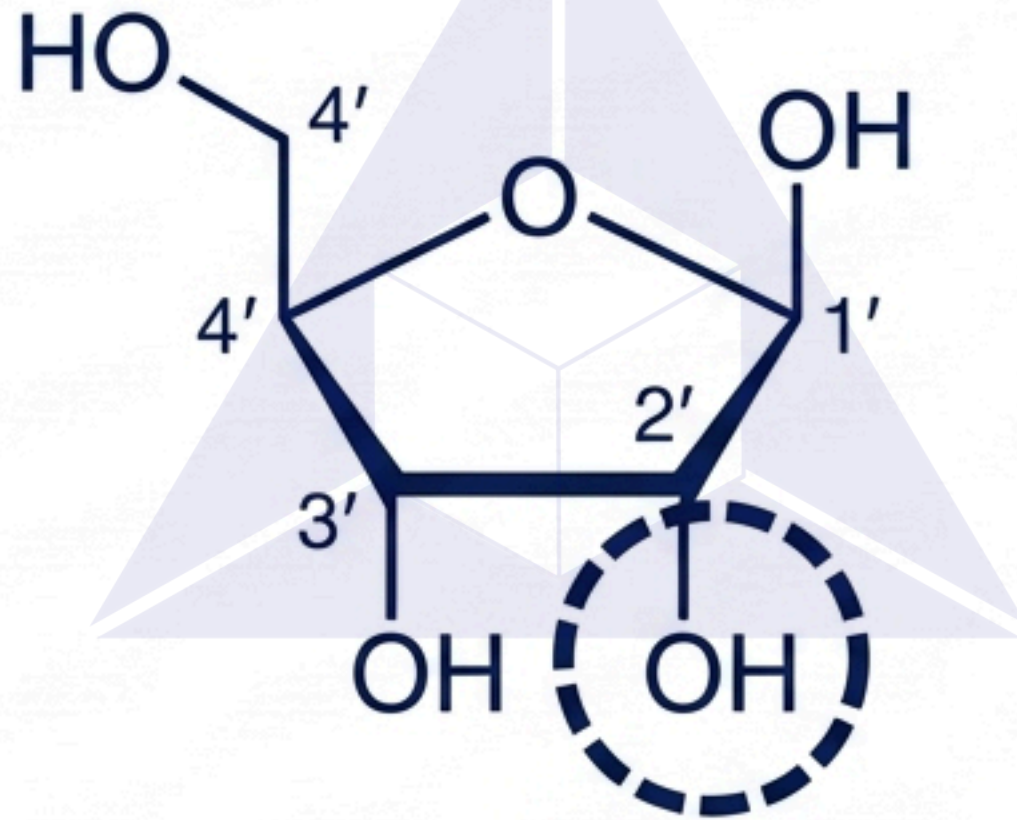
The central structural hub of the nucleic acid.

Sugar carbons are numbered with prime marks (1', 2', etc.) specifically to distinguish them from the numbering of the nitrogenous bases.

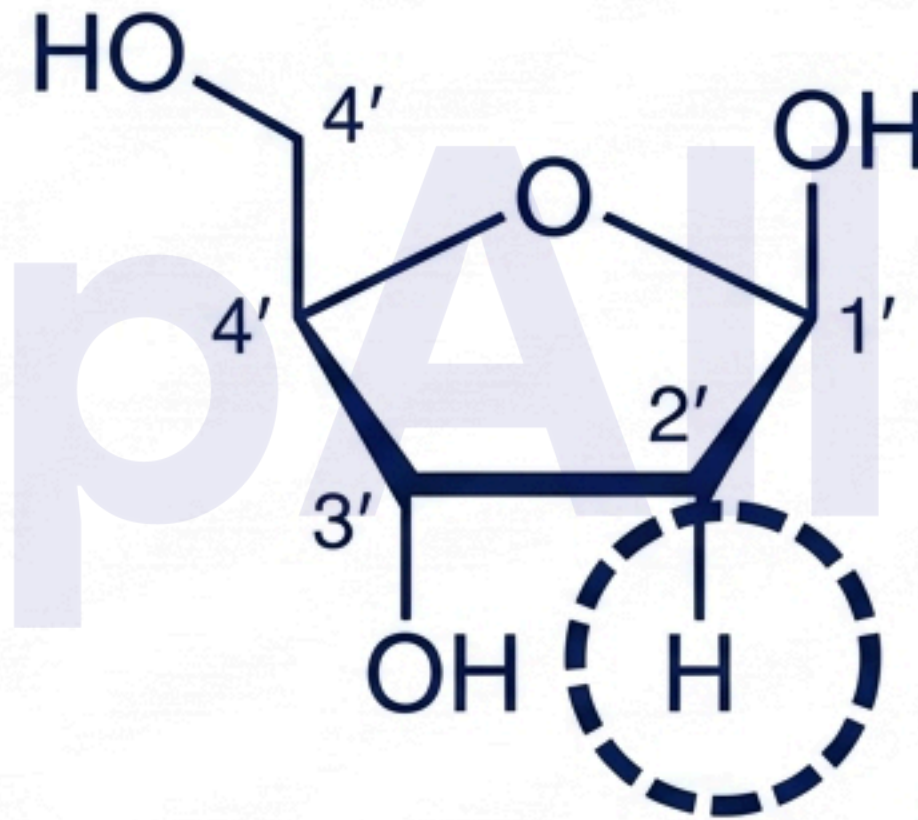
Complete hydrolysis of DNA or RNA yields a specific type of pentose sugar, which dictates the identity of the entire polymer.

β -D-ribose vs. β -D-2-deoxyribose

[Found in RNA]



[Found in DNA]



'Deoxy' strictly means 'without oxygen'. RNA utilizes β -D-ribose, whereas DNA utilizes β -D-2-deoxyribose (lacking the oxygen atom at the 2' position).



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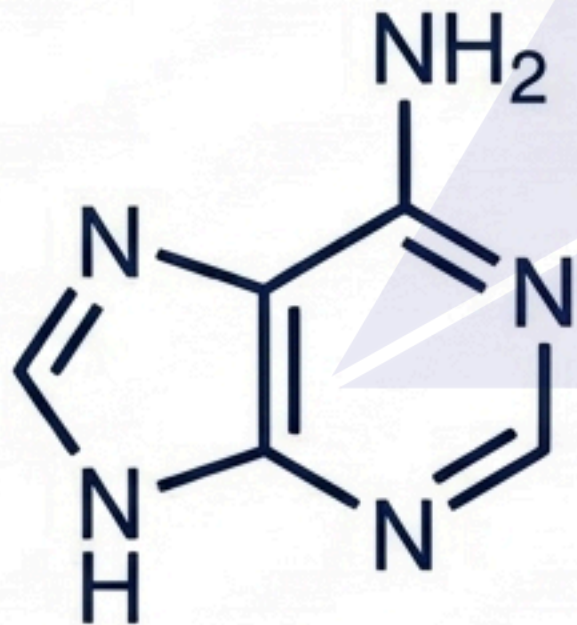


Nitrogenous Bases in DNA

[Purines] (Double-ring structures)

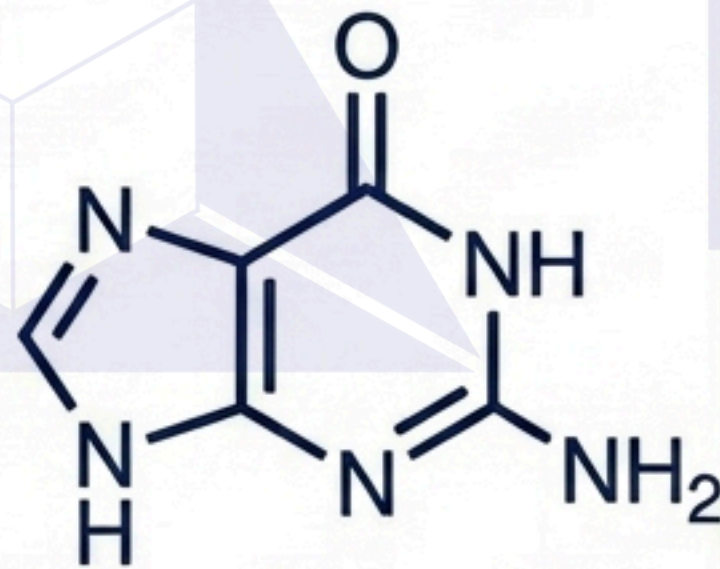
[Pyrimidines] (Single-ring structures)

[A]



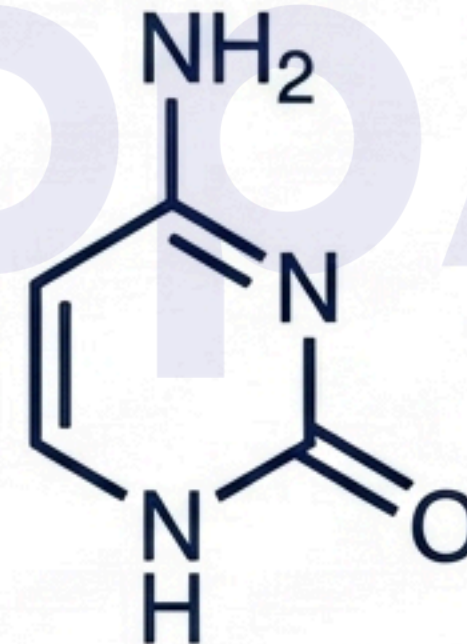
Adenine

[G]



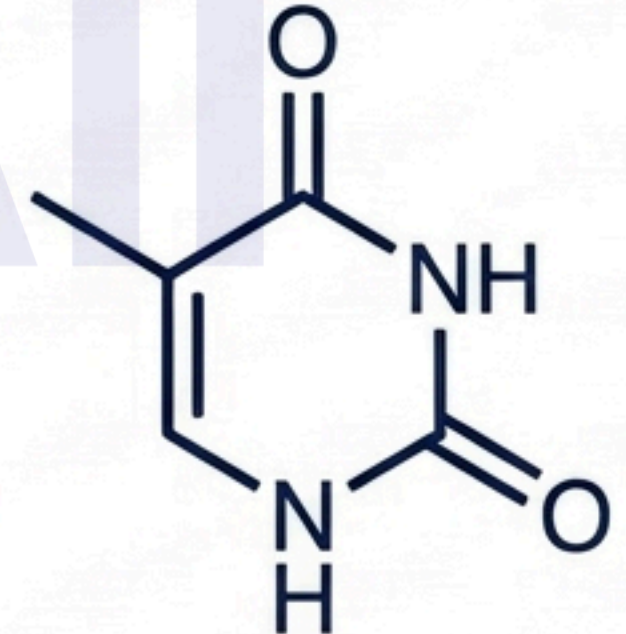
Guanine

[C]



Cytosine

[T]



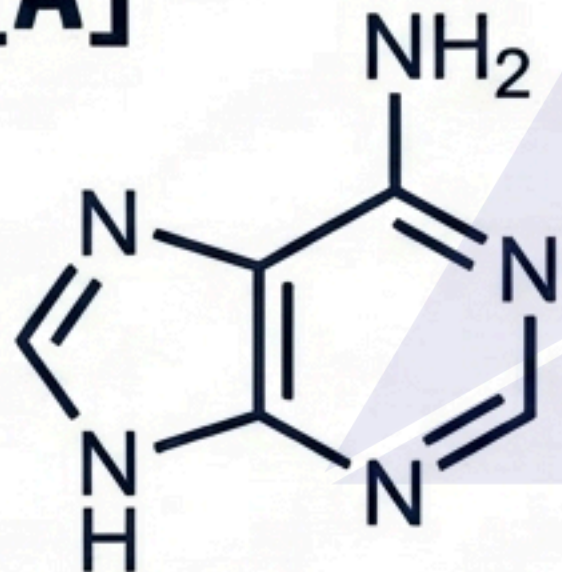
Thymine

Nitrogenous Bases in RNA

[Purines] (Double-ring structures)

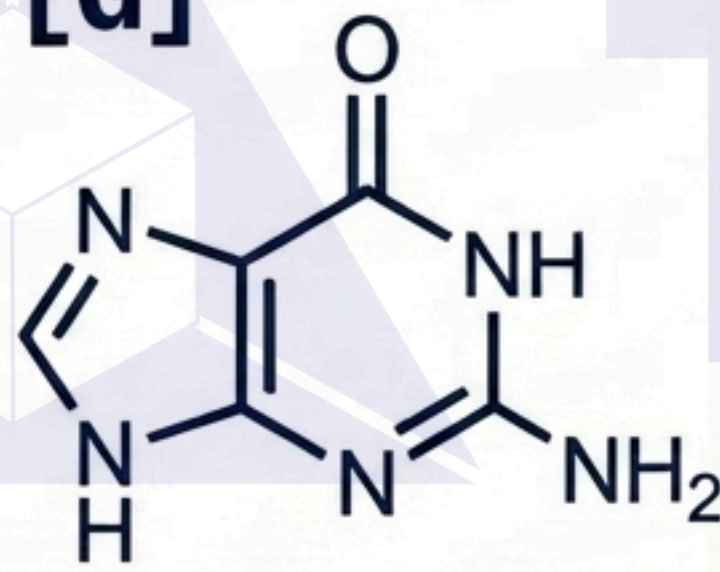
[Pyrimidines] (Single-ring structures)

[A]



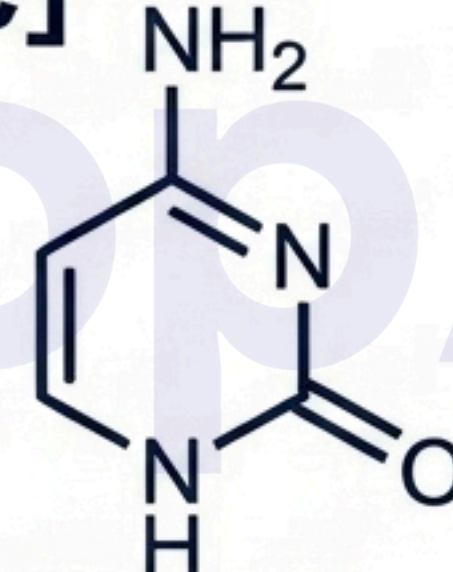
Adenine

[G]



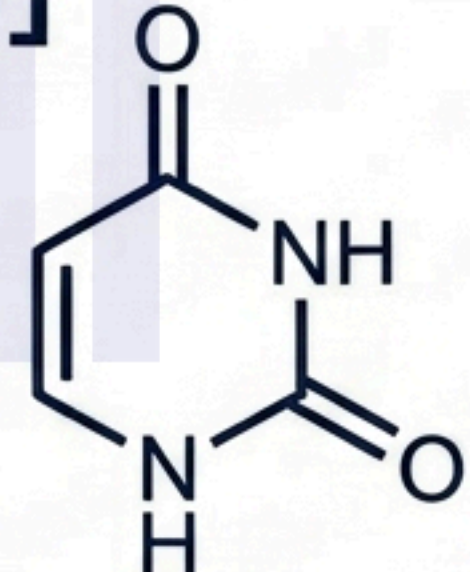
Guanine

[C]



Cytosine

[U]

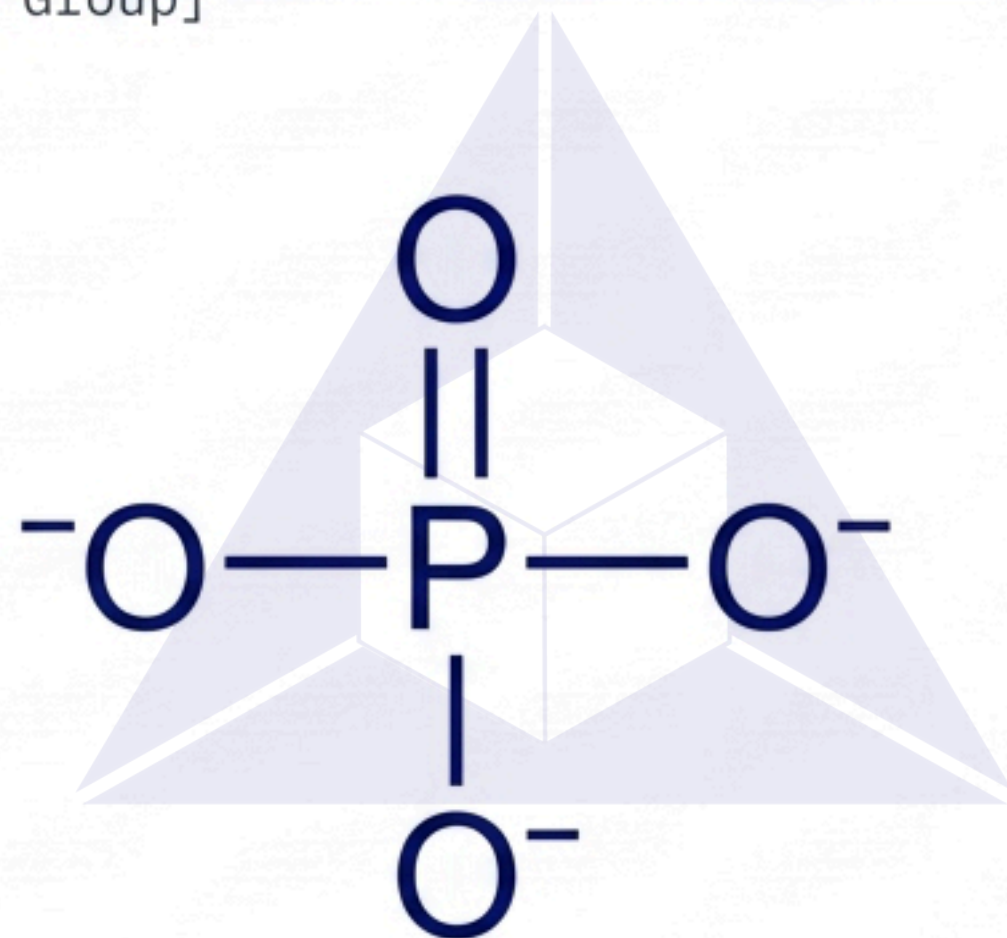


Uracil

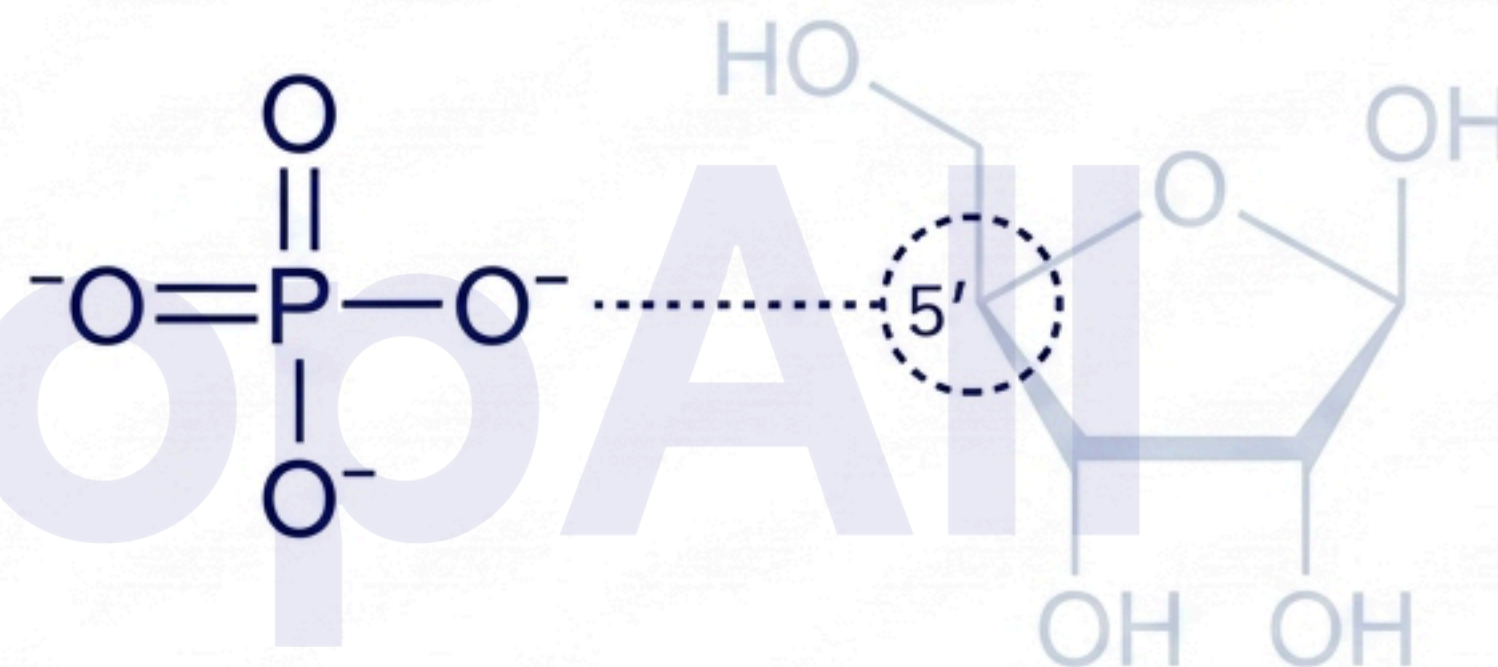
RNA shares three bases with DNA (Adenine, Guanine, Cytosine), but strictly substitutes Thymine [T] with Uracil [U].

Phosphoric Acid

[Phosphate Group]



Process-Flow Card

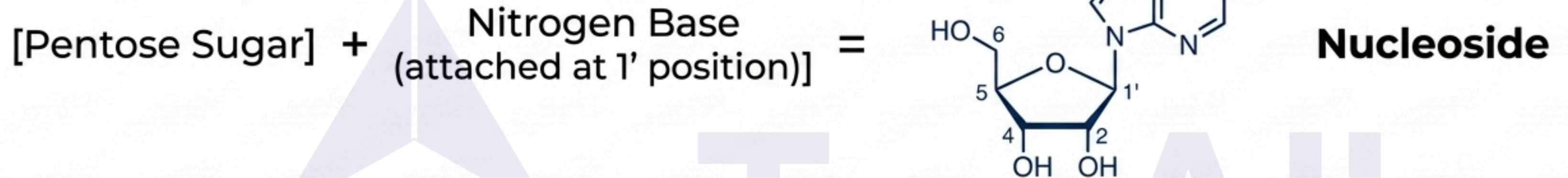


Concept Card

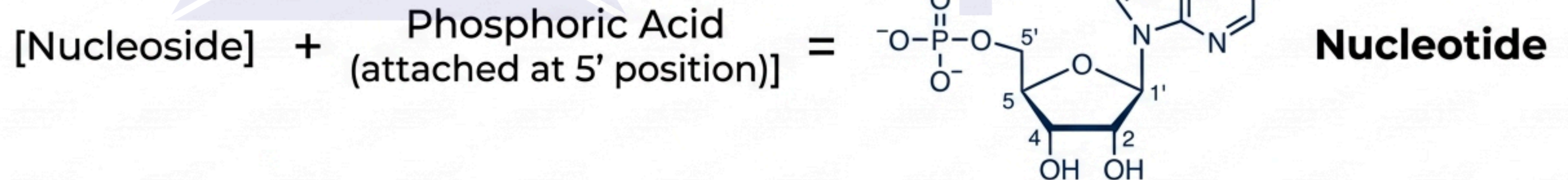
This component provides the acidic nature of the nucleic acid and carries the negative charge of the polymer chain.

Sugar + Base + Phosphate

Step 1 Strip (The Nucleoside)



Step 2 Strip (The Nucleotide)



Final Recap Badge

10.5.1 Complete. These individual nucleotide units will now link together via phosphodiester linkages to form the long-chain polymers of DNA and RNA.



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