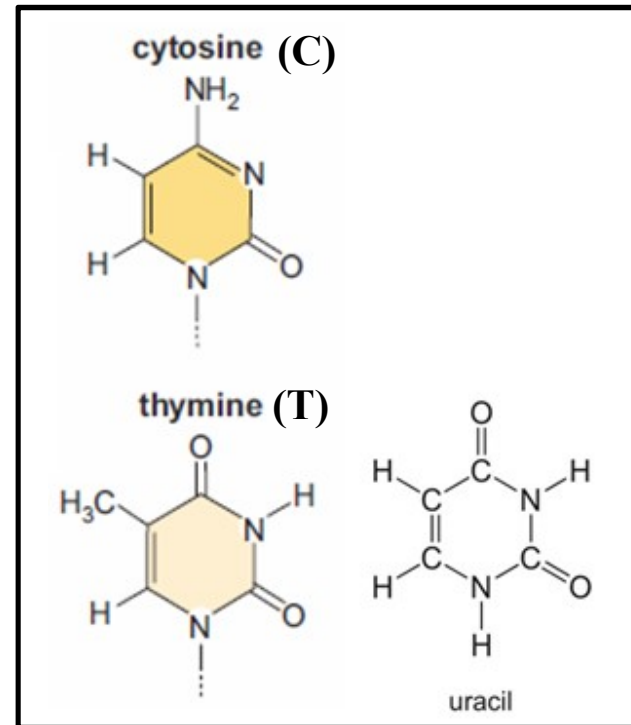
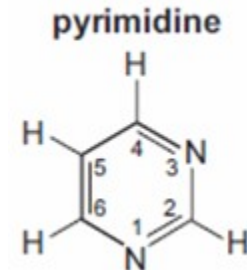
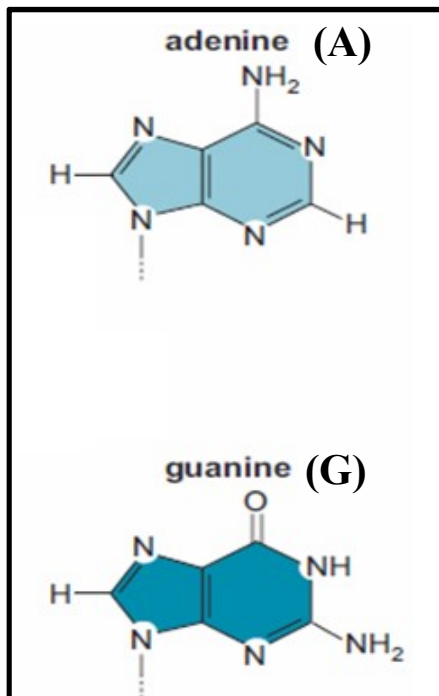
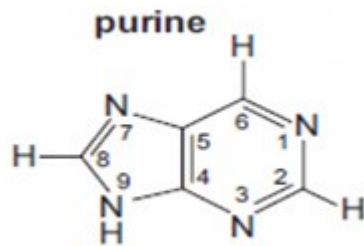


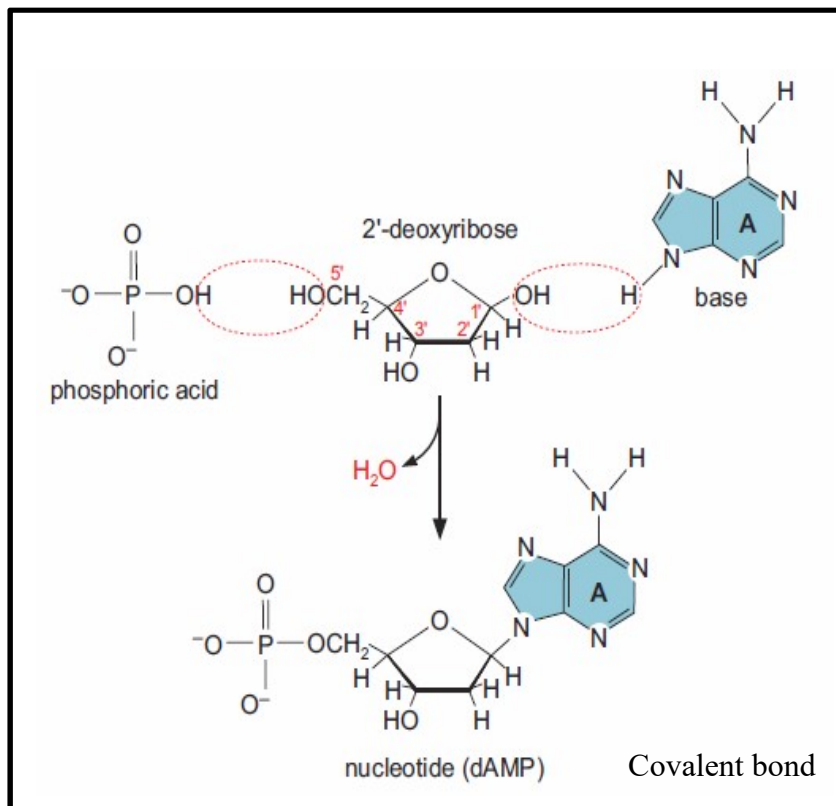
# Constituents of DNA/RNA

## 1. Nitrogen bases

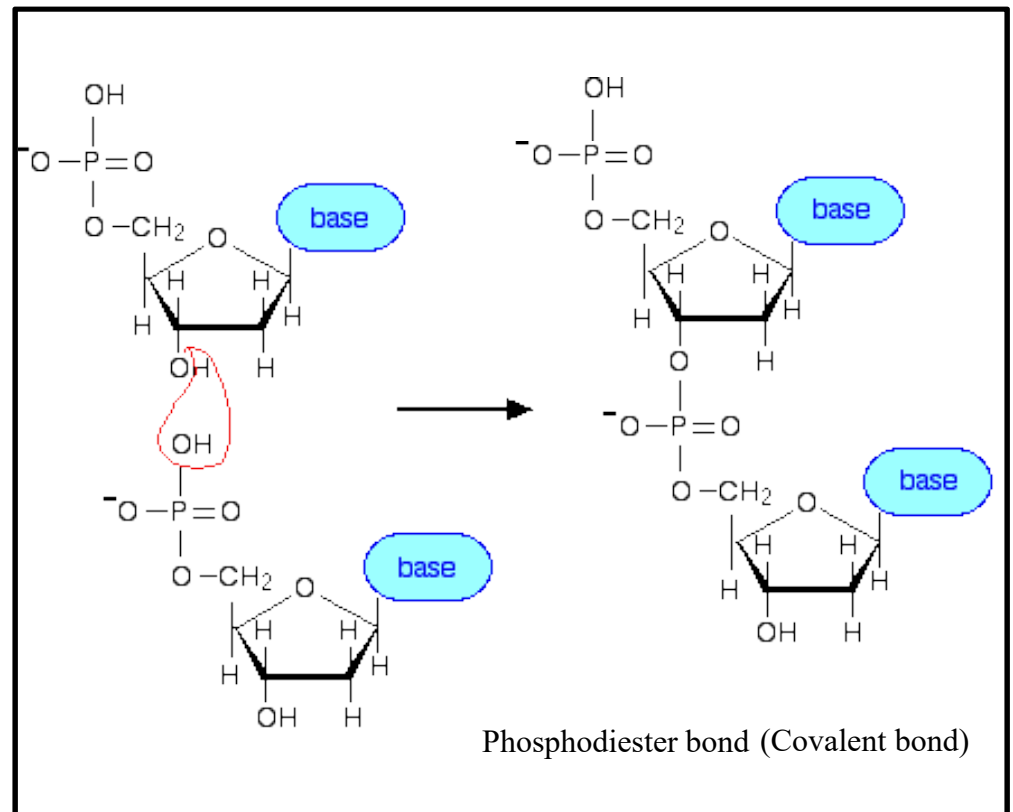


Purines and pyrimidines. The dotted lines indicate the sites of attachment of the bases to the sugars.

## Formation of nucleotide

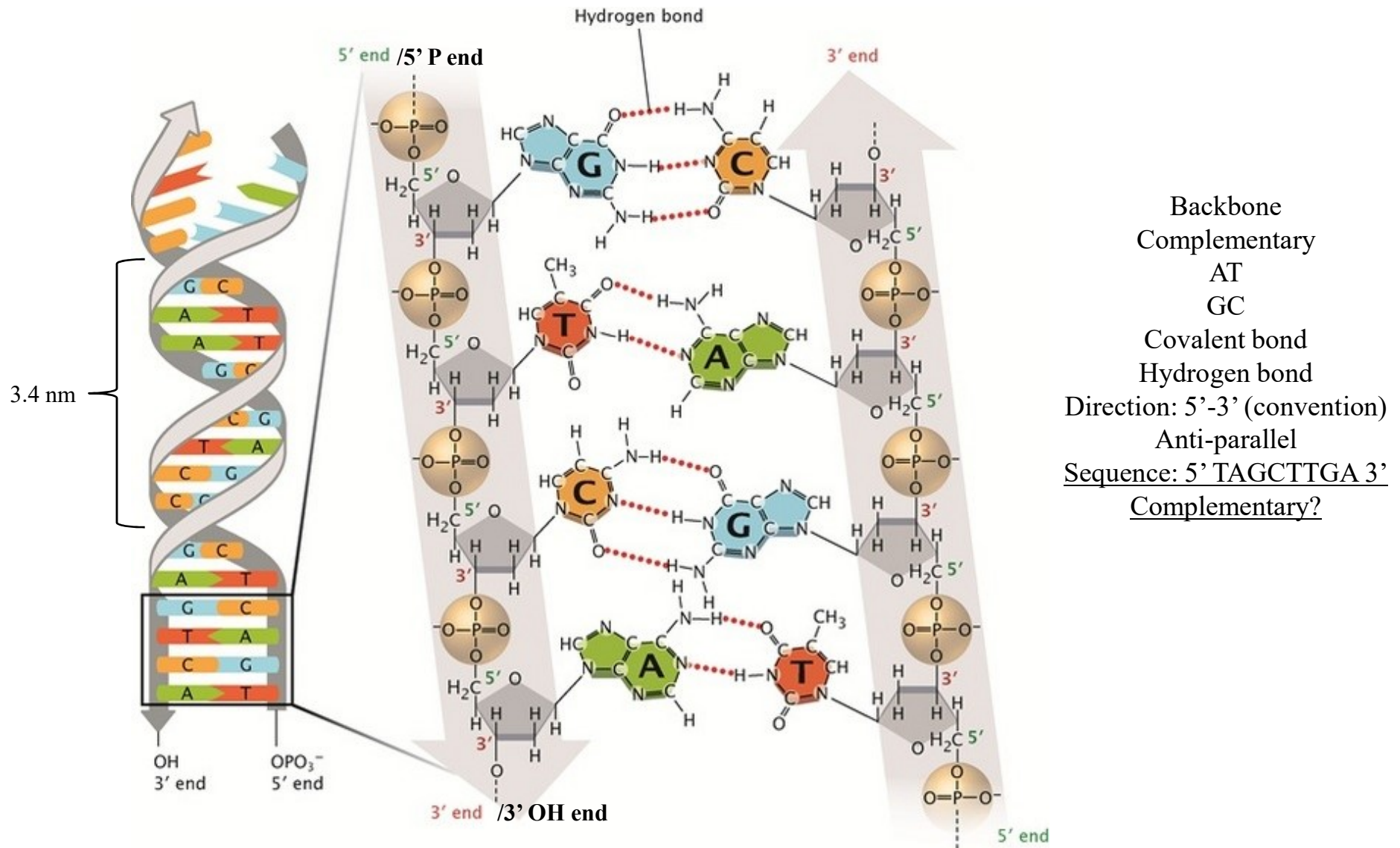


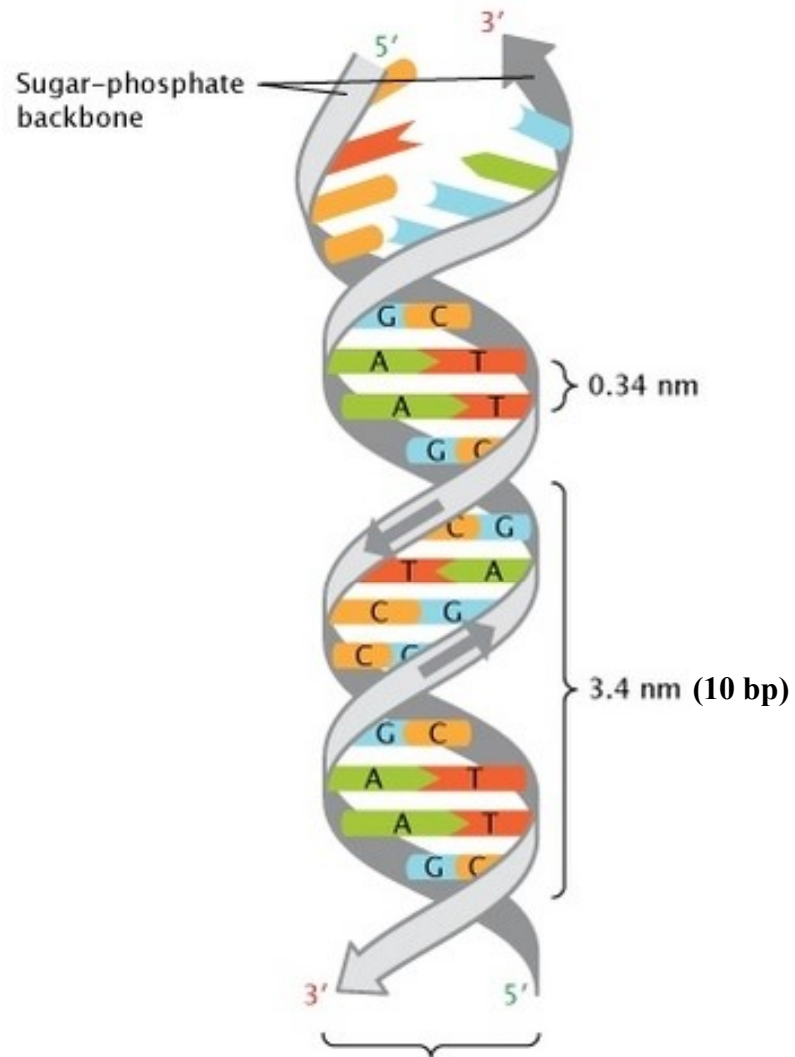
## Joining the nucleotides in a DNA strand



# Structure of DNA

**James Watson and Francis Crick** discovered DNA double helical structure in 1953. **The Nobel Prize in Physiology or Medicine** in 1962



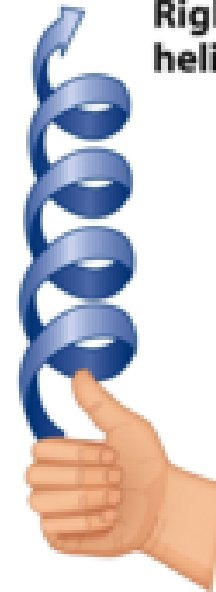


Helical diameter (2.37 nm)

**Left-handed helix**



**Right-handed helix**



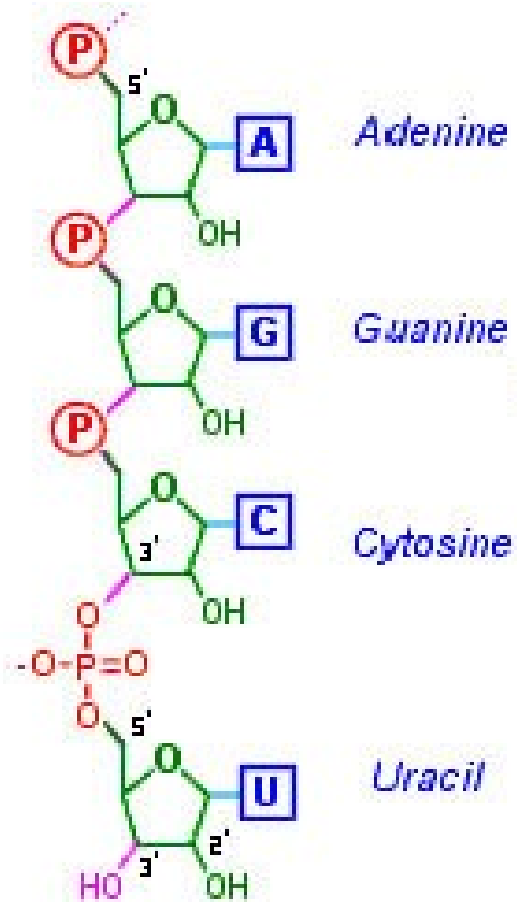
**Right-handed helix**

## Types of DNA

Feature	B-DNA	A-DNA	Z-DNA
Type of helix	Right-handed	Right-handed	Left-handed
Helical diameter (nm)	2.37	2.55	1.84
Rise per base pair (nm)	0.34	0.29	0.37
Distance per complete turn (pitch) (nm)	3.4	3.2	4.5
Number of base pairs per complete turn	10	11	12

The most common form, present in most DNA at neutral pH and physiological salt concentrations is B-form. A small amount of the DNA in a cell exists in the Z form.

## Structure of RNA



## single stranded RNA



## double stranded RNA



Hairpin  
(stem-loop)

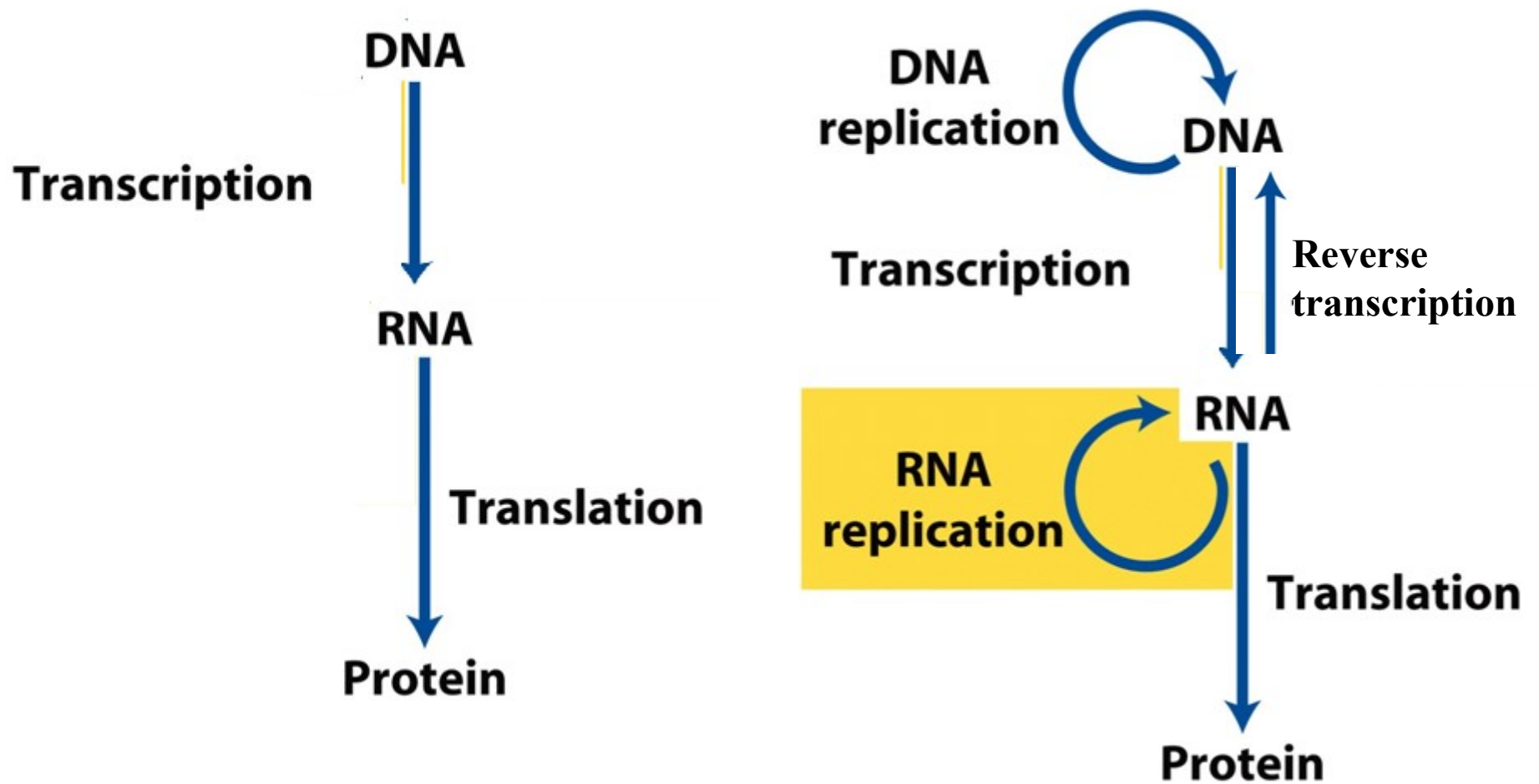


Pseudoknot



Kissing hairpins

## Central dogma of Molecular Biology





**DNA**



↓  
**transcription of DNA  
into complementary RNA**

Transcription, DNA → RNA

**Messenger RNA**



↓  
**translation of RNA on  
ribosome to polypeptide chain**

Translation, RNA → Protein

**protein**

