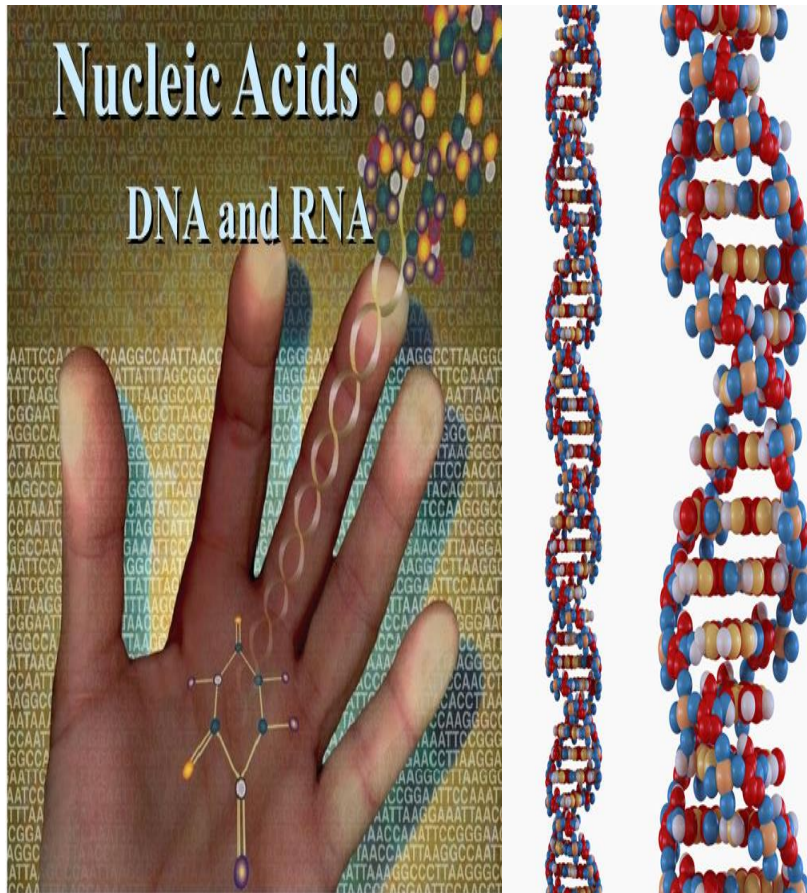




Biochemistry – Year 2



Lecture 4

By

**Assistance teacher
Wisal Althamiry**

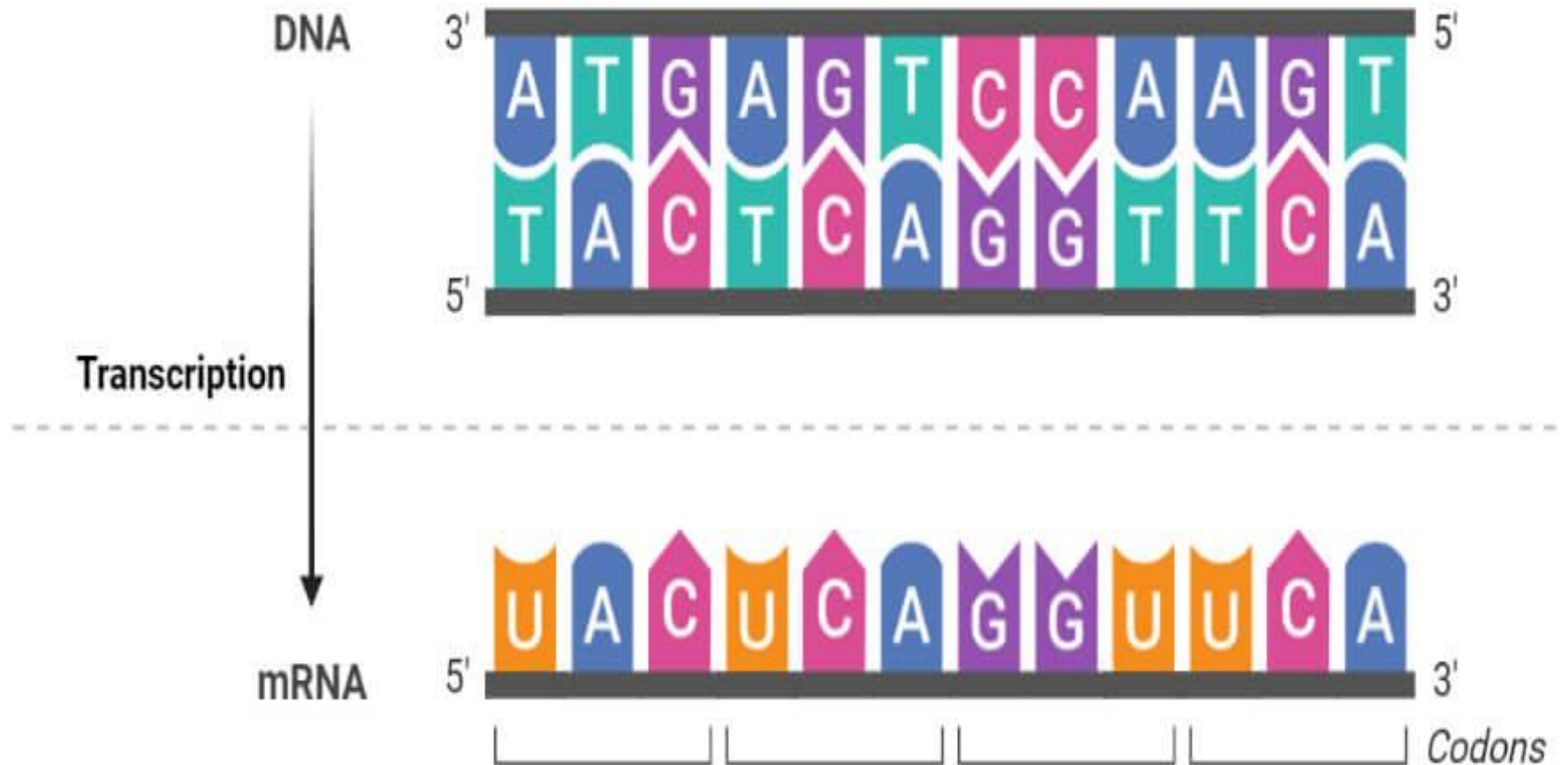
**Department of Basic
sciences**

**College of Dentistry
University of Basrah**

Transcription

- is the process by which genetic information from DNA is transferred into RNA. DNA sequence is enzymatically copied by messenger RNA (mRNA) to produce a complementary nucleotide transfer RNA (tRNA) strand.
- synthesis of mRNA from a DNA template
- only one strand of DNA, template strand, is used to make mRNA
- mRNA is complementary to the template strand

DNA Transcription (RNA Synthesis)



Protein Synthesis Transcription

Transcription process **RNA polymerase** attaches to DNA at a special sequence that serves as a “start signal”

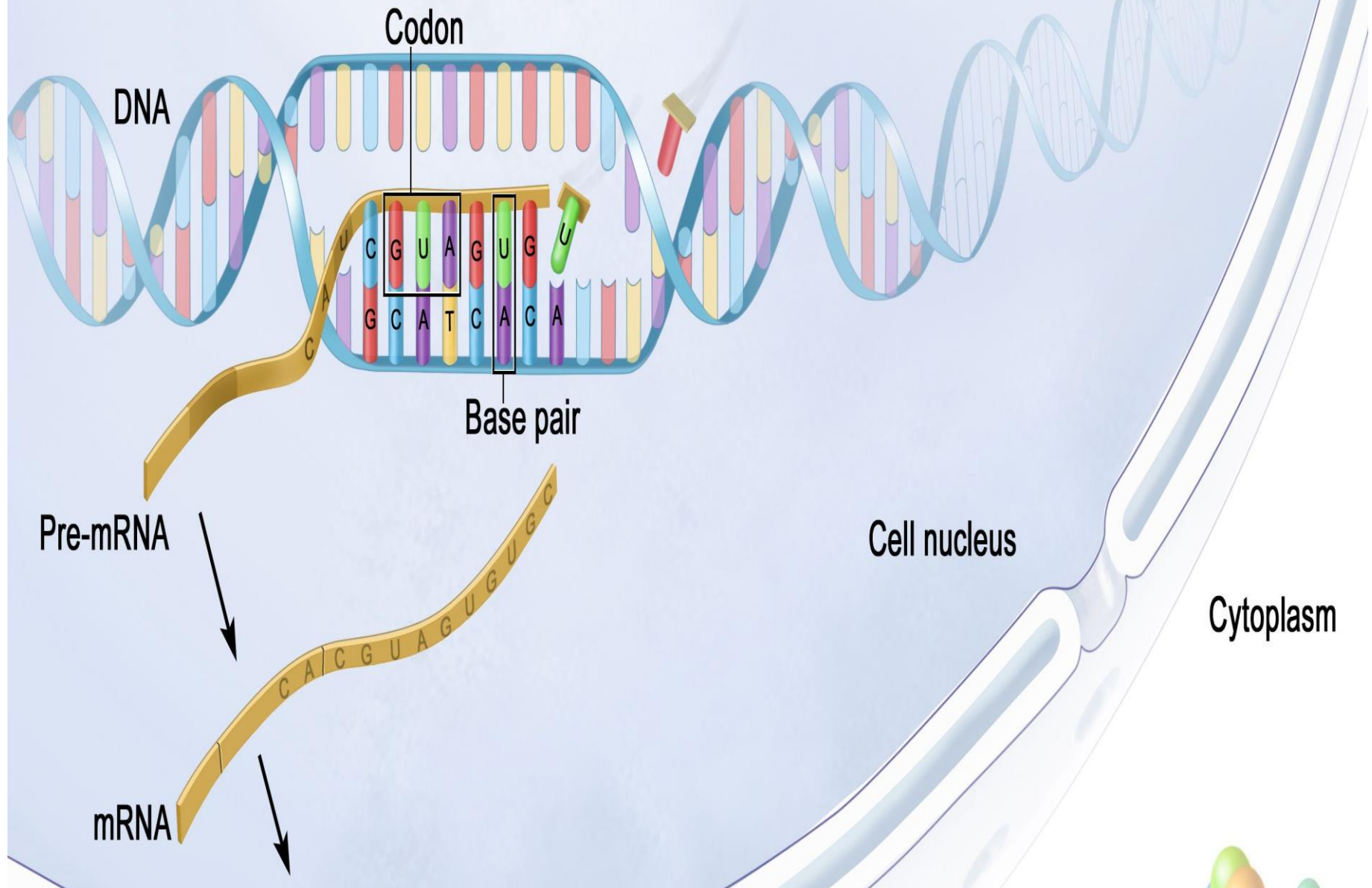
The DNA are separated and **one strand** serves as a template

The RNA bases attach to the complementary DNA template thus **synthesizing mRNA**

The RNA polymerase recognizes a termination site on the DNA molecule and **releases the new mRNA molecule.**

(mRNA leaves the nucleus and travels to the **ribosome in the cytoplasm.**)

Transcription



What **RNA** strand will be made from the following **DNA** sequence?

TACGCATGACTAGCAAGTCTAACT

answer **AUGCGUACUGAUCGUUCAGAUUGA**

Given a DNA strand with the following nucleotide sequence, what is the sequence of its complimentary strand?

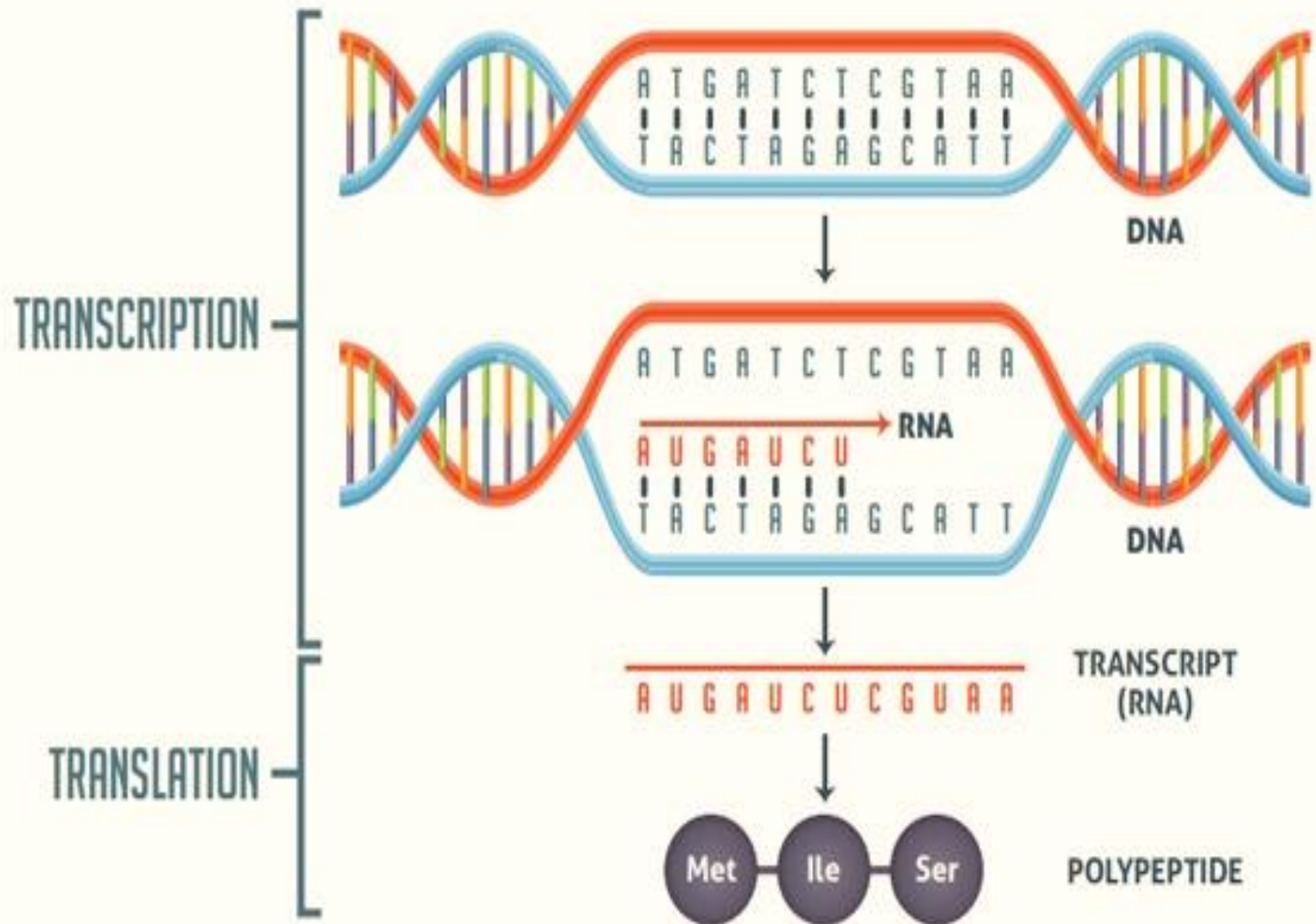
3'- TACCACGTGGACTGAGGACTCCTCTTCAGA -5'

answer

3'- AUGGUGCACCUGACUCCUGAGGAGAAGUCU -5'

Translation

- process of converting information in mRNA into a sequence of amino acids (polypeptide chain) in a protein.
- mRNA is in ribosome
- Each combination of 3 nucleotides on mRNA is called a codon or three-letter code word.
- Each codon specifies a particular amino acid that is to be placed in the polypeptide chain (protein).



- tRNA is also read in segments of 3 letters called **anticodons**.

The anticodon is complementary to the codon found on mRNA (i.e. if the codon is AUG the anticodon is UAC)

- Eventually a **stop** codon is reached. They do not code for amino acids. They tell the ribosome to stop adding amino acids. Many ribosomes may work at once on one piece of mRNA.

Given a mRNA strand with the following nucleotide sequence, what are the sequence (anticodons) of its complimentary tRNA strands?

3'- AUGGUGCACCUGACUCCUGAGGAGAAGUCU -5'

Answer 3' – UACCACGUGGAUGAGGACUCCUCUUCAGA -5'

- Given the following sequence of mRNA, what is the amino acid sequence of the resultant polypeptide?
- AUGGUGCACCUG
ACUCCUGAGGAG
AAGUCU**

		SECOND POSITION				THIRD POSITION		
FIRST POSITION		U	C	A	G			
	U	phenyl- alanine	serine	tyrosine	cysteine		U	
							C	
		leucine		stop	stop		A	
				stop	tryptophan		G	
	C	leucine	proline	histidine	arginine		U	
								C
				glutamine			A	
							G	
	A	isoleucine	threonine	asparagine	serine	U		
					C			
* methionine		lysine		arginine	A			
					G			
G	valine	alanine	aspartic acid	glycine	U			
						C		
			glutamic acid		A			
					G			

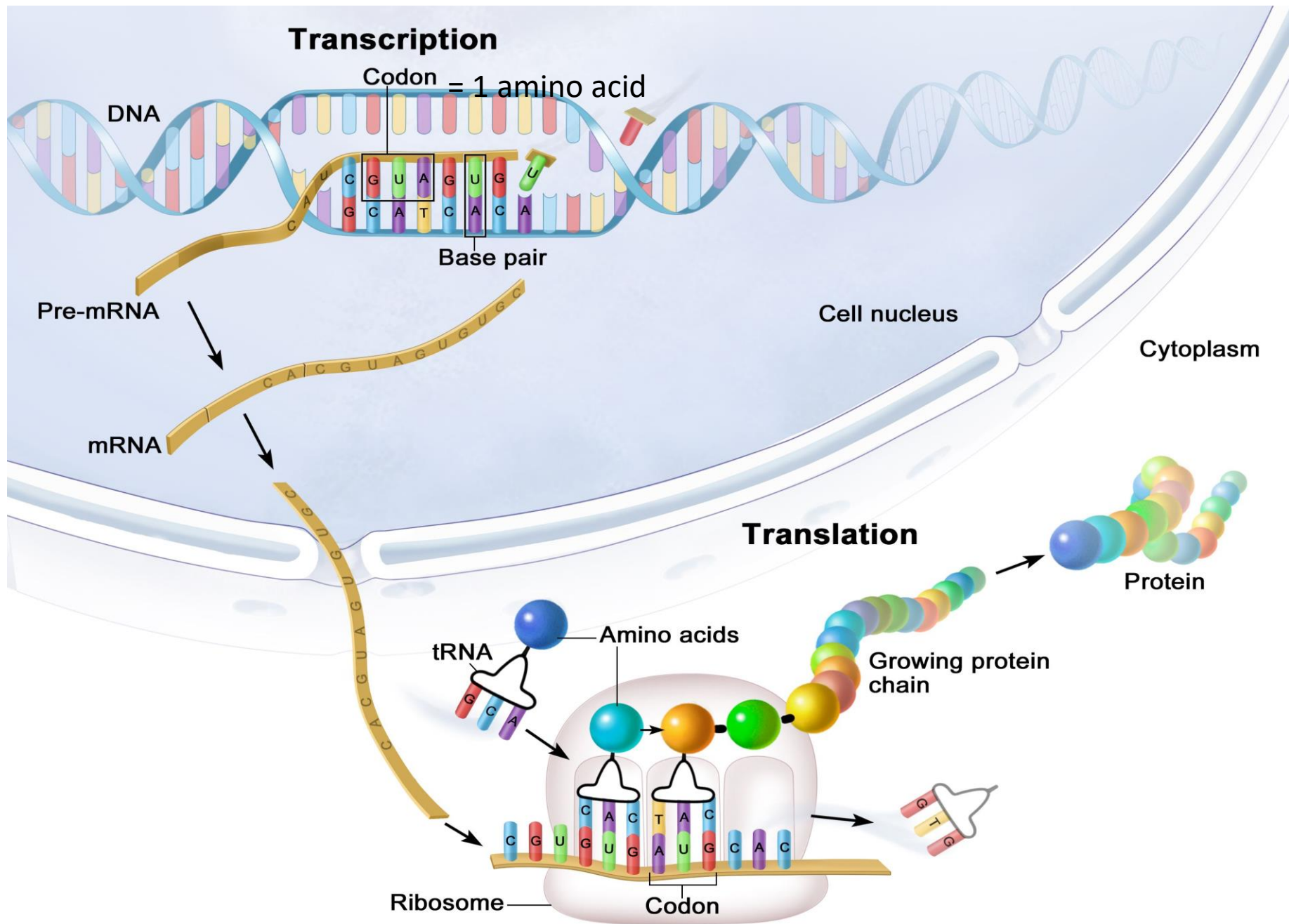
* and start

* and start

Answer

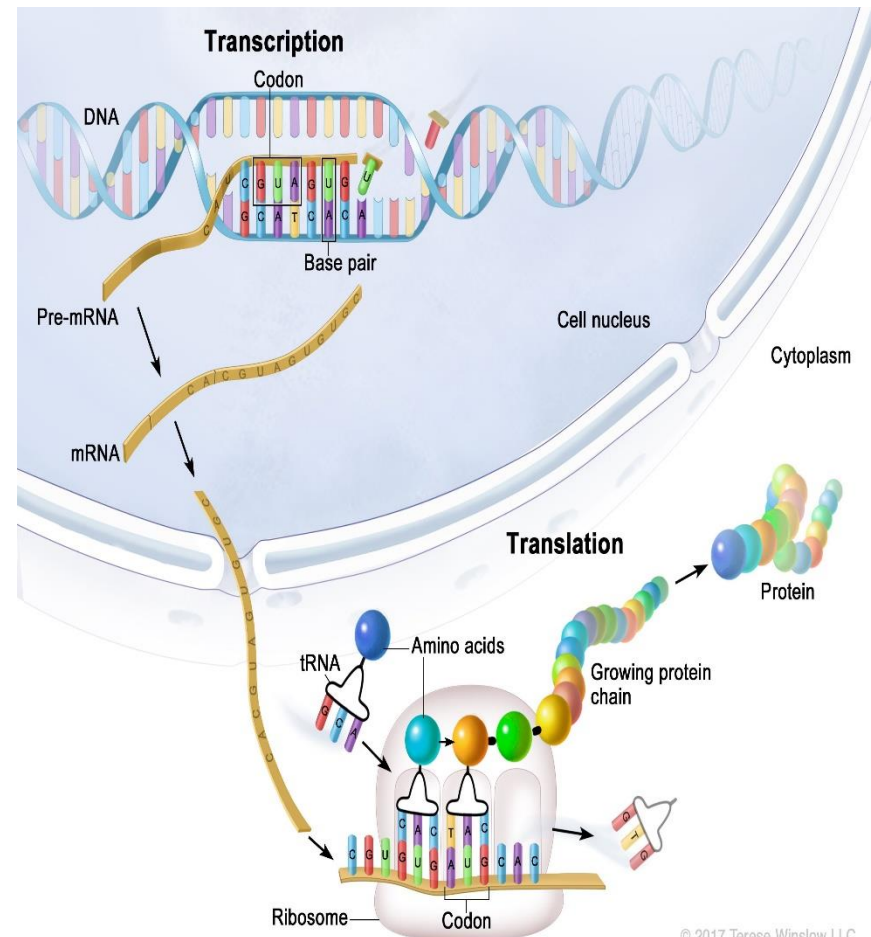
;Met-val-his-leu-thr-pro-glu-glu-lys-ser

Transcription



RECAP:

1. DNA is **transcribed** into mRNA in the nucleus.
2. The mRNA leaves the nucleus and enters the cytoplasm.
3. The protein is **translated** from the mRNA sequence using tRNA and amino acids.



Thanks