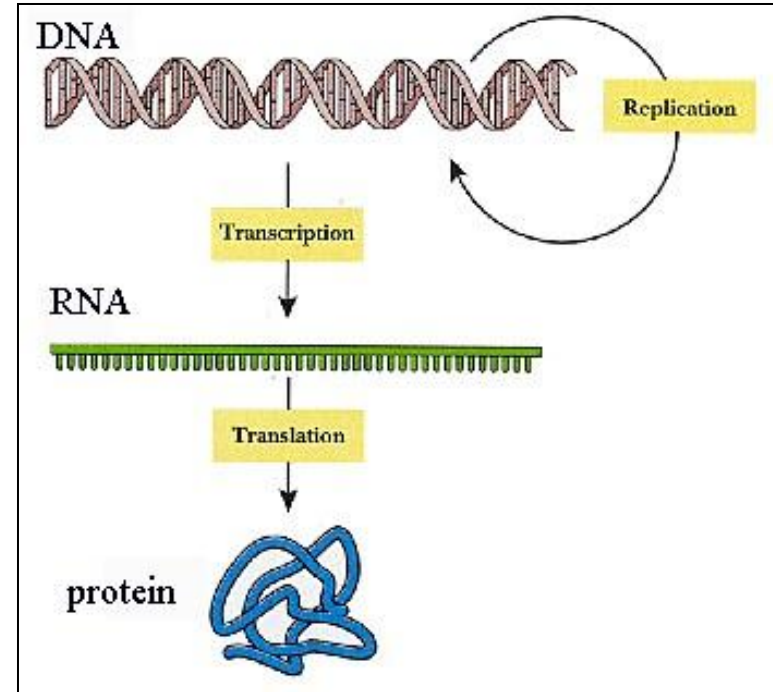


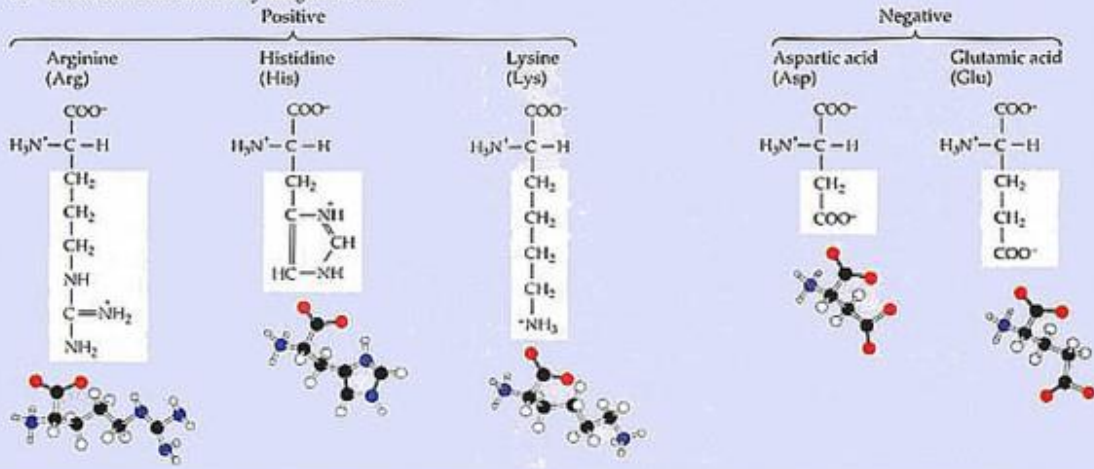
Step 3 is **TRANSLATION**

In **translation**, RNA molecules are used as a code for protein assembly at the ribosome.

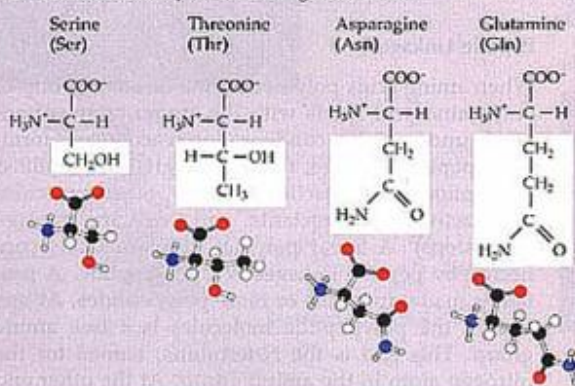
Proteins are large, complex molecules made up of smaller subunits called **amino acids**.



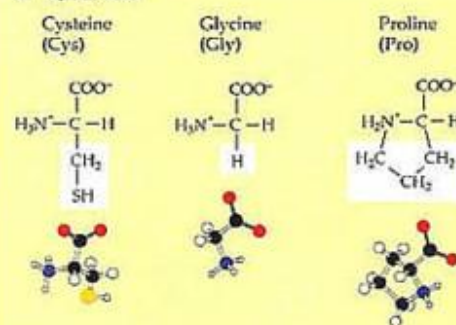
A. Amino acids with electrically charged side chains



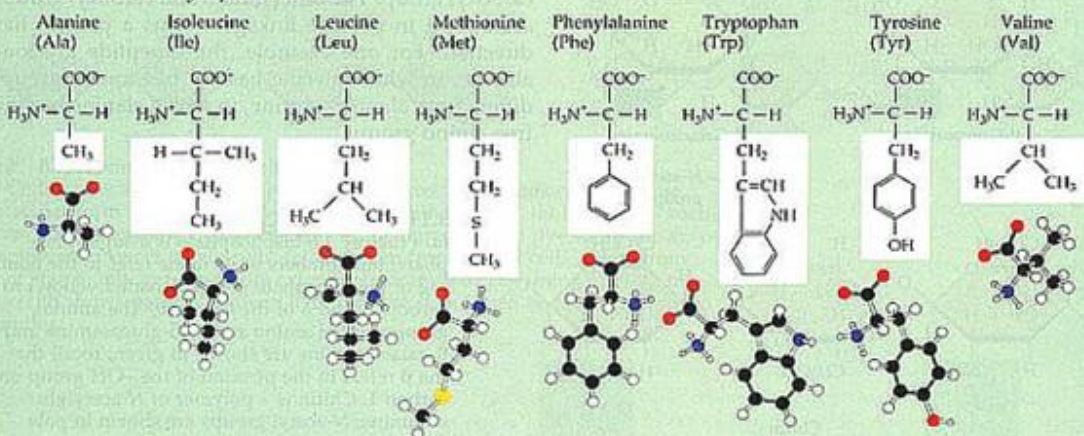
B. Amino acids with polar but uncharged side chains



C. Special cases



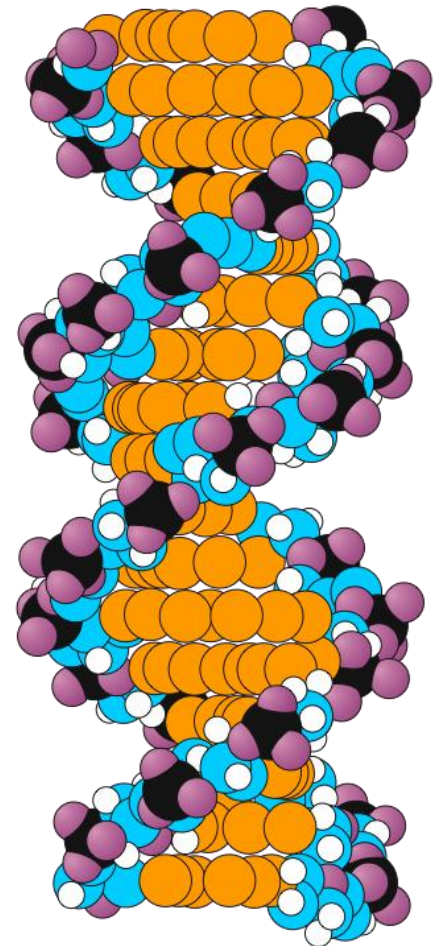
D. Amino acids with hydrophobic side chains

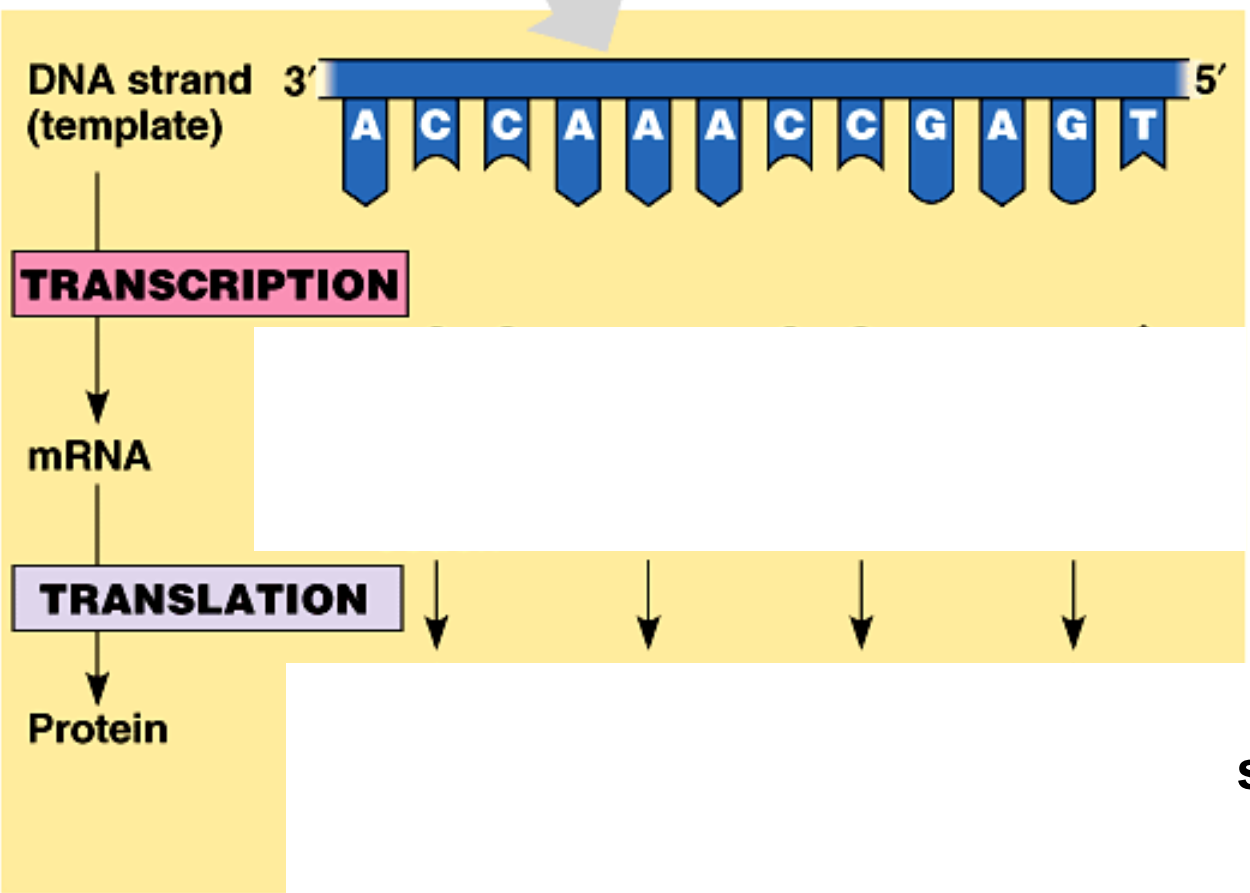
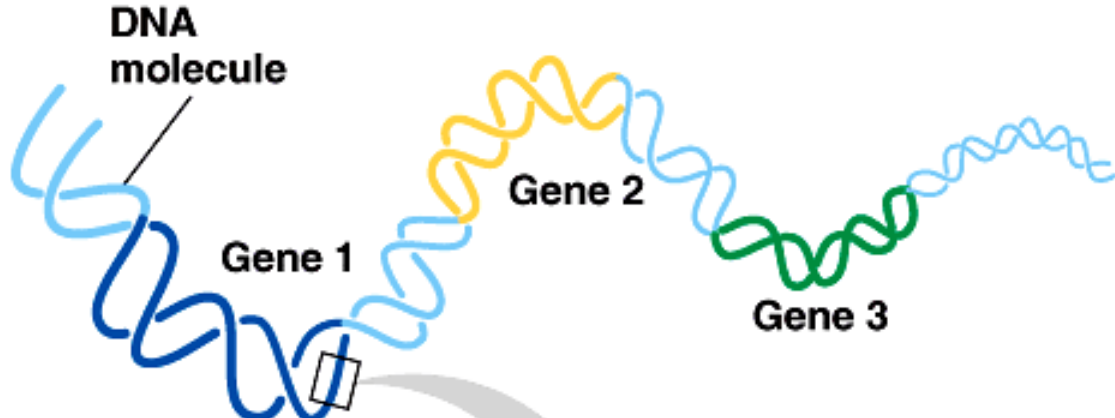


The Genetic Code

In 1961, **Crick** and colleagues determined that that the DNA codes for amino acids in a sequence of **three bases** called:

- Triplets** on DNA
- Codons** on mRNA





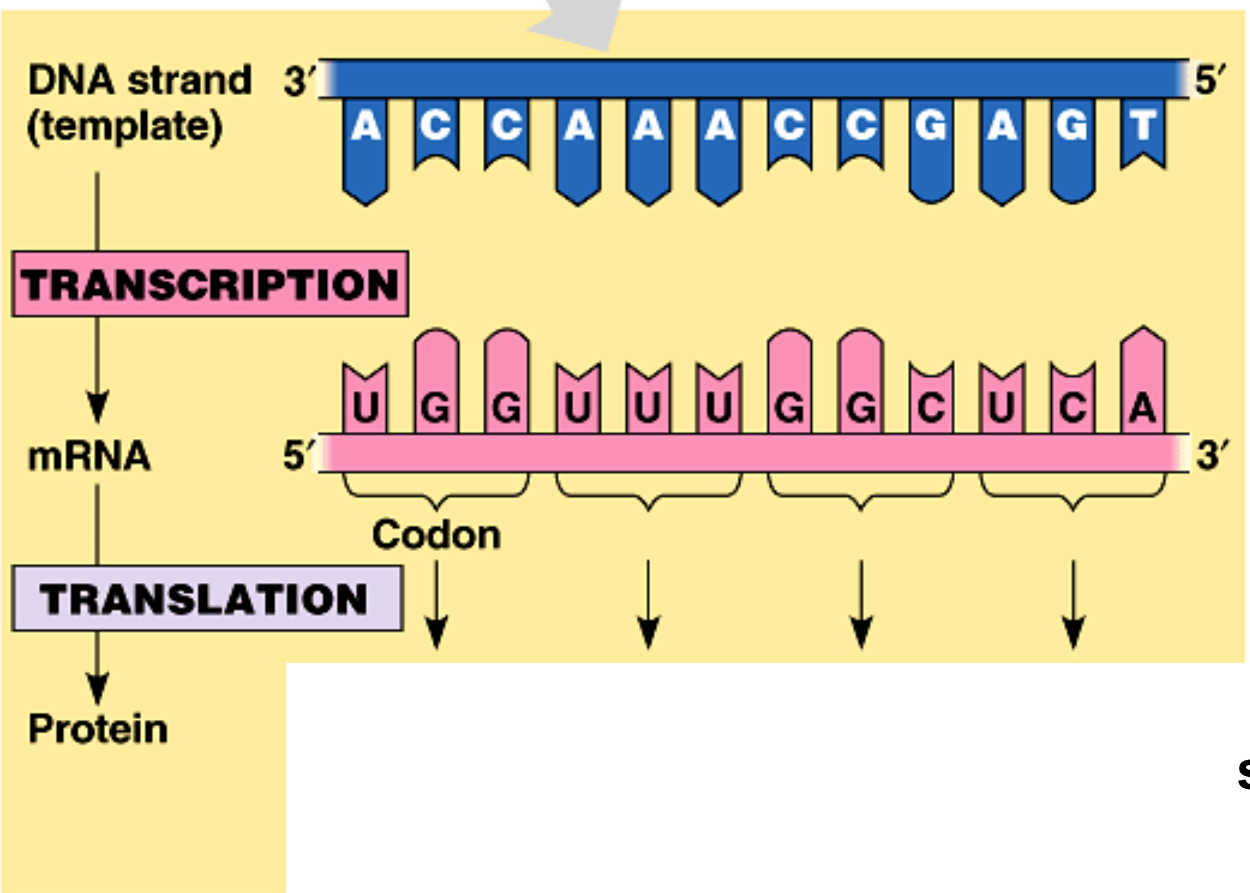
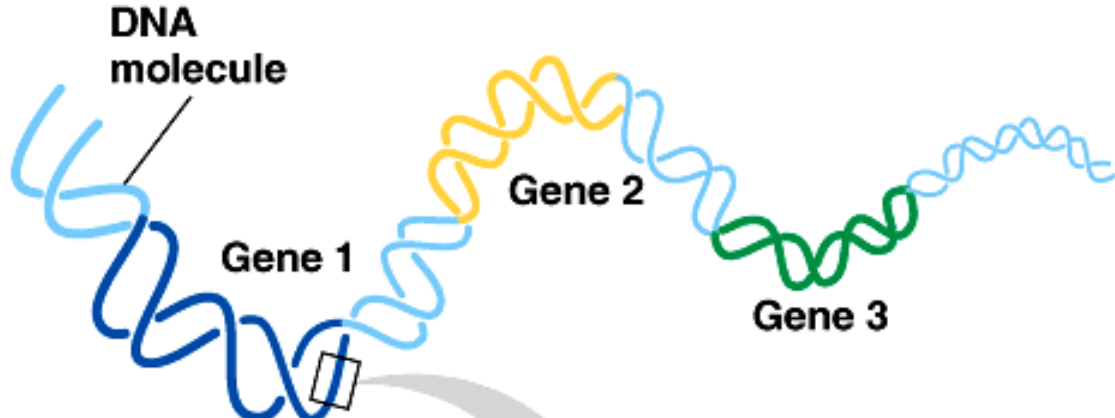
COPY THIS SEQUENCE INTO YOUR NOTES

The triplet of DNA codes (A C C) through transcription.

FIGURE OUT THE SEQUENCE

Each mRNA CODON specifies an amino acid or a signal to stop protein synthesis.

		Second base				
		U	C	A	G	
First base (5' end)	U	UUU	UCU	UAU	UGU	U
		UUC	UCC	UAC	UGC	C
		UUA	UCA	UAA Stop	UGA Stop	A
		UUG	UCG	UAG Stop	UGG Trp	G
	C	CUU	CCU	CAU	CGU	U
		CUC	CCC	CAC	CGC	C
		CUA	CCA	CAA	CGA	A
		CUG	CCG	CAG	CGG	G
	A	AUU	ACU	AAU	AGU	U
		AUC	ACC	AAC	AGC	C
		AUA	ACA	AAA	AGA	A
		AUG Met or start	ACG	AAG	AGG	G
G	GUU	GCU	GAU	GGU	U	
	GUC	GCC	GAC	GGC	C	
	GUA	GCA	GAA	GGA	A	
	GUG	GCG	GAG	GGG	G	



The triplet of DNA codes for three mRNA nucleotides (“codons”) through transcription.

Each mRNA CODON specifies a particular amino acid. **FIGURE OUT THE SEQUENCE** of amino acids to determine the sequence of the protein synthesis.

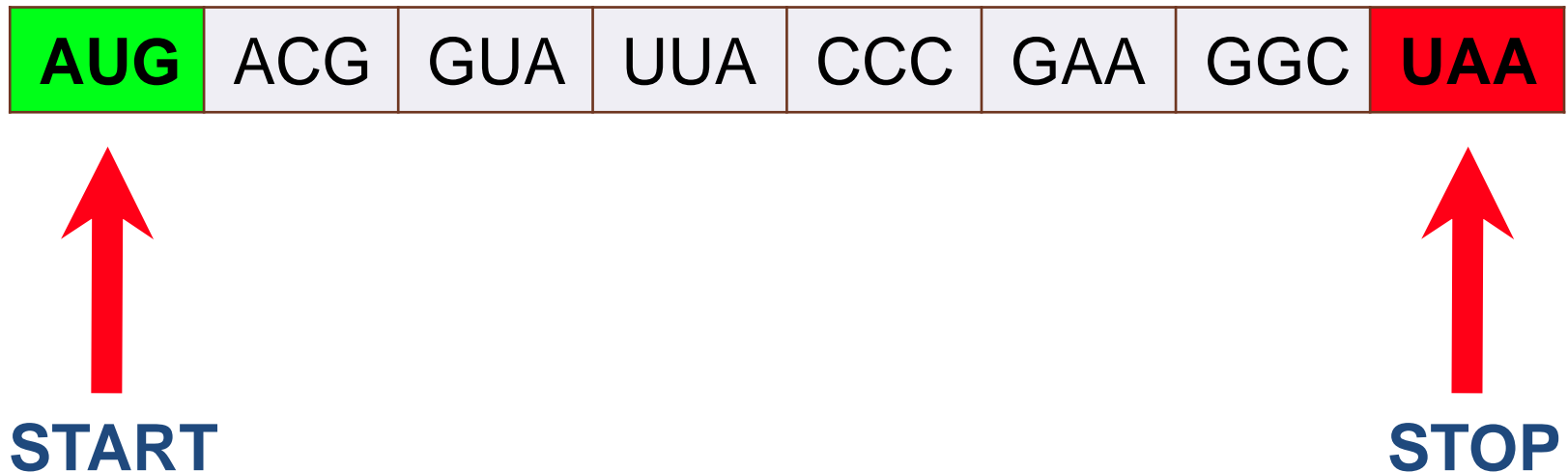
The Genetic Code

● **START:** AUG

● **STOP:** UAA, UAG, UGA

EXAMPLE:

A mRNA strand coding for six amino acids with a start and stop sequence:



A portion of a specific DNA molecule consists of the following sequence of nucleotide triplets...

TAC GAA CTT CGG TCC GTT

- What mRNA is transcribed?

AUG CUU GAA GCC AGG CAA

- What amino acids are coded?

MET LEU GLU ALA ARG GLN

With few exceptions, the genetic code is degenerate and universal

- **Degenerate:** having more than one codon that may code for the same amino acid.
- **Universal:** A shared characteristic all types of life