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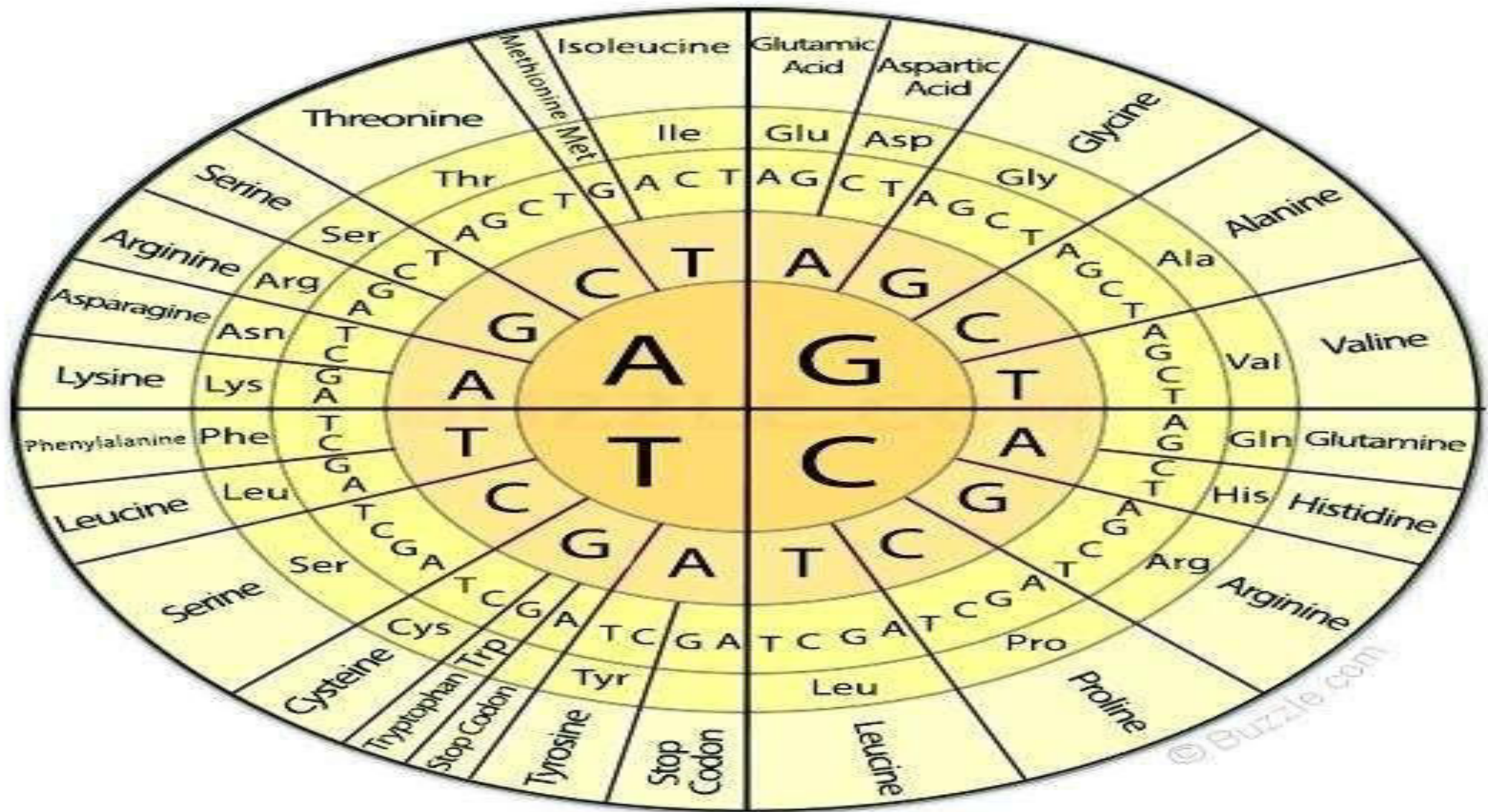
FACULTY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

What is genetic code?

Genetic code is the sequence of nitrogenous bases in mRNA molecules which encloses information for the synthesis of protein molecules.



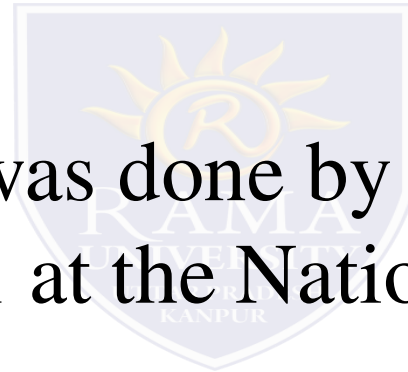
The genetic code is the set of rules by which information encoded in genetic material (DNA or RNA sequences) is translated into proteins by living cells.



To decode the codon, move from the center circle towards the periphery.

To understand how proteins are encoded began after the structure of DNA was discovered by James Watson and Francis Crick.

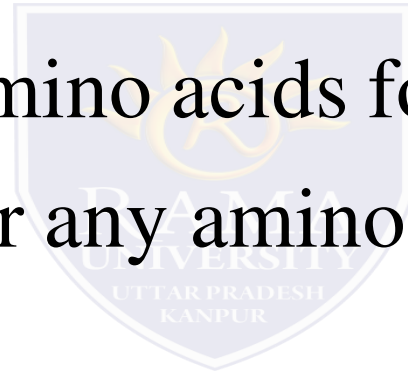
First elucidation of codon was done by Marshall Nirenberg & Heinrich J-Matthaei in 1961 at the National Institute of Health.



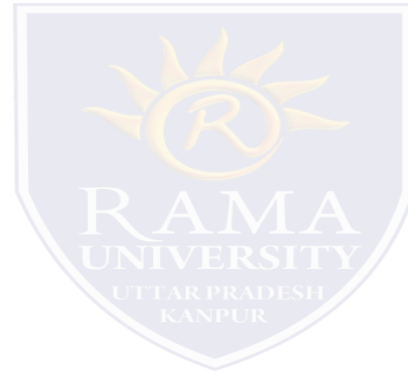
Genetic code is a Dictionary consists of “Genetic words” called CODONS.

Each codon consists of three bases (triplet)

- There are 64 codons.
- 61 codons code for 20 amino acids found in protein.
- 3 codons do not code for any amino acids.



- ❖ Sense Codons
- ❖ Signal Codons
- ❖ Start codons
- ❖ Stop codons



Sense codon:

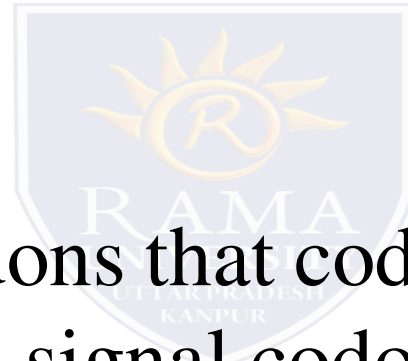
The codon that code for amino acid are called sense codon.

Signal codon:

Those codons that code for signal during protein synthesis are called signal codons. For Example: AUG, UAA, UAG & UGA.

There are Two types of signal codons.

- Terminating Codon • Initiating Codon



Terminating Codons

UAA, UAG & UGA are termination codons or nonsense codons & are often referred to as amber, ochre & opal codons.

“Initiating codon”

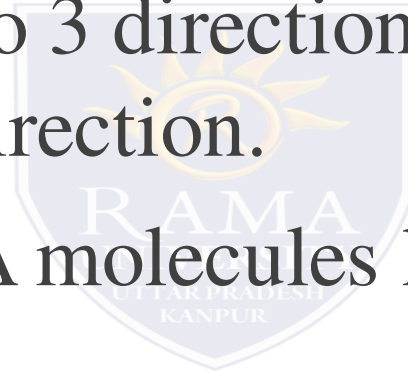
- AUG is the initiation codon. It codes for the first amino acid in all proteins.
- At the starting point it codes for methionine in eukaryotes & formyl methionine in prokaryotes.



Differences between codon & anticodon

Codon could be present in both DNA & RNA, but anticodon is always present in RNA & never in DNA.

- Codons are written in 5 to 3 direction whereas anticodons are usually written in 3 to 5 direction.
- Anticodon of some tRNA molecules have to pair with more than one codon.



Genetic code properties:

- 1) The code is a triplet code.
- 2) The code is non overlapping code.
- 3) The code is non ambiguous.
- 4) The code is polarity.
- 5) The code is degenerate.
- 6) Some codes as act start code.
- 7) Some codes as act stop code.
- 8) The code is universal code.

