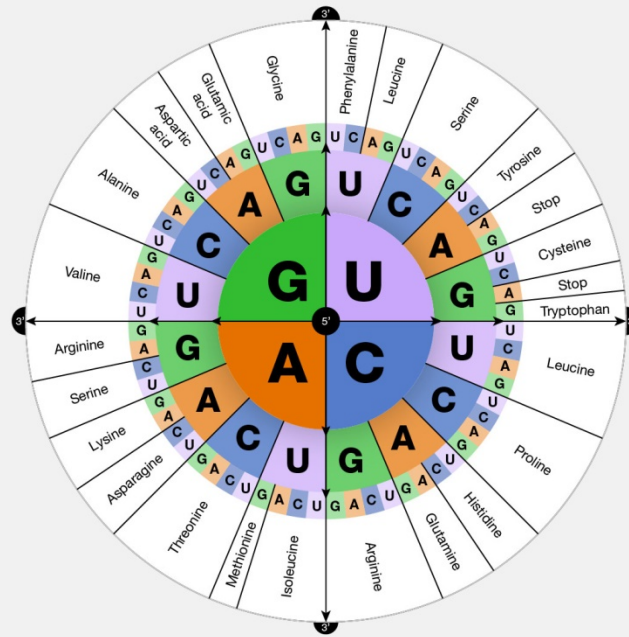


Genetic codon



What Is Genetic Code ?

- Genetic Code Is The Genetic Information carried by Living cell
- Term given By “**Goerge Gamow**”
- **Codon :-**

It Is Set of 3 Nitrogenous Bases in mRNA , Which Provide Genetic information For Amino acid During synthesis Of Polypeptide Chain

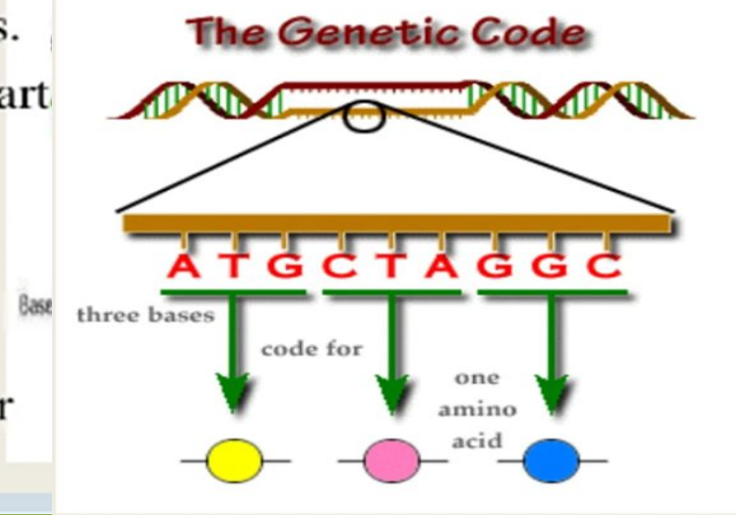
For 20 amino acids there should be 20 codons.

Each codon should have 3 nucleotides to impart specificity to each of the amino acid for a specific codon.

1 nucleotide – 4 combinations

2 nucleotide-16 combinations

3nucleotide- 64 combinations(most suited for 20 amino acids)



DISCOVERY

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



James Watson & Crick

- George Gamow postulated that a three-letter code must be employed to encode the 20 standard amino acids used by living cells to build proteins.



		Second letter				
		U	C	A	G	
First letter	U	UUU } Phe UUC } UUA } Leu UUG }	UCU } UCC } Ser UCA } UCG }	UAU } Tyr UAC } UAA Stop UAG Stop	UGU } Cys UGC } UGA Stop UGG Trp	U C A G
	C	CUU } CUC } Leu CUA } CUG }	CCU } CCC } Pro CCA } CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } CGC } Arg CGA } CGG }	U C A G
	A	AUU } AUC } Ile AUA } AUG Met	ACU } ACC } Thr ACA } ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U C A G
	G	GUU } GUC } Val GUA } GUG }	GCU } GCC } Ala GCA } GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } GGC } Gly GGA } GGG }	U C A G

The genetic code is often summarized in a table.

Type of codon

- 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 → UAA, UAG, UGA
 - Initiating Codon. → AUG

Characteristic of the genetic code

1. Triplet code
2. Comma less
3. Nonoverlapping code
4. The coding dictionary
5. Degenerate code
6. Universality of code
7. Non ambiguous code
8. Chain initiation code
9. Chain termination codons

“Universality”
















































- The genetic code is universal.
- AUG is the codon for methionine in mitochondria. The same codon (AUG) codes for isoleucine in cytoplasm. With some exceptions noted the genetic code is universal.

“Non-Ambiguous”

- The genetic code is non-ambiguous.
- Thus one codon can not specify more than one amino acid.

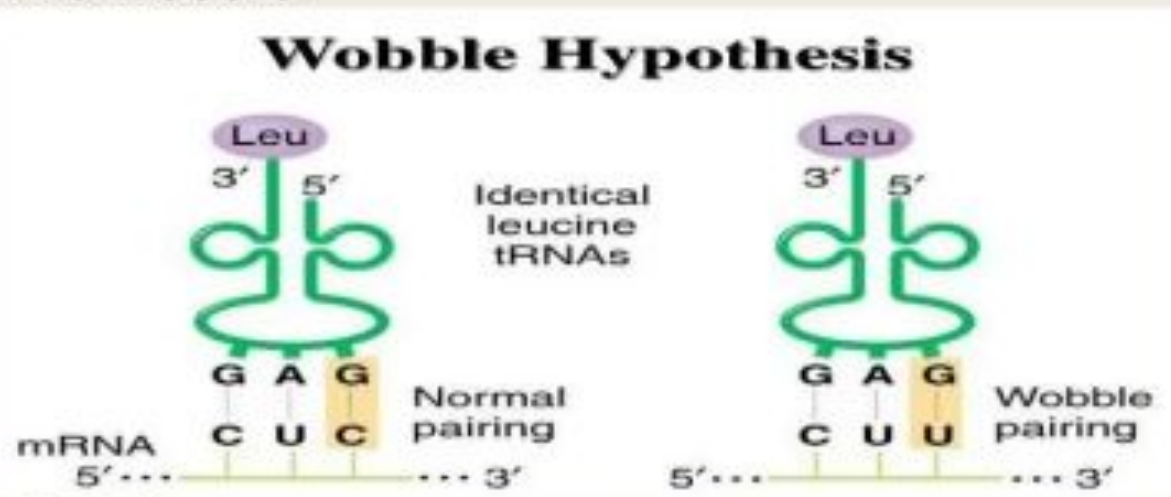
Degeneracy of genetic code

- An amino acid can be coded for by more than one codon. This is called degeneracy of genetic code.

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

Wobble hypothesis

- Crick postulated the ‘wobble hypothesis’ to account for the degeneracy of genetic code. According to this hypothesis, the first two bases of a codon pair according to the normal base pairing rules with the last two bases of the anticodon. Base-pairing at the third position of a codon is wobble



Thank
you

