Department of Biochemistry
Third Year – Molecular Biochemistry
Title: *Genetic Code*
Lecture: Abbas Hamza Khudair
2025-2026

What is Genetic code???

- Genetic code is a dictionary that corresponds with sequence of nucleotides and sequence of amino acids.
- Genetic code is a set of rules by which information encoded in genetic material(DNA or RNA sequences) is translated into proteins by living cells.
- Term given By " Goerge Gamow "

Codon and its type

- 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 acid.

RNA codon table

1st position	2nd position U	2nd position C	2nd position A	2nd position G	3rd position
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	stop	stop	A
	Leu	Ser	stop	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G
	Amino Acids				

Ala: Alanine
Arg: Arginine
Asn: Asparagine
Asp:Aspartic acid
Cys:Cysteine
Gln: Glutamine
Glu: Glutamic acid
Gly: Glycine
His: Histidine
Ile: Isoleucine
Leu: Leucine
Lys: Lysine
Met: Methionine
Phe: Phenylalanine
Pro: Proline
Ser: Serine
Thr: Threonine
Trp: Tryptophane
Tyr: Tyrosisne
Val: Valine

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 inition code
9. Chain termination codons

Genetic code is triplet code

→ Consecutive sequence of three bases on mRNA.

→ ATC ACCGTTCCG GCA

Genetic code is commaless

→ It is read continously

→ No punctuations like comma, fullstop etc.

→ ACCGTCGCATGCA

Genetic code is non-overlapping

→ Codons are read one after another

→ No overlapping of codons

→ ACCGTCGCACCA →no overlap

ACCGTCGCACCATC

↑ overlap

Genetic code is degenerate

Example → 61 codons. for 20 amino acids

Serine
UCU
UCC
UCA
UCG
AGU
AGC

→ One amino acid has more than one codon.

→ This is called degenerousy of coding gene

→ Provide protection from harmful mutations.

Genetic code is unambigous

→ One codon code for one amino acid only.

→ UUU code for phenylalanine
CCA code for proline
GGU code for glycine

Genetic code is universal

→ Codon is present in all living organisms

→ It is the same in all

Genetic code has polarity

→ The genetic code start from starting codon and end with stop codon

→ Start codon / Initiation codon - AUG

→ Stop codon - UAG, UGA, UAA

→ The message/information is always read in 5'-3' direction.