

MJC-8

TOPIC :- Classification of amino acids

Amino acids can be classified on several bases: -

1. Classification Based on Side chain: -A. Non polar amino acids: -

> R-group is hydrogen

> Insoluble in water

eg - Glycine, alanine, Valine etc

B. polar but uncharged Amino acids: -

> R-group contains -OH, -SH, -CONH₂

> Form hydrogen bond

eg: - Serine, Threonine, Cysteine.

Tyrosine, Asparagine and Glutamine.

C. Acidic amino acids

eg - Aspartic acid

Glutamic acid

D. Basic amino acids

Contain extra -NH₂ group

eg: - Lysine, Arginine, Histidine.

2. Classification Based on Nutritional Requirement

Teacher's Signature : _____

A. Essential Amino acids

> Cannot be synthesized by the human body

> Must be obtained from diet

egs - Phenylalanine, Valine, Threonine, etc.

B. Non essential amino acids

> Synthesized by the body

egs - Glycine, Alanine, Serine, Aspartic acid, etc.

③ Classification based on No. of functional groups

A. Neutral amino acids

> One $-NH_2$ and one $-COOH$ eg - Alanine

B. Acidic amino acids

> One $-NH_2$ and two $-COOH$ eg - Aspartic acid

C. Basic amino acids

> Two $-NH_2$ and one $-COOH$ eg - Lysine

④ Classification based on Metabolic fate -

A. Gluco-genic amino acids

> Convert into glucose

eg - Alanine, Glycine, Aspartic acid

B. Ketogenic amino acids

> Convert into ketone bodies

egs - Leucine, Lysine

C. Both Glucogenic and Ketogenic: -
Leu - Isoleucine, phenylalanine, tyrosine,
tryptophan

Importance of amino acids

7 protein synthesis

7 Enzyme formation

7 Hormone production

7 Tissue repair and growth

7 Immune functions.

Nonpolar/hydrophobic amino acids

	<u>Abbreviation</u>	<u>Symbol</u>
Glycine	Gly	G
Alanine	Ala	A
Valine	Val	V
Leucine	Leu	L
Isoleucine	Ile	I
Methionine	Met	M
Proline	Pro	P

Nonpolar/hydrophobic AROMATIC amino acids

	<u>Abbreviation</u>	<u>Symbol</u>
Phenylalanine	Phe	F
Tryptophan	Trp	W

Polar/hydrophilic AROMATIC amino acids

	<u>Abbreviation</u>	<u>Symbol</u>
Tyrosine	Tyr	Y

Polar/hydrophilic, uncharged amino acids

	<u>Abbreviation</u>	<u>Symbol</u>
Serine	Ser	S
Threonine	Thr	T
Cysteine	Cys	C
Asparagine	Asn	N
Glutamine	Gln	Q

Polar/hydrophilic, CHARGED amino acids

	<u>Abbreviation</u>	<u>Symbol</u>	
Aspartic acid	Asp	D	(-)
Glutamic acid	Glu	E	(-)
Lysine	Lys	K	(+)
Arginine	Arg	R	(+)
Histidine	His	H	(+)