

Amino acids

Amino acid	Three letter (1 letter) Symbol	Special Group & Structure	Polarity	Net charge	Metabolic fate	Nutritional Requirements
Glycine	Gly (G)	Aliphatic chain	Non polar	No net charge	Glycogenic	Non essential
Alanine	Ala (A)	Aliphatic chain	Non polar	No net charge	Glycogenic	Non essential
Valine	Val (V)	Branched aliphatic chain	Non polar	No net charge	Glycogenic	Essential
Leucine	Leu (L)	Branched aliphatic chain	Non polar	No net charge	Ketogenic	Essential
Isoleucine	Ile (I)	Branched aliphatic chain	Non polar	No net charge	Glycogenic and Ketogenic	Essential
Serine	Ser (S)	Hydroxyl	Polar	No net charge	Glycogenic	Non essential
Threonine	Thr (T)	Hydroxyl	Polar	No net charge	Glycogenic and Ketogenic	Essential
Cysteine	Cys (C)	Sulfahydral group	Polar	No net charge	Glycogenic	Non essential
Methionine	Met (M)	Thioether group	Non polar	No net charge	Glycogenic	Essential
Aspartic acid	Asp (D)	β carboxyl group	Polar	-ve	Glycogenic	Non essential
Asparagine	Asn (N)	Amide group	Polar	No net charge	Glycogenic	Non essential
Glutamic acid	Glu (E)	γ carboxyl group	Polar	-ve	Glycogenic	Non essential
Glutamine	Gln (Q)	Amide group	Polar	No net charge	Glycogenic	Non essential
Lysine	Lys (K)	E amino group	Polar	+ve	Ketogenic	Essential
Arginine	Arg (R)	Guanidine group	Polar	+ve	Glycogenic	Semi Essential
Histidine	His (H)	Imidazole group (aromatic)	Polar	+ve		Semi-Essential
Phenylalanine	Phe (F)	Benzene/Phenyl (Aromatic)	Non polar	No net charge	Glycogenic and Ketogenic	Essential
Tyrosine	Tyr (Y)	Phenol (aromatic)	Polar	No net charge	Glycogenic and Ketogenic	Non essential
Tryptophan	Trp (W)	Indole (aromatic)	Non polar	No net charge	Glycogenic and Ketogenic	Essential
Proline	Pro (P)	Pyrrolidine (Imino acid)	Non polar	No net charge	Glycogenic	Non essential

- Essential AA mnemonic: **PVT TIM HALL** (Phenylalanine, Valine, Tryptophan, Threonine, Isoleucine, Methionine, Histidine, Arginine, Lysine, Leucine)
- Only **Leucine and Lysine** are Ketogenic amino acids.
- The amino acids which are both glycogenic and Ketogenic can be memorized as: **PITTT** (Phenylalanine, isoleucine, threonine, Tryptophan, Tyrosine)