

## Nomenclature and Symbolism for Amino Acids and Peptides:

<http://www.chem.qmul.ac.uk/iupac/AminoAcid/A2021.html#AA20>

Initial letters of the names of the amino acids were chosen where there was no ambiguity. There are six such cases: cysteine, histidine, isoleucine, methionine, serine and valine. All the other amino acids share the initial letters A, G, L, P or T, so arbitrary assignments were made. These letters were assigned to the most frequently occurring and structurally most simple of the amino acids with these initials, alanine (A), glycine (G), leucine (L), proline (P) and threonine (T).

Other assignments were made on the basis of associations that might be helpful in remembering the code, e.g. the phonetic associations of F for phenylalanine and R for arginine. For tryptophan the double ring of the molecule is associated with the bulky letter W. The letters N and Q were assigned to asparagine and glutamine respectively; D and E to aspartic and glutamic acids respectively. K and Y were chosen for the two remaining amino acids, lysine and tyrosine, because, of the few remaining letters, they were close alphabetically to the initial letters of the names. U and O were avoided because U is easily confused with V in handwritten material, and O with G, Q, C and D in imperfect computer print-outs, and also with zero. J was avoided because it is absent from several languages.

Two other symbols are often necessary in partly determined sequences, so B was assigned to aspartic acid or asparagine when these have not been distinguished; Z was similarly assigned to glutamic acid or glutamine. X means that the identity of an amino acid is undetermined, or that the amino acid is atypical. See the [Addendum](#) for an alternative use of X.