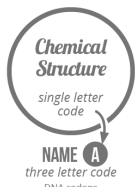
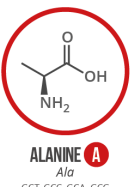
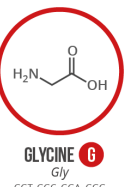
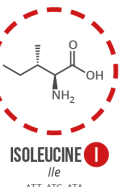
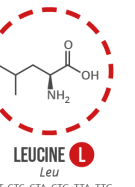
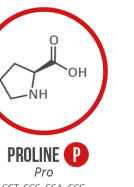
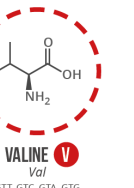
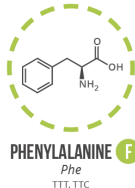
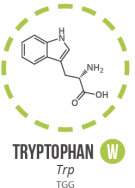
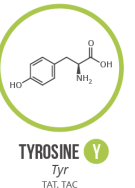
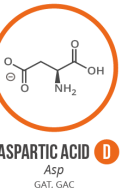
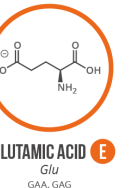
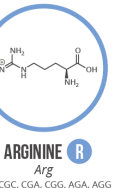
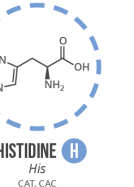
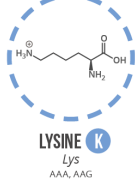

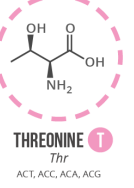
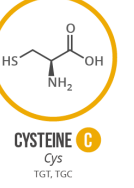
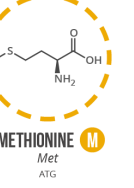
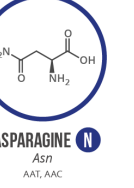
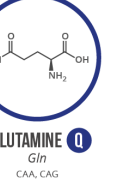


A GUIDE TO THE TWENTY COMMON AMINO ACIDS

AMINO ACIDS ARE THE BUILDING BLOCKS OF PROTEINS IN LIVING ORGANISMS. THERE ARE OVER 500 AMINO ACIDS FOUND IN NATURE - HOWEVER, THE HUMAN GENETIC CODE ONLY DIRECTLY ENCODES 20. 'ESSENTIAL' AMINO ACIDS MUST BE OBTAINED FROM THE DIET, WHILST NON-ESSENTIAL AMINO ACIDS CAN BE SYNTHESISED IN THE BODY.

Chart Key: ● ALIPHATIC ● AROMATIC ● ACIDIC ● BASIC ● HYDROXYLIC ● SULFUR-CONTAINING ● AMIDIC ○ NON-ESSENTIAL ○ ESSENTIAL

 <p>Chemical Structure single letter code A three letter code DNA codons</p>	 <p>ALANINE A <i>Ala</i> GCT, GCC, GCA, GCG</p>	 <p>GLYCINE G <i>Gly</i> GGT, GGC, GGA, GGG</p>	 <p>ISOLEUCINE I <i>Ile</i> ATT, ATC, ATA</p>	 <p>LEUCINE L <i>Leu</i> CTT, CTC, CTA, CTG, TTA, TTG</p>	 <p>PROLINE P <i>Pro</i> CCT, CCC, CCA, CCG</p>	 <p>VALINE V <i>Val</i> GTT, GTC, GTA, GTG</p>
 <p>PHENYLALANINE F <i>Phe</i> TTT, TTC</p>	 <p>TRYPTOPHAN W <i>Trp</i> TGG</p>	 <p>TYROSINE Y <i>Tyr</i> TAT, TAC</p>	 <p>ASPARTIC ACID D <i>Asp</i> GAT, GAC</p>	 <p>GLUTAMIC ACID E <i>Glu</i> GAA, GAG</p>	 <p>ARGININE R <i>Arg</i> CGT, CGC, CGA, CGG, AGA, AGG</p>	 <p>HISTIDINE H <i>His</i> CAT, CAC</p>
 <p>LYSINE K <i>Lys</i> AAA, AAG</p>	 <p>SERINE S <i>Ser</i> TCT, TCC, TCA, TCG, AGT, AGC</p>	 <p>THREONINE T <i>Thr</i> ACT, ACC, ACA, ACG</p>	 <p>CYSTEINE C <i>Cys</i> TGT, TGC</p>	 <p>METHIONINE M <i>Met</i> ATG</p>	 <p>ASPARAGINE N <i>Asn</i> AAT, AAC</p>	 <p>GLUTAMINE Q <i>Gln</i> CAA, CAG</p>

Note: This chart only shows those amino acids for which the human genetic code directly codes for. Selenocysteine is often referred to as the 21st amino acid, but is encoded in a special manner. In some cases, distinguishing between asparagine/aspartic acid and glutamine/glutamic acid is difficult. In these cases, the codes asx (B) and glx (Z) are respectively used.



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