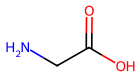
Amino acid chart

Nonpolar Polar Acidic Basic

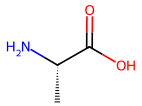
The 20 amino acids: structure, three- and one-letter code, side-chain class, molecular weight, pI and DNA codons.



G

Glycine Gly

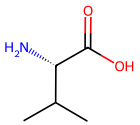
Nonpolar · 75.07 g/mol
pI 5.97
GGT GGC GGA GGG



A

Alanine Ala

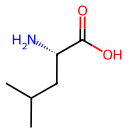
Nonpolar · 89.09 g/mol
pI 6.01
GCT GCC GCA GCG



V

Valine Val

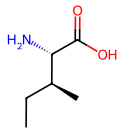
Nonpolar · 117.15 g/mol
pI 5.96
GTT GTC GTA GTG



L

Leucine Leu

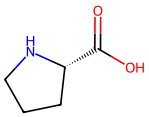
Nonpolar · 131.17 g/mol
pI 5.98
TTA TTG CTT CTC CTA CTG



I

Isoleucine Ile

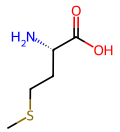
Nonpolar · 131.17 g/mol
pI 6.02
ATT ATC ATA



P

Proline Pro

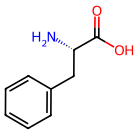
Nonpolar · 115.13 g/mol
pI 6.30
CCT CCC CCA CCG



M

Methionine Met

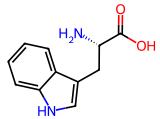
Nonpolar · 149.21 g/mol
pI 5.74
ATG



F

Phenylalanine Phe

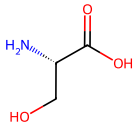
Nonpolar · 165.19 g/mol
pI 5.48
TTT TTC



W

Tryptophan Trp

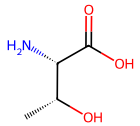
Nonpolar · 204.22 g/mol
pI 5.89
TGG



S

Serine Ser

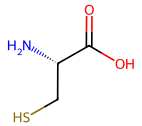
Polar · 105.09 g/mol
pI 5.68
TCT TCC TCA TCG AGT AGC



T

Threonine Thr

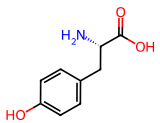
Polar · 119.12 g/mol
pI 5.60
ACT ACC ACA ACG



C

Cysteine Cys

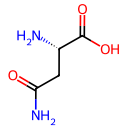
Polar · 121.16 g/mol
pI 5.07 · side-chain pKa 8.18
TGT TGC



Y

Tyrosine Tyr

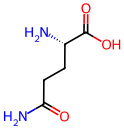
Polar · 181.19 g/mol
pI 5.66 · side-chain pKa 10.07
TAT TAC



N

Asparagine Asn

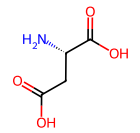
Polar · 132.12 g/mol
pI 5.41
AAT AAC



Q

Glutamine Gln

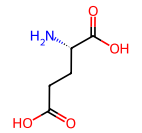
Polar · 146.14 g/mol
pI 5.65
CAA CAG



D

Aspartic acid Asp

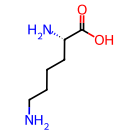
Acidic · 133.10 g/mol
pI 2.77 · side-chain pKa 3.65
GAT GAC



E

Glutamic acid Glu

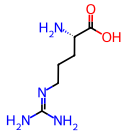
Acidic · 147.13 g/mol
pI 3.22 · side-chain pKa 4.25
GAA GAG



K

Lysine Lys

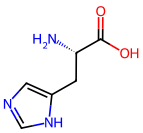
Basic · 146.19 g/mol
pI 9.74 · side-chain pKa 10.53
AAA AAG



R

Arginine Arg

Basic · 174.20 g/mol
pI 10.76 · side-chain pKa 12.48
CGT CGC CGA CGG AGA AGG



H

Histidine His

Basic · 155.15 g/mol
pI 7.59 · side-chain pKa 6.00
CAT CAC

Codons read 5′ to 3′ in the standard genetic code (NCBI table 1). Structures are the neutral L-amino acids as PubChem records them; molecular weights from PubChem.
pI and side-chain pKa from OpenStax Organic Chemistry, Table 26.1. Side-chain classes are broad teaching groups. CodonChart.com