

CONCEPT: THE GENETIC CODE

• **Genetic Code** is the assignment of each _____ to one of the ____ amino acids.

□ **Recall:** a codon is a nucleotide triplet that codes for an amino acid or acts as a or signal.

□ $4 \times 4 \times 4 = 64$ total codons

□ A single amino acid can have _____ codons.

| The Genetic Code | | | | | | | | | |
|-----------------------|---|----------------------------------|------------------------------|--|---------------------------------------|---|---|---|---|
| | | Second Letter of Codon | | | | | | | |
| | | U | C | A | G | | | | |
| First Letter of Codon | U | UUU Phe UUC UUA Leu UUG | UCU Ser UCC UCA UCG | UAU Tyr UAC UAA Stop UAG Stop | UGU Cys UGC UGA Stop UGG Trp | U | C | A | G |
| | C | CUU Leu CUC CUA CUG | CCU Pro CCC CCA CCG | CAU His CAC CAA Gln CAG | CGU Arg CGC CGA CGG | U | C | A | G |
| | A | AUU Ile AUC AUA AUG Met | ACU Thr ACC ACA ACG | AAU Asn AAC AAA Lys AAG | AGU Ser AGC AGA Arg AGG | U | C | A | G |
| | G | GUU Val GUC GUA GUG | GCU Ala GCC GCA GCG | GAU Asp GAC GAA Glu GAG | GGU Gly GGC GGA GGG | U | C | A | G |

• _____ at start of mRNA acts as **start** signal.

• _____ codons assigned to amino acids.

• _____ codons act as **stop** signals

Remembering Stop Codons

| | |
|---|---|
| A | G |
| | |
| | |

U

EXAMPLE: Determine the polypeptide sequence from the mRNA sequence given below:

5' GGCCAUACCAUGUAU 3'

STEP 1: Break the given mRNA sequence in _____ (nucleotide triplets).

5' _____ 3'

STEP 2: Identify the amino acid for each codon and write the peptide sequence.

5' GGC–CAU–ACC–AUG–UAU 3'

| | | Second Letter of Codon | | | | | | | |
|-----------------------|---|----------------------------------|------------------------------|--|---------------------------------------|---|---|---|---|
| | | U | C | A | G | | | | |
| First Letter of Codon | U | UUU Phe UUC UUA Leu UUG | UCU Ser UCC UCA UCG | UAU Tyr UAC UAA Stop UAG Stop | UGU Cys UGC UGA Stop UGG Trp | U | C | A | G |
| | C | CUU Leu CUC CUA CUG | CCU Pro CCC CCA CCG | CAU His CAC CAA Gln CAG | CGU Arg CGC CGA CGG | U | C | A | G |
| | A | AUU Ile AUC AUA AUG Met | ACU Thr ACC ACA ACG | AAU Asn AAC AAA Lys AAG | AGU Ser AGC AGA Arg AGG | U | C | A | G |
| | G | GUU Val GUC GUA GUG | GCU Ala GCC GCA GCG | GAU Asp GAC GAA Glu GAG | GGU Gly GGC GGA GGG | U | C | A | G |

PRACTICE: Determine the number of bases in the information strand for the gene that codes for the peptide below:

Pro–His–Gly–Gly–Lys–Arg

- a) 6
- b) 12
- c) 18
- d) 3