Key

Protein synthesis problems

Answer these questions using table 22.3 pg. 484

1. Synthesize a polypeptide from the strand of DNA below.

Showing:

a) The mRNA strand produced (circle the codons).

b) The anticodon sequence needed to compliment this mRNA.

c) The sequence of amino acids coded for by this strand of DNA.

DNA- **TAC GAA TAA TAC TGA GCG CGT CCT CAA ATA TTG ATC**

mRNA- **AUG CUU AUU AUG ACU CGC GCA GGA GUU UAU AAG UAG**

anticodon-**UAC GAA UAA UAC UGA GCG CGU CCU CAA AUA UUG AUC**

A.A.'S- Start-Leucine-Isoleucine-Methionine-Threonine-Arginine-Alanine-Glycine-Valine-Tyrosine-Asparagine-Stop

2. A tRNA has the anticodon **UAG**, what amino acid does it carry?

mRNA = **AUC**

Animo Acid = Isoleucine.

3. a)What polypeptide would be made from the series of anticodons below?

anticodon- **UAC GCA GUA CGA CAA UUC UCA UAC AAC ACU**

mRNA- **AUG CGU CAU GCU GUU AAG AGU AUG UUG UGA**

polypeptide- Start-Arginine-Histidine-Alanine-Valine-Lysine-Serine-Methionine-Leucine-Stop

b) Write out the sequence of nucleotides that would be found on the DNA strand that the above polypeptide was coded from.

DNA- **TAC GCA GTA CGA CAA TTC TCA TAC AAC ACT**

4. Which of these sections of DNA would synthesize the shortest polypeptide?

Ans: Look for start and stop codons. Translation will terminate at the stop codon no matter how long the DNA strand, therefore the strand with the stop codon closest to the start codon will be the shortest. The answer is b.

a)**TACCCAGGAGTAATCAGAACT**

mRNA **AUGGGUCCUCAUUAGUCUUGA**

start Gly Pro His stop Ser Stop

b)TACTTAATAATCGGTCAAACT

AUGAAUUAUUAGCCAGUUUGA

start Asp Tyr *stop* Pro Val Stop

d)**TACTCAGAACCACAAGGGACT**

mRNA **AUGAGUCUUGGUGUUCCCUGA**

start Ser Leu Gly Val Pro stop

d)**TACGGACGAGTACAGGACACT**

AUGCCUGCUCAUGUCCUGUGA

start Pro Ala His Val Leu stop