

Self assessment Lecture 38: Translation

1. Please compare and contrast translation in prokaryotes and eukaryotes:
 - a. Similarities: both use ribosomes, the universal code and tRNAs
 - b. Differences:
 - i. Prokaryotes
 1. Transcription occurs at the same time, same place as transcription
 2. The initiator methionine is formylated
 3. Message is generally polycistronic, having multiple coding regions
 4. Initiation relies on recognition of purine-rich Shine-Delgarno Sequence by 16s rRNA
 - ii. Eukaryotes
 1. Circular mRNA is recognized by both the 5' cap and 3' poly-A tail
 2. Ribosome binds at the cap and scans for the first AUG codon
2. In translation, the template is read $\{3'-5'/5'-3'\}$ and the amino acids are added $\{N\text{-terminus to C-terminus}/C\text{-terminus to N-terminus}\}$
3. What specifies which amino acid is added to the peptide chain? Is it the *anticodon* or the *amino acid which is bound to the tRNA* that is recognized as correct? _____
4. Please write the two reactions that result in the charging of a tRNA to form an aminoacyl-tRNA.____
 - a. $\text{Amino acid} + \text{ATP} \rightleftharpoons \text{Aminoacyl-AMP} + \text{PPi}$
 - b. $\text{Aminoacyl-AMP} + \text{tRNA} \rightleftharpoons \text{Amino Acyl-tRNA} + \text{AMP}$
5. The reactions in Q4 are catalyzed by _____aminoacyl tRNA synthetase_____
6. Initiation factors IF1, IF3 are found in $\{prokaryotes / eukaryotes\}$ and serve what purpose_____Bind to 30 s ribosome and prevent 50 s from binding____
7. IF2 serves what purpose and used what energy source? _brings formylated initiator methionine to 30S
8. For what process is the energy used? _to transfer the methionine to the 30S
9. What purpose does EF-Tu serve__brings the rest of the aminoacyl tRNAs to the ribosome.
10. What does the I in IF1, 2, 3 and the E in EF-Tu stand for?

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a. I _____ Initiation _____

b. E _____ Elongation _____

11. What type of enzyme is EF - Ts? _____ Guanylate exchange factor __ (GEF) _____

12. What purpose does EF-G serve? __ this translocase binds and through hydrolysis of GTP, moves the mRNA down by 3 NTs

13. Please state the function of release factors. These allow release of the nascent peptide from the ribosome.

14. Please state the function of the signal recognition peptide _____ This protein binds the signal sequence and brings the ribosome and its mRNA to the ER _____