

CONCEPT: STEPS OF TRANSLATION

- Similar to transcription, the process of translation also consists of _____ steps:

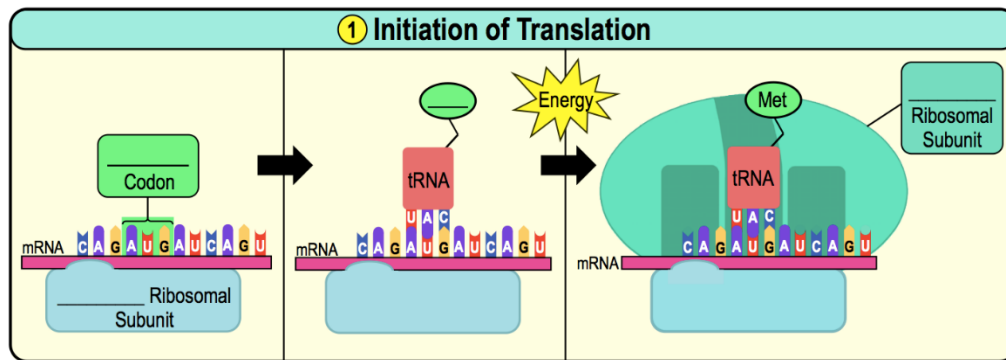
1 _____

2 _____

3 _____

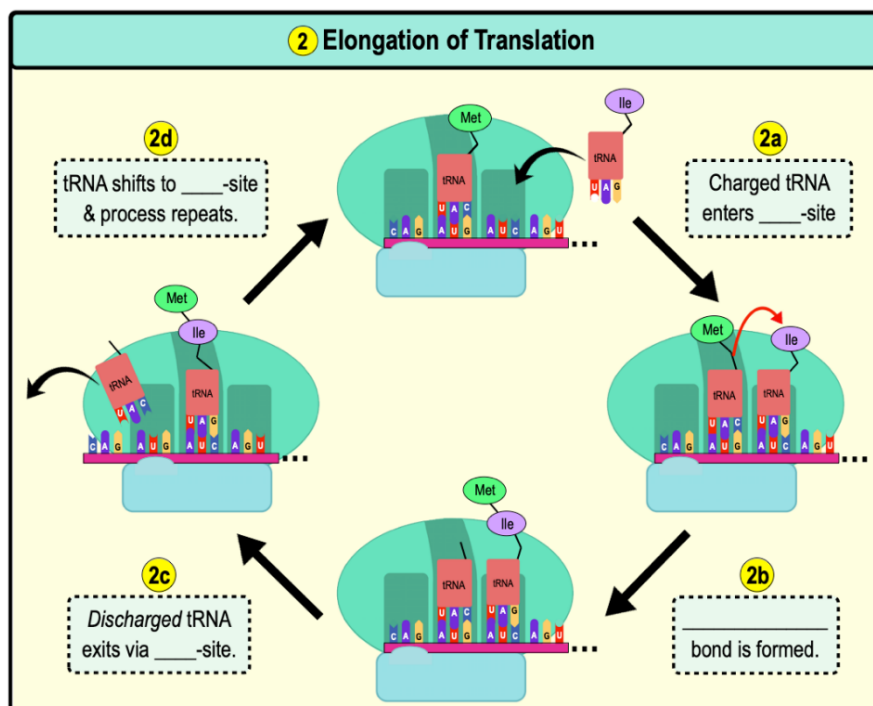
1) Initiation of Translation

- Initiation:** the small ribosomal subunit first binds the mRNA & a tRNA before the large ribosomal subunit binds.
 - The start codon (_____) specifies the amino acid Methionine (Met) at the *start* of translation.
 - Several proteins called “*initiation factors*” & *energy* are required.



2) Elongation of Translation

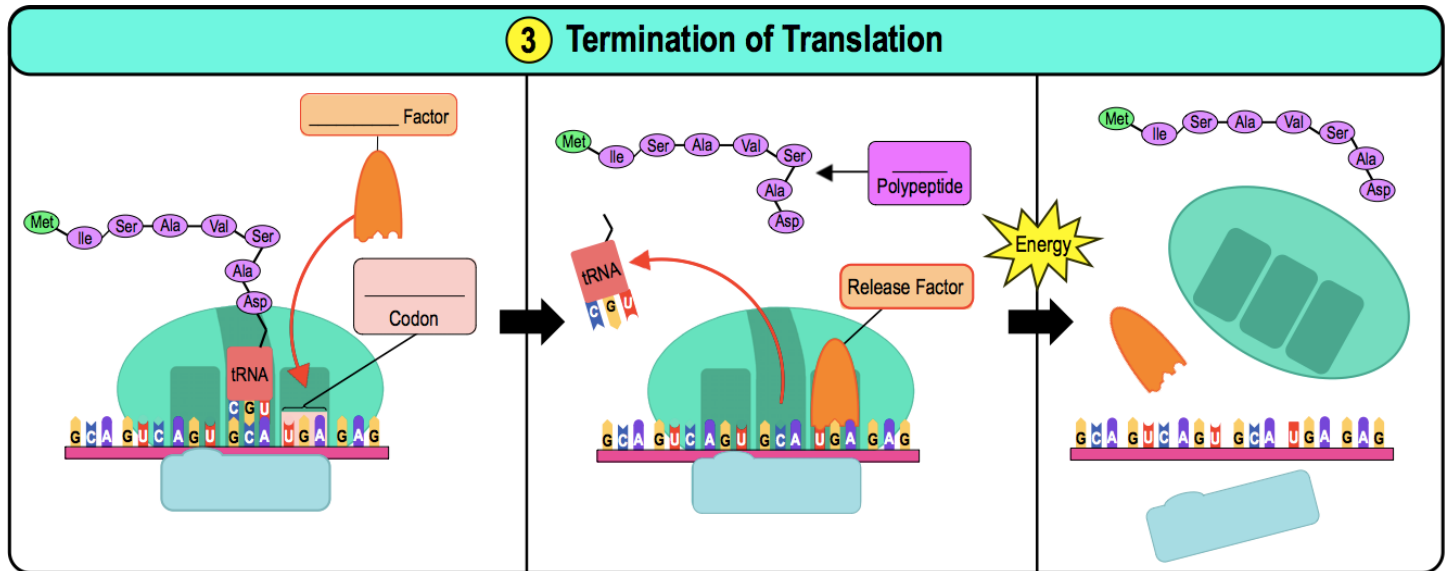
- Elongation:** amino acids are added one by one to the previous amino acid at the _____-terminus of the growing chain.
 - Polypeptide chain grows from its _____-terminus to its _____-terminus.
 - Ribosome reads mRNA _____ 5' → 3', pairing them with *tRNA anti-codons* that specifies one *amino acid*.
 - New tRNAs enter ribosome's _____ site, then shift into the _____ site, & finally the _____-site before exiting.



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3) Termination of Translation

- **Termination:** a _____ codon reaches the ribosome's A-site, triggering *release factor* proteins to bind.
 - The polypeptide chain is cleaved & released from the tRNA & the translation assembly comes apart.



PRACTICE: The tRNA for which amino acid is the first to enter the ribosome?

- a) Arginine. c) Methionine.
- b) Lysine. d) Histidine.

PRACTICE: Which of the following processes is the first event to take place in translation?

- a) Base pairing of charged methionine-tRNA to AUG of the messenger RNA.
- b) Binding of the larger ribosomal subunit to smaller ribosomal subunits.
- c) The ribosome reaches a stop codon.
- d) The small subunit of the ribosome recognizes and attaches to the mRNA.

PRACTICE: When is a peptide bond formed during the process of translation?

- a) During the elongation phase, just after a tRNA charged with the next amino acid binds to the A site.
- b) During the termination phase, just after the release factor binds to the A site.
- c) During the elongation phase, just after a tRNA that has lost its amino acid and exits the E site.

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PRACTICE: Which of the following does not occur during translation's termination step?

- a) The first tRNA brings the amino acid methionine to the ribosome.
- b) The small and large ribosomal subunits separate from each other.
- c) The polypeptide is released from the ribosome.
- d) A "stop" codon is reached by the ribosome along the mRNA.

PRACTICE: What is the function of the release factor during translation?

- a) It binds to the stop codon in the A site in place of a tRNA.
- b) It releases the amino acid from its tRNA to allow the amino acid to be added to the growing polypeptide.
- c) It supplies a source of energy for termination of translation and the release of the polypeptide.
- d) It releases the ribosome from the rough endoplasmic reticulum and allows the polypeptide to enter the cytosol.