

Translation Worksheet

Answers

Translation occurs when mRNA is in the **cytoplasm** and a enters the **ribosome**.

Ribosomes

Are proteins that read mRNA and build **polypeptide chains**.

A ribosome consists of two subunits; the **large subunit** and the **small subunit**. During translations mRNA resides between the two subunits.

There are three sites for tRNA to enter and build a polypeptide chain.

They are called;

1. **A site (aminoacyl binding site)**
2. **P site (peptide binding site)**
3. **E site (exit site)**

Translation occurs in three stages;

1. **Initiation**
2. **Elongation**
3. **Termination**

Stage 1: Initiation

1. The **5' cap** is recognized by the ribosome along with the **start codon** (AUG) which codes for **methionine**.
2. mRNA is then read by the ribosome in a **5' to 3'** direction. For each **codon** an amino acid is added.

Codon: **A series of three nitrogenous bases which code for an amino acid.**

Stage 2: Elongation

1. **Initiator tRNA** with the amino acid **methionine** enters the P site.
2. **The second tRNA** with the correct bases on the **anticodon arm** enters the A site.
3. **Peptidyl transferase** catalyses the bonding of the two amino acids.
4. The ribosome moves along the mRNA to the next **codon**, emptying the **A site** and moving the **initiator tRNA** to the E site.
5. As it continues to translate the mRNA, the tRNA is released.
6. This process continues, eventually producing a polypeptide chain (made of amino acids) until the **stop codon** is encountered.

Stage 3: Termination

1. The **stop codon** (UAG, UGA, UAA) is encountered and **the polypeptide chain** production is terminated. No amino acids are coded for the stop codon.
2. A protein called the **release factor** aids in the removal of the **polypeptide chain** from the **ribosome**.
3. The **small subunit** and **the large subunit** fall apart.
4. The **polypeptide chain** folds into a protein.