

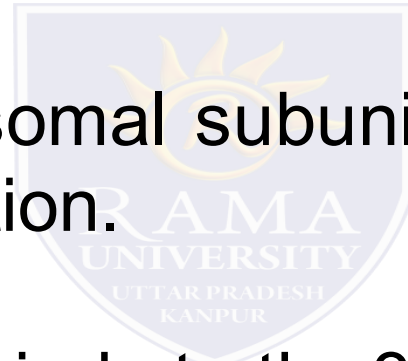


RAMA
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FACULTY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

1. The interaction between the small ribosomal subunit (30S) and two initiation factors (**IF 1 and IF 3**).
2. The complex (30S ribosomal subunit + IF1 + IF 3) bind to the mRNA at a specific location.
3. A special initiator tRNA binds to the 30S ribosome and mRNA at the start codon.

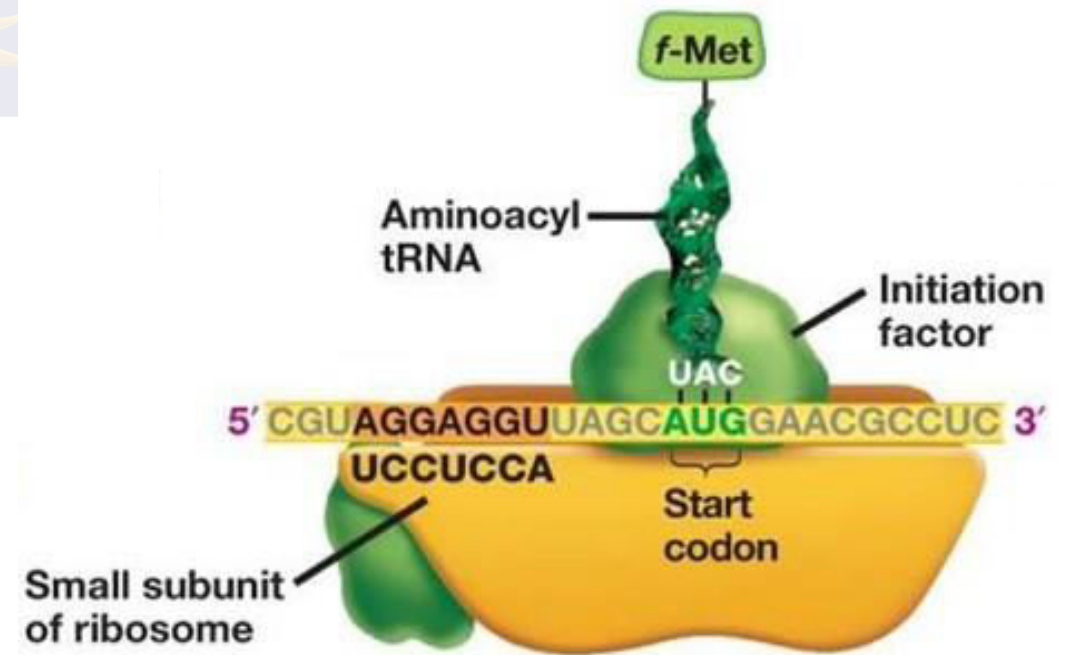


Initiator tRNA in bacteria

- The initiator tRNA carries a specific modified amino acid called **formyl-methoionine (fMet-tRNA)**. It is a methoionine with a formyl group added.
- When AUG is in the middle of a transcript another tRNA is used. It is called **Met-tRNA**.

Initiator tRNA in bacteria

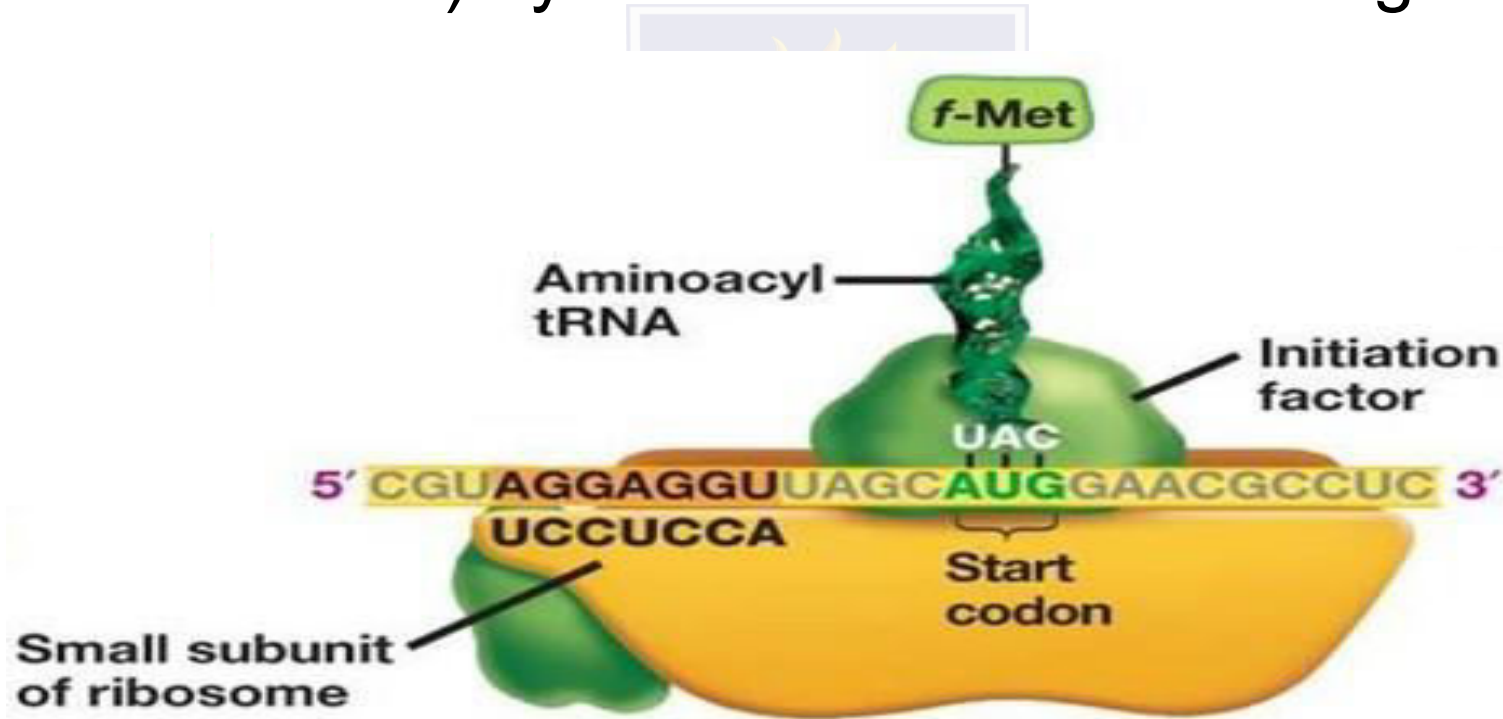
1. The initiator tRNA (fMet-tRNA) gets carried to the complex (30S ribosome + IF1 + IF 3) by initiation factor IF2 using GTP.



2. f-Met tRNA binds.

Initiator tRNA in bacteria

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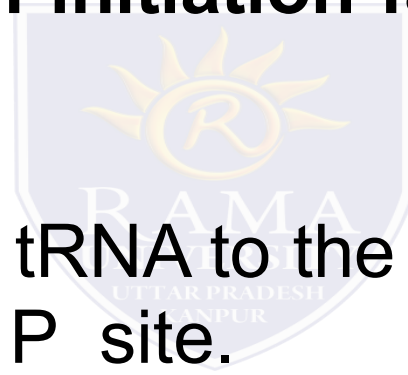
2. f-Met tRNA binds.

Functions of translation initiation factors

- **IF 1:**
 - Blocks the A site in the ribosome so that only P site is available for initiator tRNA is available to bind to.

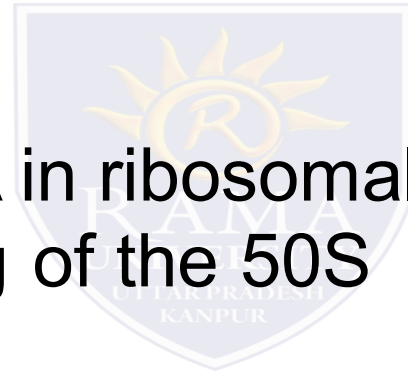
Functions of translation initiation factors

- **IF 2:**
 - Carries the initiator tRNA to the small ribosomal subunit and places it in the P site.



Functions of translation initiation factors

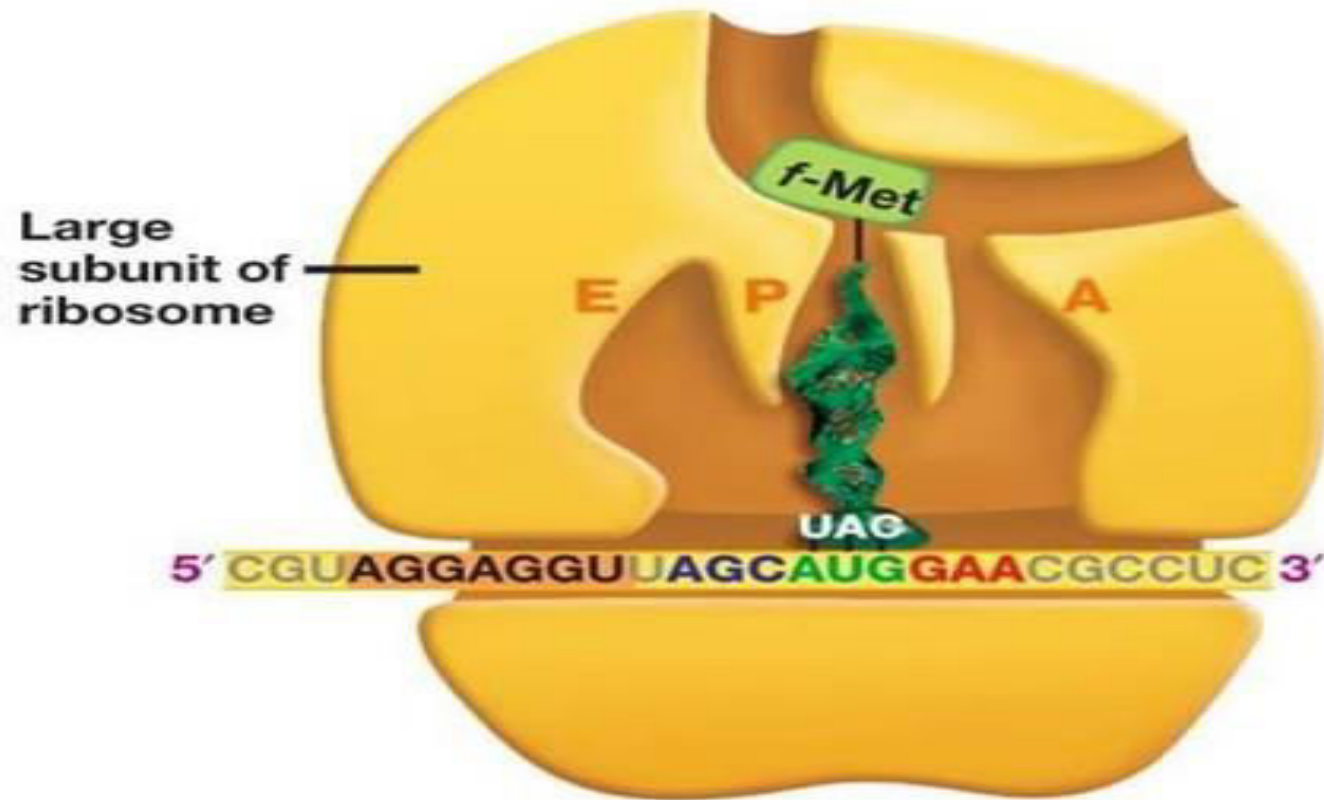
- **IF 3:**
 - Binds to the mRNA in ribosomal binding site.
 - Prevent the binding of the 50S ribosomal large subunit to the small one.



Translation initiation in bacteria

1. The interaction between the small ribosomal subunit (30S) and two initiation factors (**IF 1 and IF 3**).
2. The complex (30S ribosomal subunit + IF1 + IF 3) bind to the mRNA at a specific location.
3. A special initiator tRNA binds to the 30S ribosome and mRNA at the start codon.
4. The 50S ribosomal subunit binds to the (30S + mRNA + fMet-tRNA) using GTP as a source of energy.

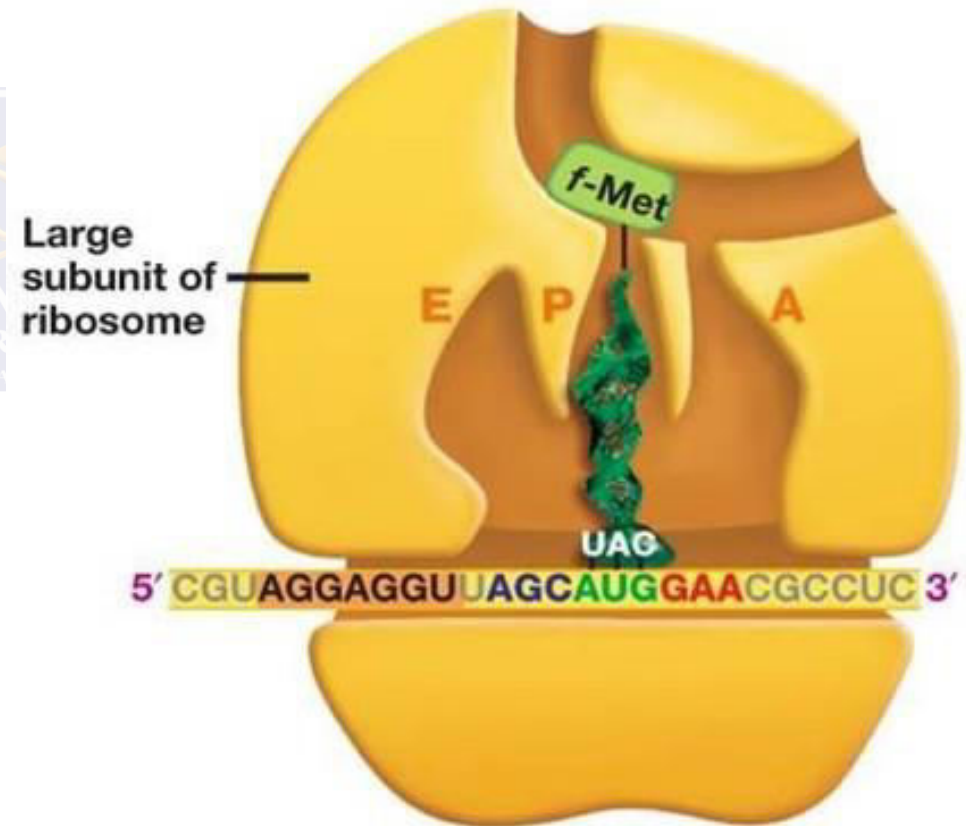
- The initiation factors (IF1 and IF3) gets released and the resulting complex is called **the initiation complex**.



3. Large subunit binds.

- **Initiation complex includes:**

1. fMet-tRNA.
2. mRNA.
3. Small ribosome.
4. Large ribosome.



3. Large subunit binds.

INITIATING TRANSLATION IN BACTERIA

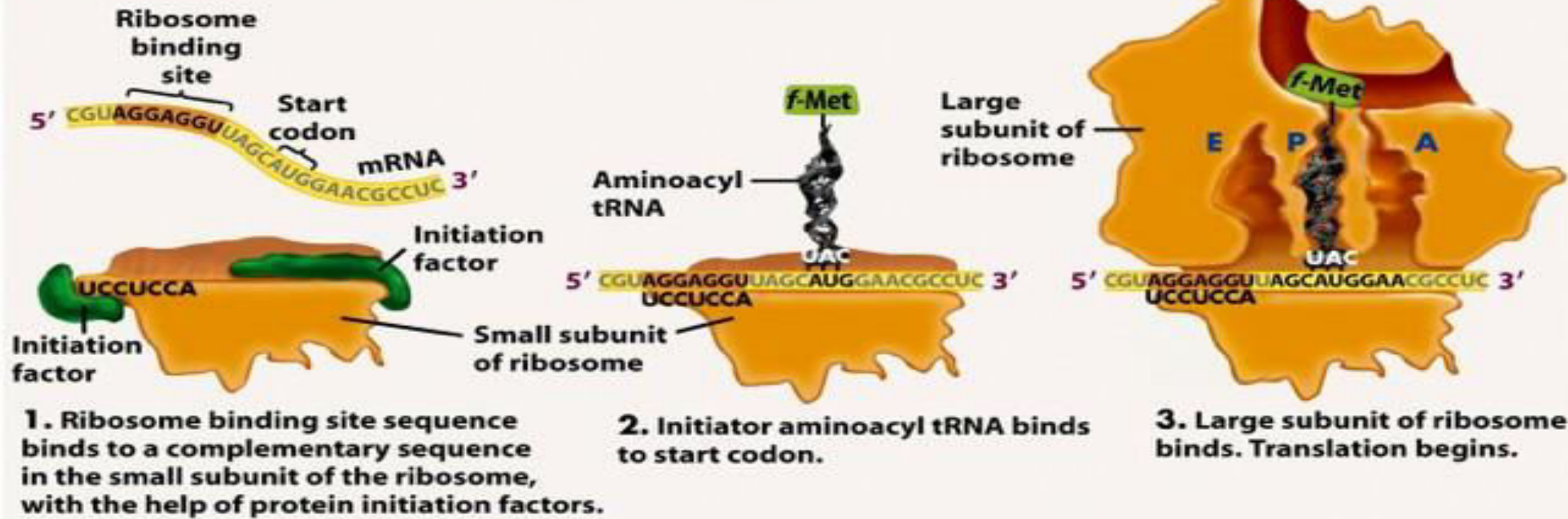


Figure 16-14 Biological Science, 2/e