RAMA UNIVERSITY

www.ramauniversity.ac.in

FACULTY OF ENGINEERING &TECHNOLOGY

DEPARTMENT OF BIOTECHNOLOGY

**Elongation** is adding more amino acids carried by tRNA to Met (the start amino acid.

**What are the steps in translation elongation?**

1. Amino-acyl tRNA (charged tRNA) binds to the ribosome's **A site.**
2. Peptide bond forms.
3. Ribosome moves (translocate) one codon downstream.

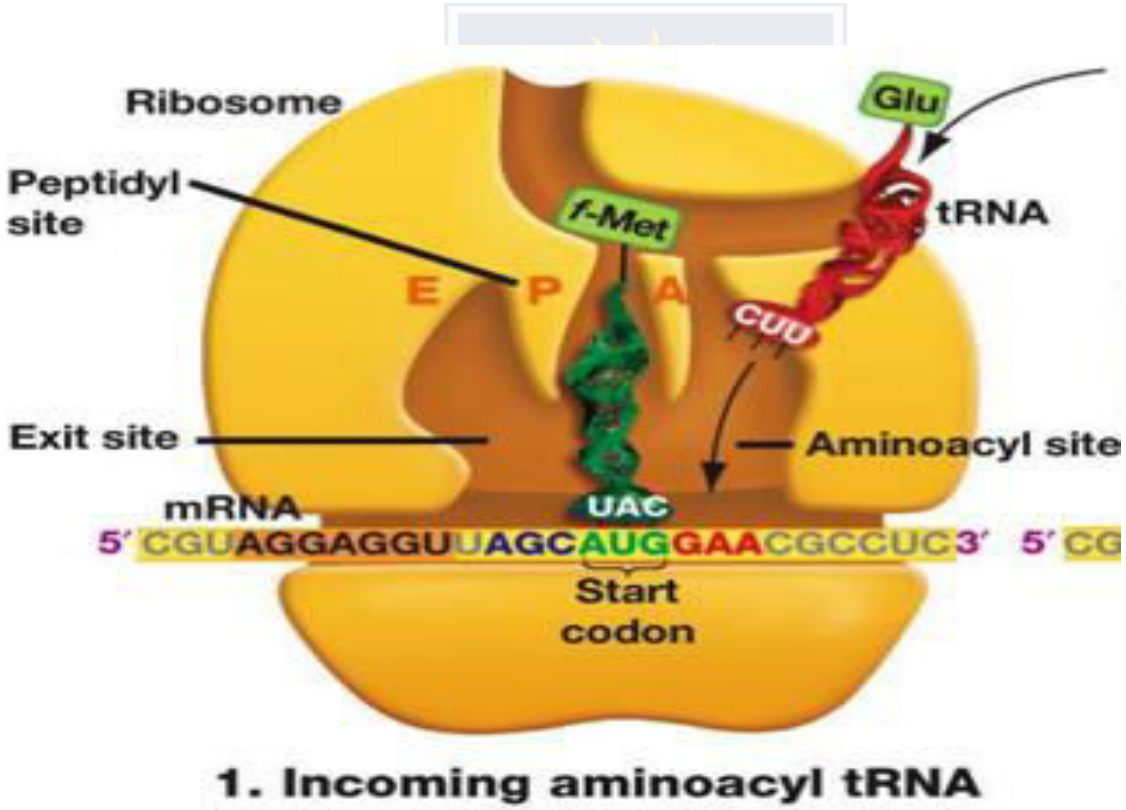
## What is needed for elongation?

1. Charged tRNA
2. Elongation factors (EF)
3. GTP

RAMA UNIVERSITY
UTTAR PRADESH
KANPUR

# Elongation process:

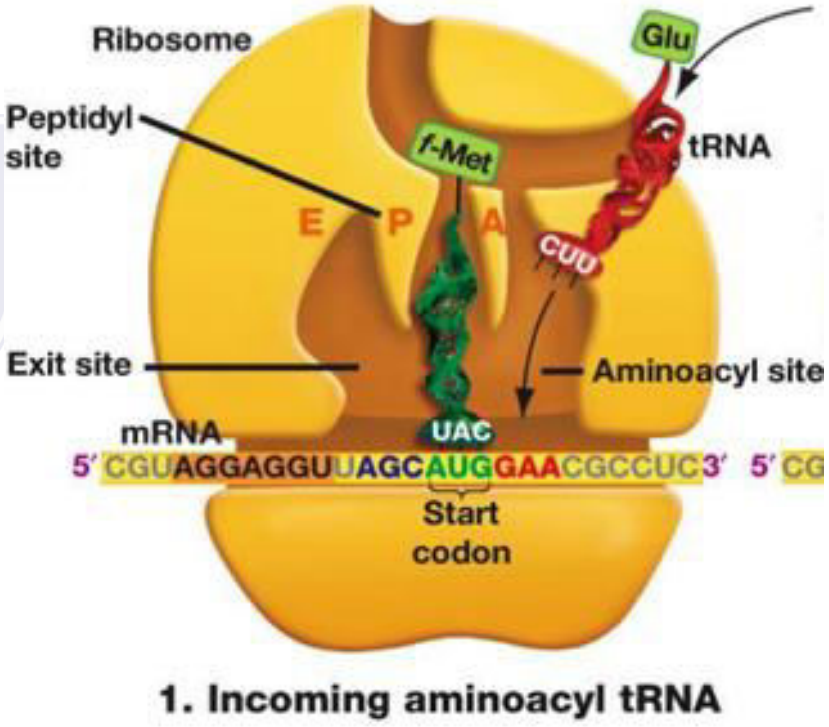
1.fMet tRNA is bound to the AUG codon at P site. 2.Next codon is positioned in the A site.



**Elongation process:**

3.Appropriate amino-acyl tRNA binds to the Asite.

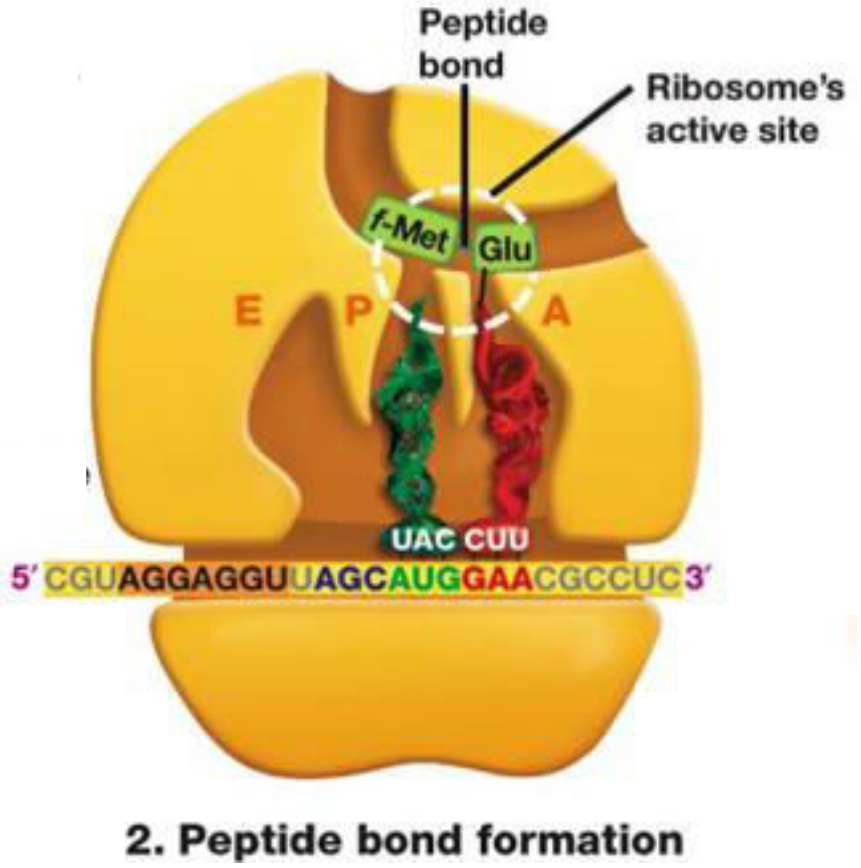
4.The charged tRNA is brought to the ribosome by **elongation factors (EF and GTP)**.



**Elongation process:**

5.Two amino-acyl tRNAs are in positions P and A and a peptide bond is formed between the two amino acids.

6.The bond between the amino acid and tRNA at P site is broken.

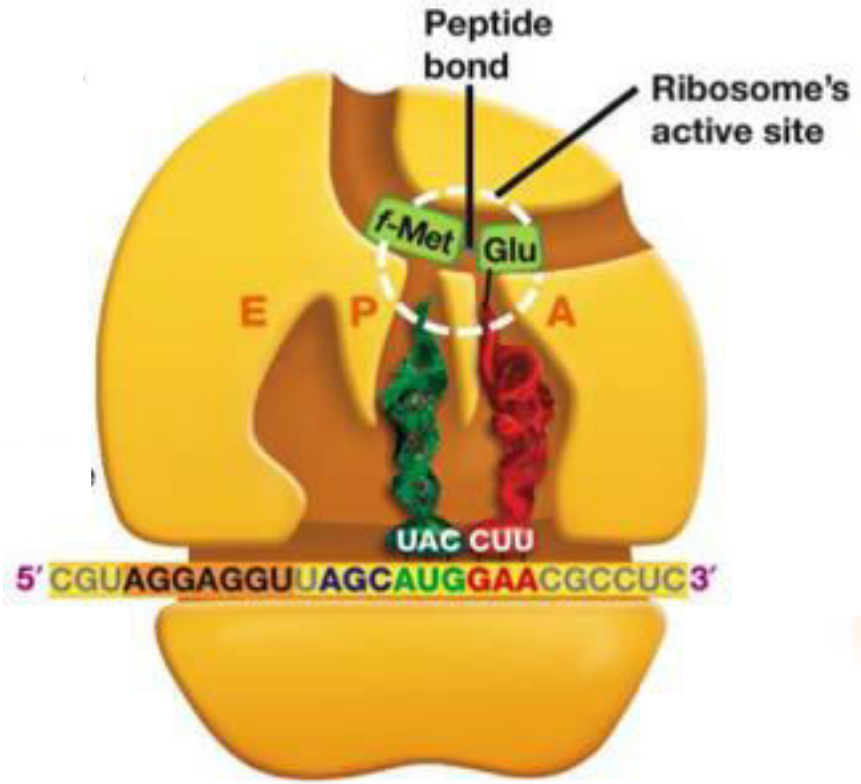



2. Peptide bond formation

**Elongation process:**

7. A peptide bond is formed between the free amino acid from the P site and the one at the A site by:

**Peptidyl Transferase**

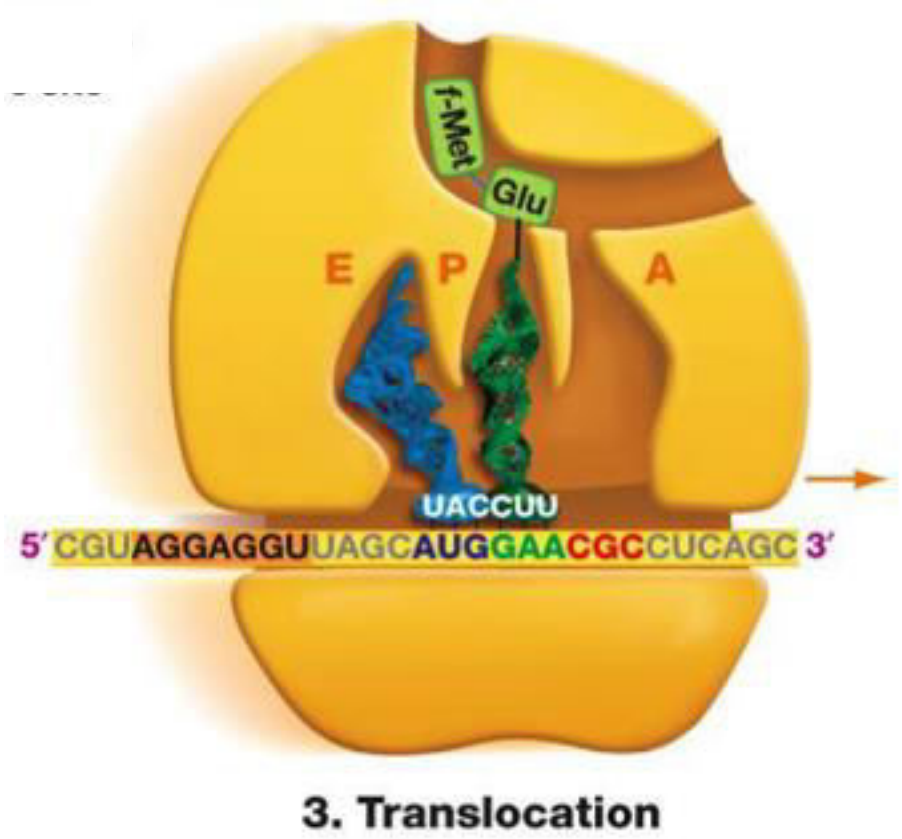



2. Peptide bond formation

**Elongation process:**

8.When a peptide bond is formed the free tRNA is in site P and the tRNA at site A has two amino acids.

9.Ribosome moves one codon downstream (3').



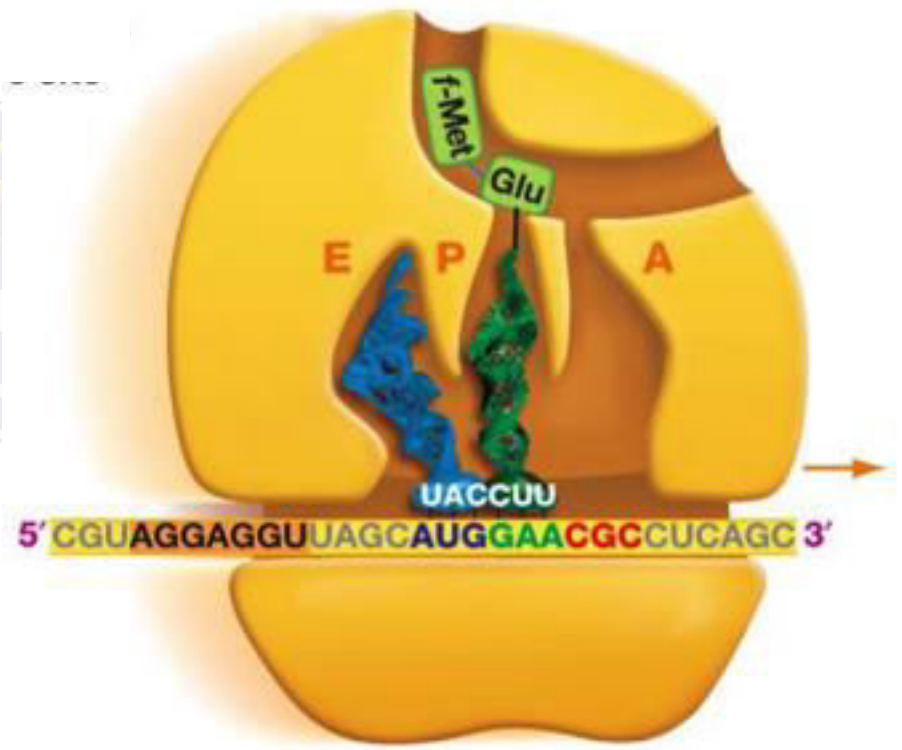
3. Translocation

RAMA UNIVERSITY UTTAR PRADESH KANPUR

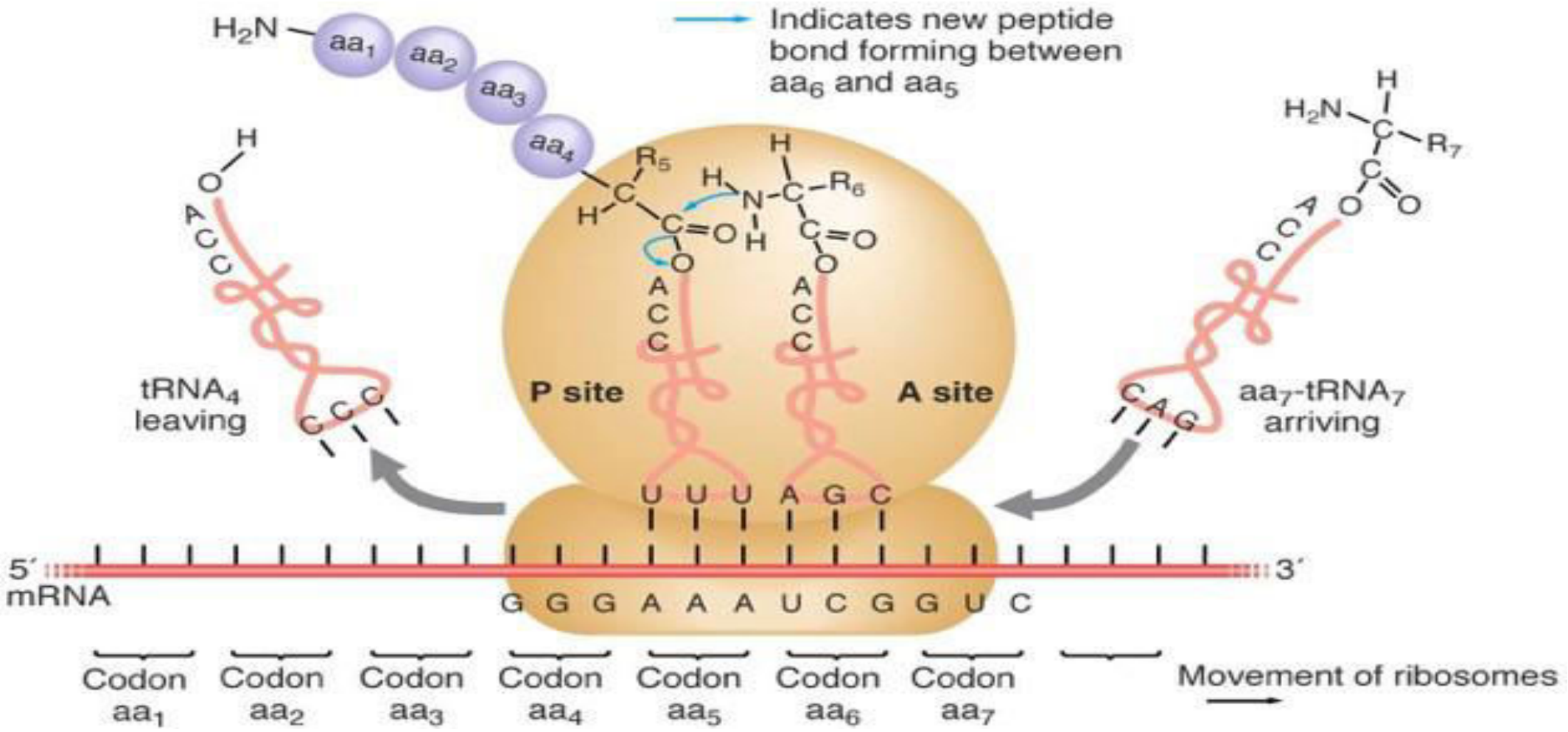
**Elongation process:**

10.Free tRNA moves to the E site.

11.A new charged tRNA gets to the A site and the cycle repeats.




3. Translocation


Indicates new peptide bond forming between aa6 and aa5
H2N
aa1
aa2
aa3
aa4
R5
R6
R7
tRNA4 leaving
P site
A site
aa7-tRNA7 arriving
U U U A G C
5′
mRNA
3′
G G G A A A U C G G U C
Codon aa1
Codon aa2
Codon aa3
Codon aa4
Codon aa5
Codon aa6
Codon aa7
Movement of ribosomes

# ELONGATION OF POLYPEPTIDES DURING TRANSLATION

**1. Incoming aminoacyl tRNA**
New tRNA moves into A site, where its anticodon base pairs with the mRNA codon.

**2. Peptide bond formation**
The amino acid attached to the tRNA in the P site is transferred to the tRNA in the A site.

**3. Translocation**
Ribosome moves down mRNA. The tRNA attached to polypeptide chain moves into P site. The A site is empty.

Figure 16-15 part 1 Biological Science, 2/e

© 2005 Pearson Prentice Hall, Inc.

**4. Incoming aminoacyl tRNA**
New tRNA moves into A site, where its anticodon base pairs with the mRNA codon.

**5. Peptide bond formation**
The polypeptide chain attached to the tRNA in the P site is transferred to the tRNA in the A site.

**6. Translocation**
Ribosome moves down mRNA. The tRNA attached to polypeptide chain moves into P site. Empty tRNA from P site moves to E site, where tRNA is ejected. The A site is empty again.

Figure 16-15 part 2 Biological Science, 2/e

© 2005 Pearson Prentice Hall, Inc.