



# Translation

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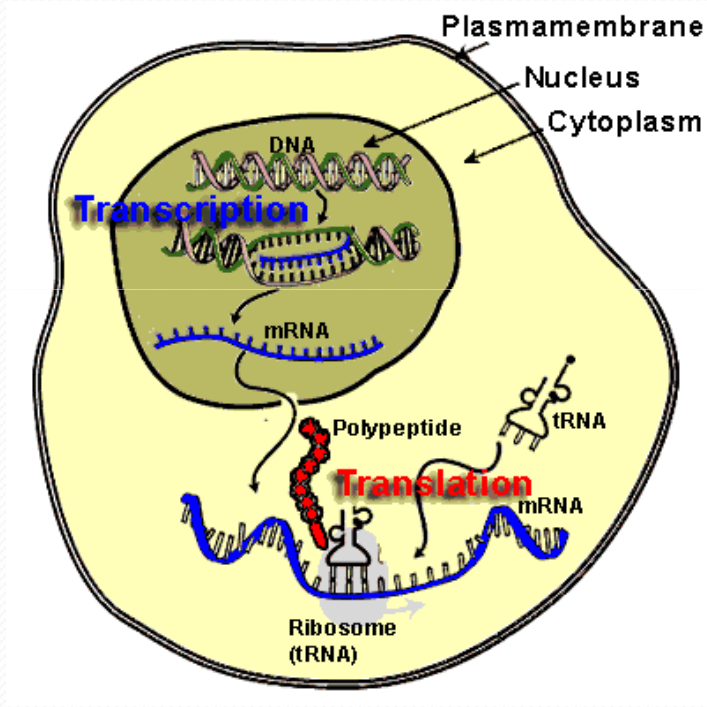
**Translation is a process where proteins are made by the ribosomes on the mRNA strand.**

**Or**

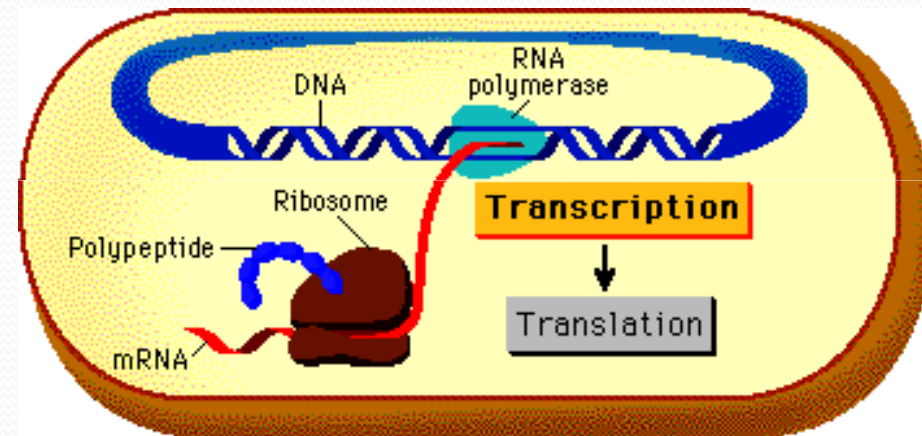
**The process in the ribosomes of a cell by which a strand of messenger RNA directs the assembly of a sequence of amino acids to make a protein.**

**DNA → RNA → PROTEIN**

# Site of protein synthesis in eukaryotes and prokaryotes



Eukaryotic cell



Prokaryotic cell

# Ribosome Structure (Site of Protein Synthesis)



**70S**

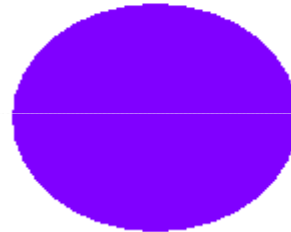
**$2.5 \times 10^6$**

**30S**



**$0.9 \times 10^6$**

**16 S rRNA with 1541 nucleotides  
21 proteins**



**50S**

**$1.6 \times 10^6$**

**5S rRNA with 120 nucleotides  
23S rRNA with 2904 nucleotides  
31 different proteins  
L1,L2,L3,.....**

## Steps in Translation

Activation of amino acids

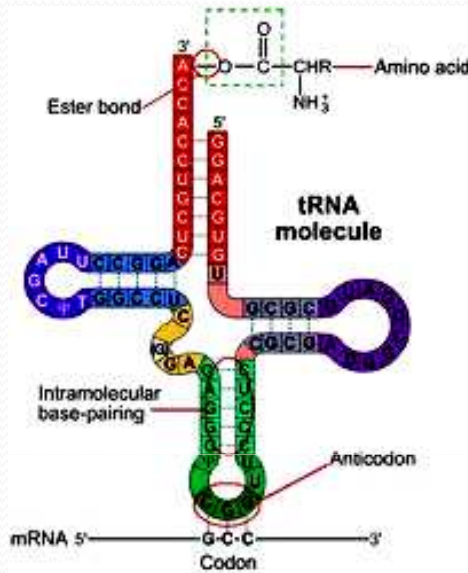
Transfer of amino acid to tRNA (charging of tRNA)

**Initiation of synthesis**

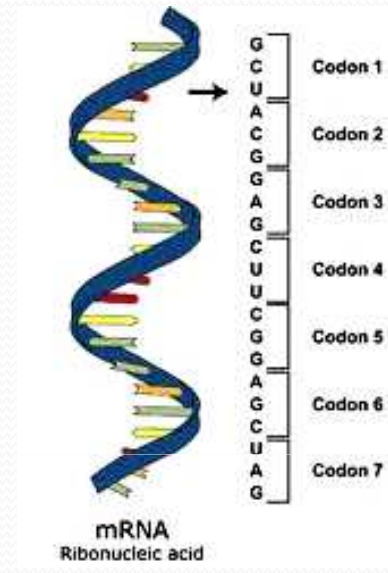
**Elongation of polypeptide chain**

**Termination of synthesis**

# Role of RNAs in translation

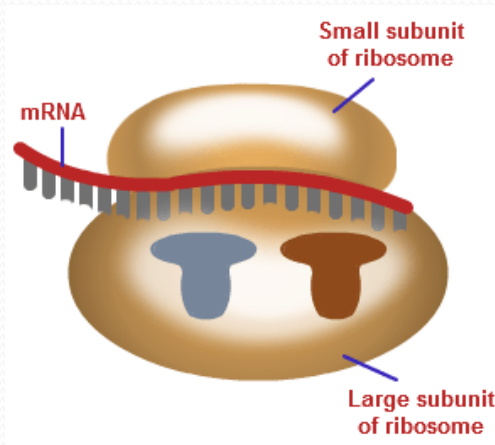


**tRNA transports amino acids**



**mRNA carries genetic information**

**rRNA is integral part of ribosome**

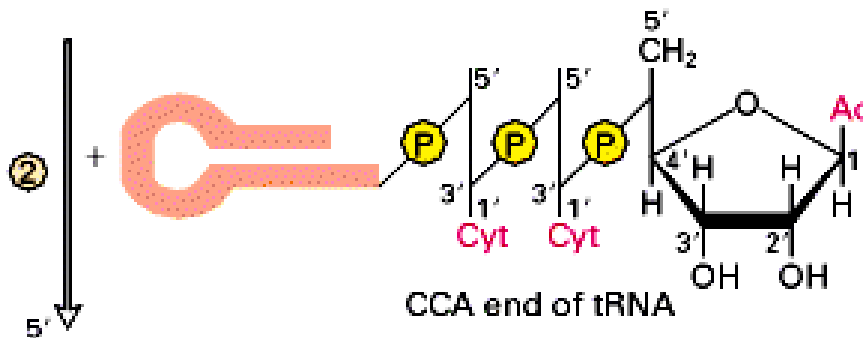
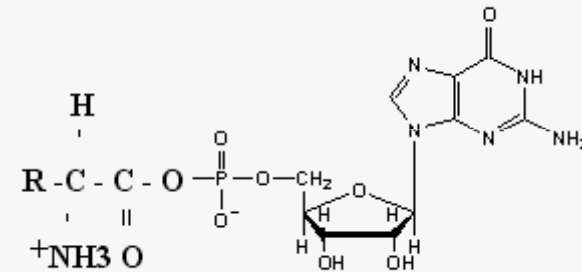
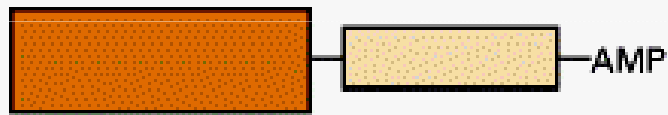
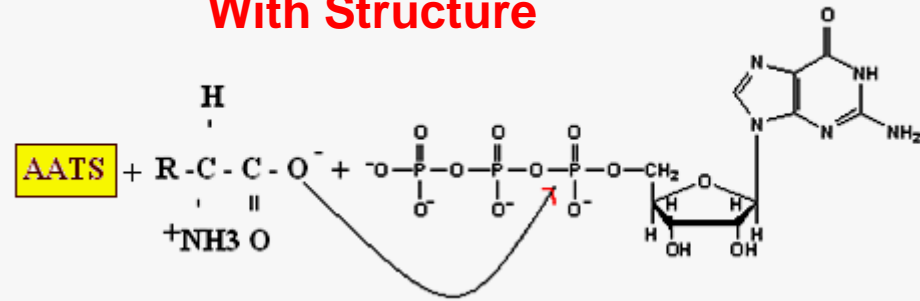


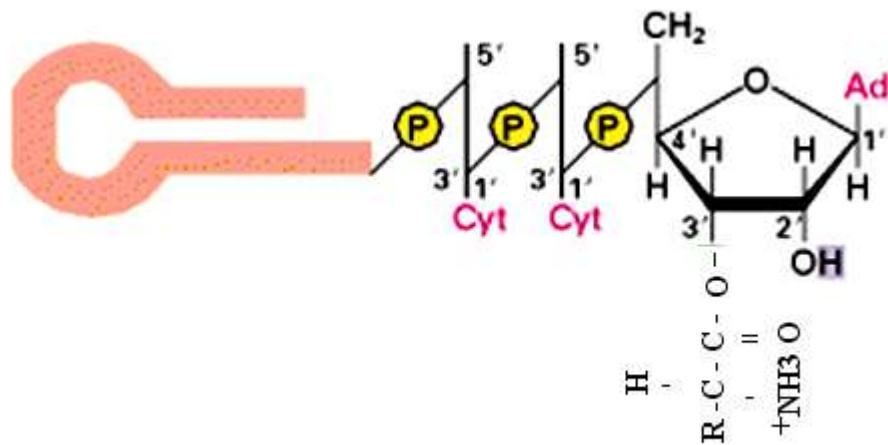
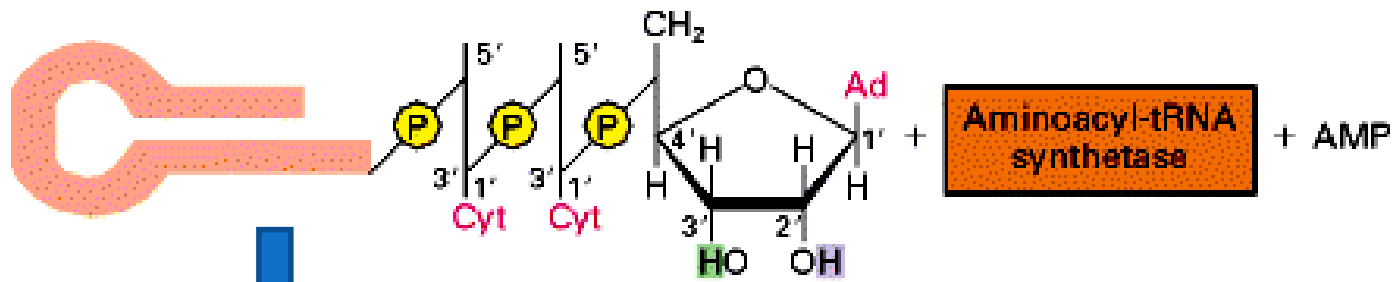
# Activation of amino acids & Charging of tRNA

Names only



With Structure



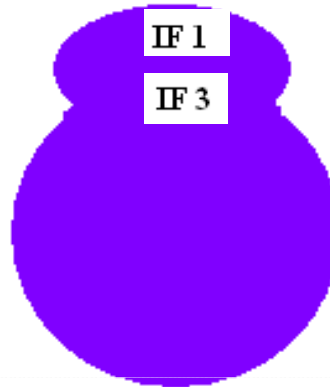




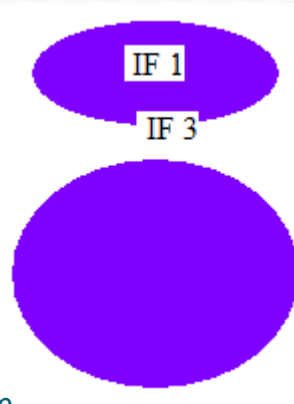
# Initiation of translation



Both subunits are attached

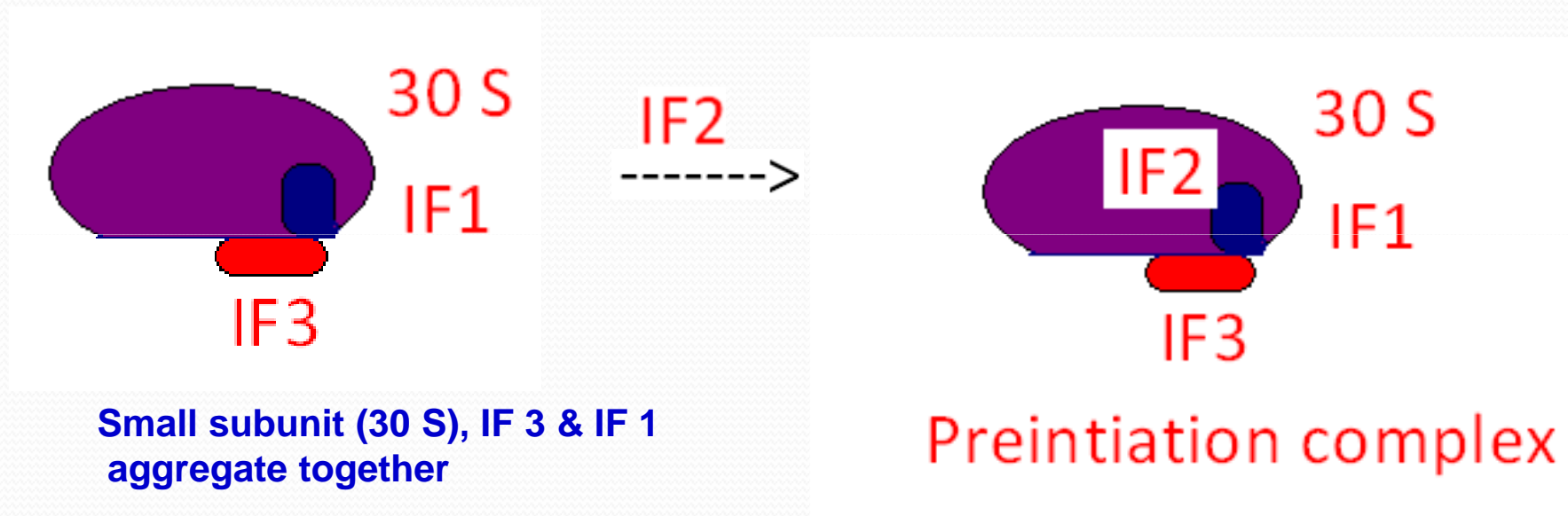


Initiation Factors (IF 1 & IF 3) attaches to the junction for disassociation

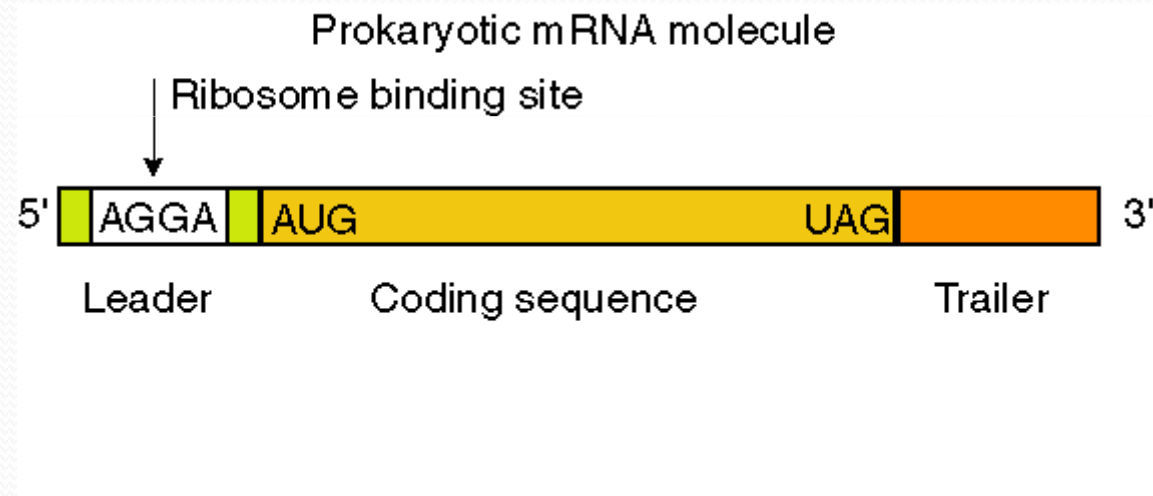
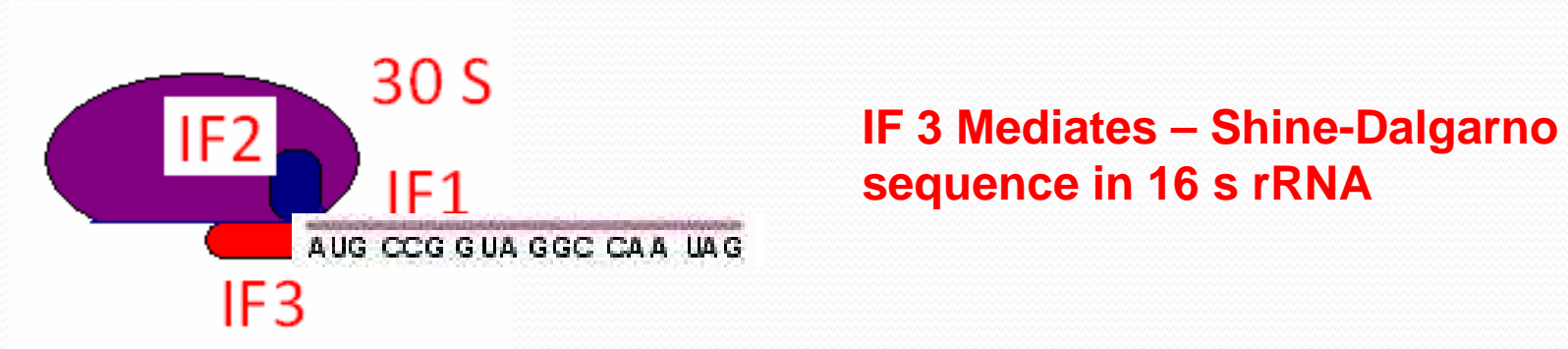


Disassociated small & large subunits

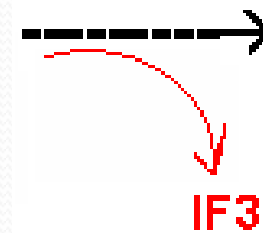
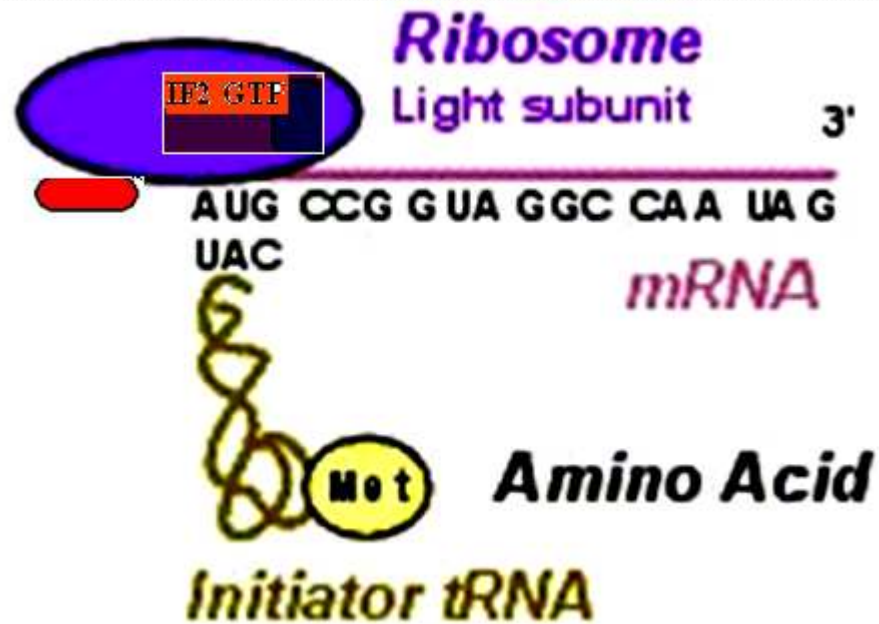
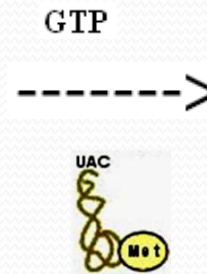
## Formation of Pre Initiation Complex



## mRNA attaches to form initiation Complex



## Initiation of polypeptide synthesis / Initiation step in translation begins



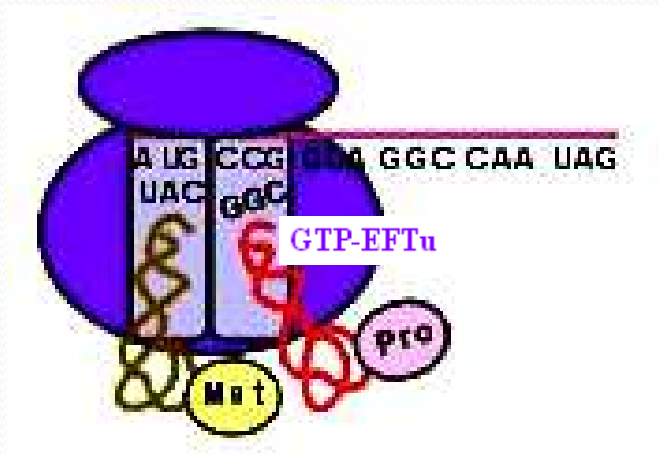
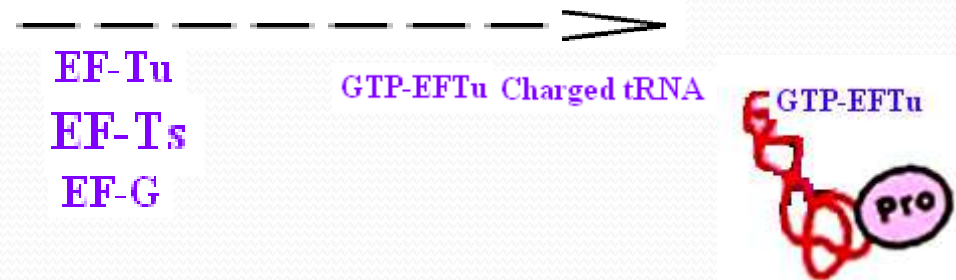
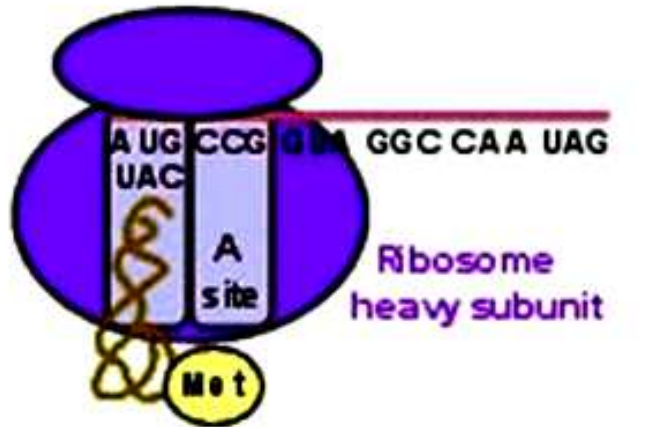
IF1

IF2-GTP → IF2GDP



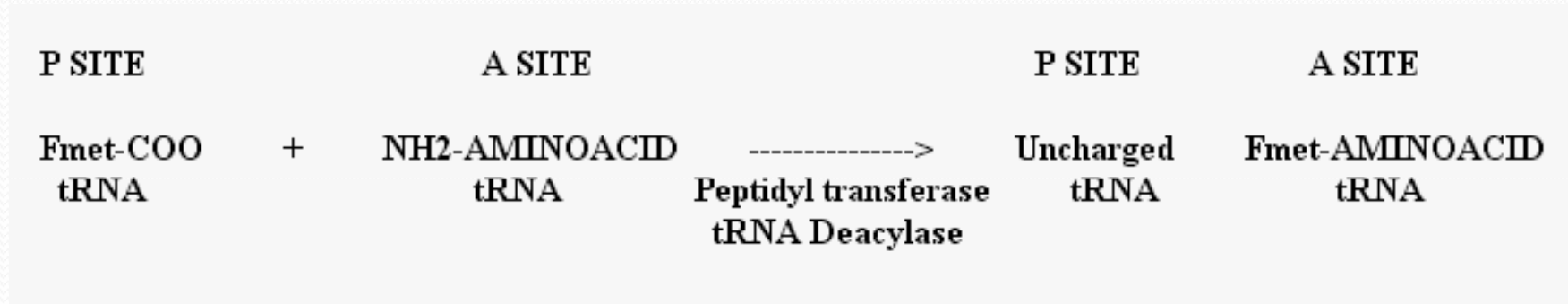


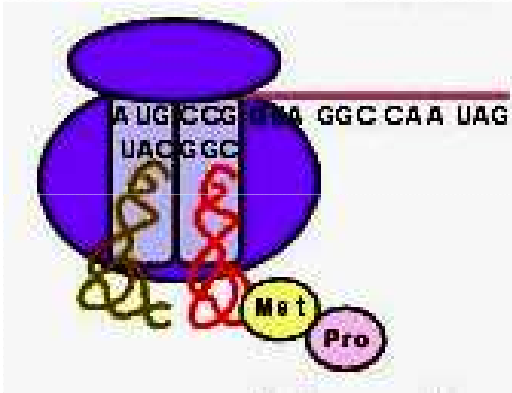
## Elongation - starts



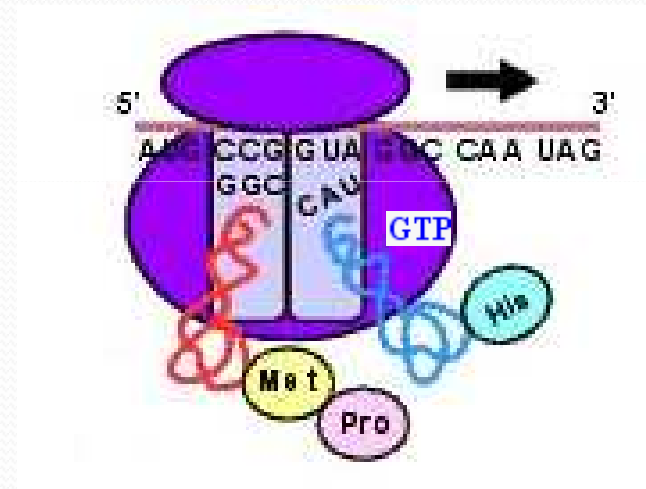
**Peptidyl transferase centre/ active centre created by L proteins**

## Peptidyl transferase centre/ active centre Formation by L proteins of large sub unit



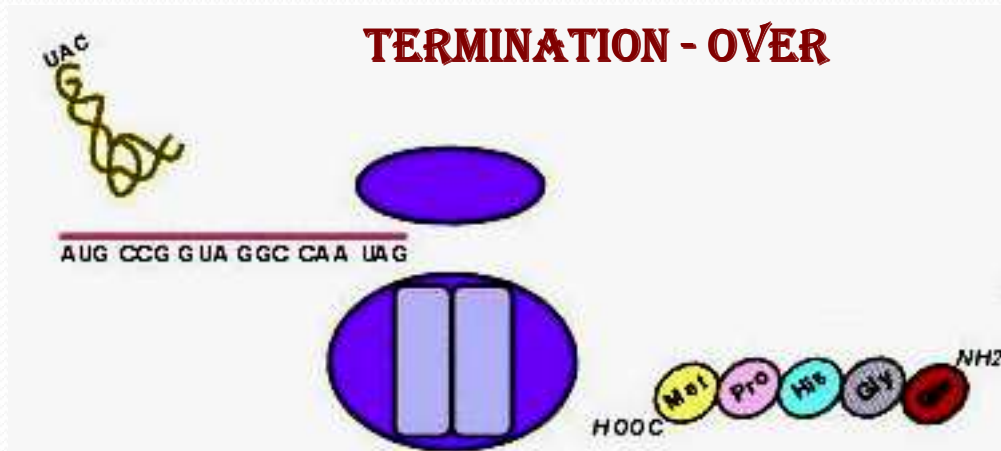
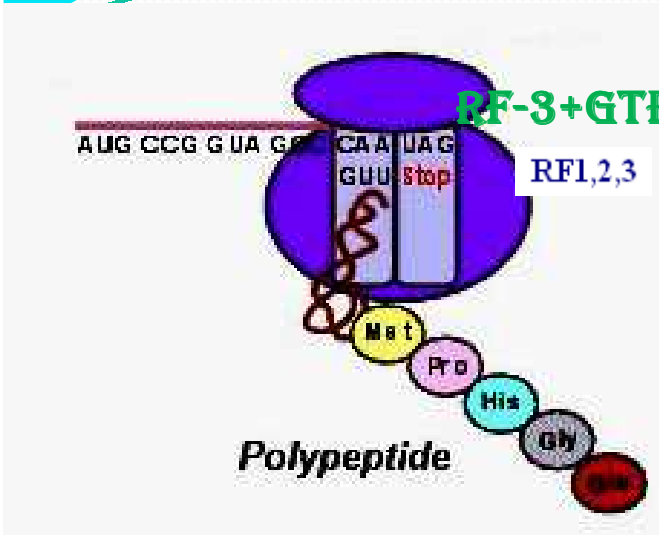


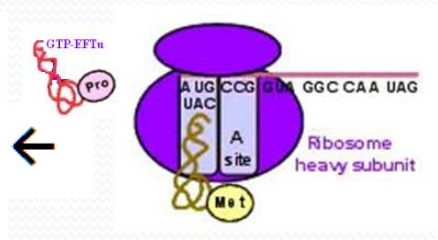
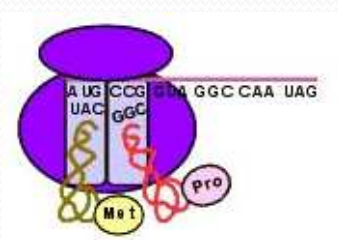
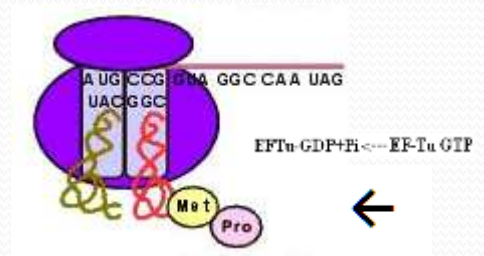
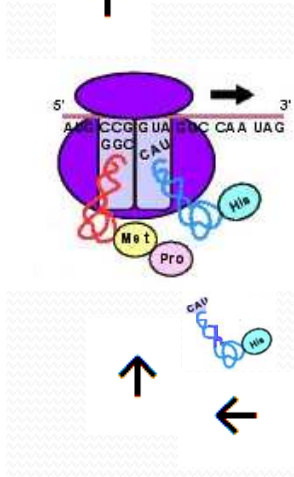
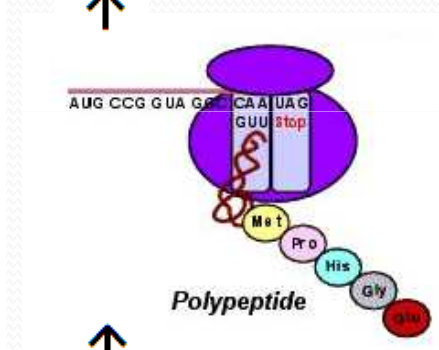
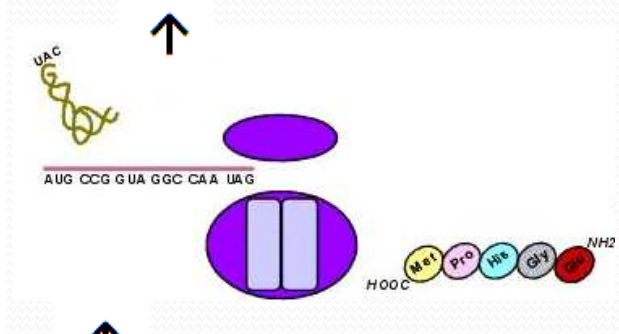
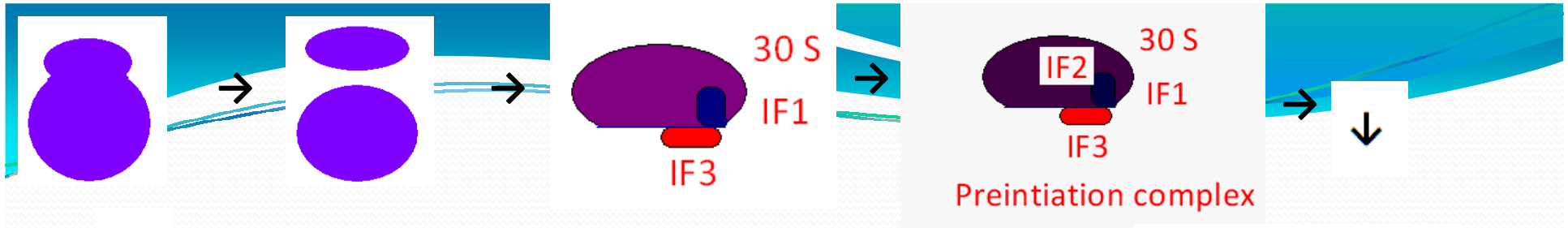
**EF-G**



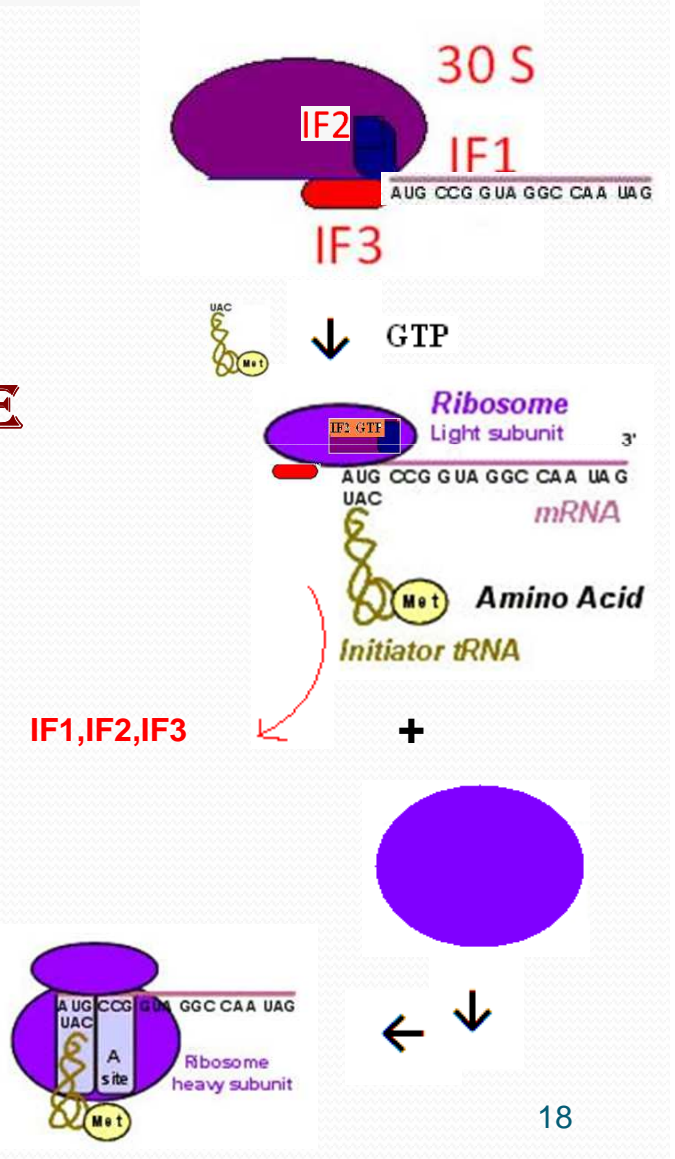
**ELONGATION - OVER**

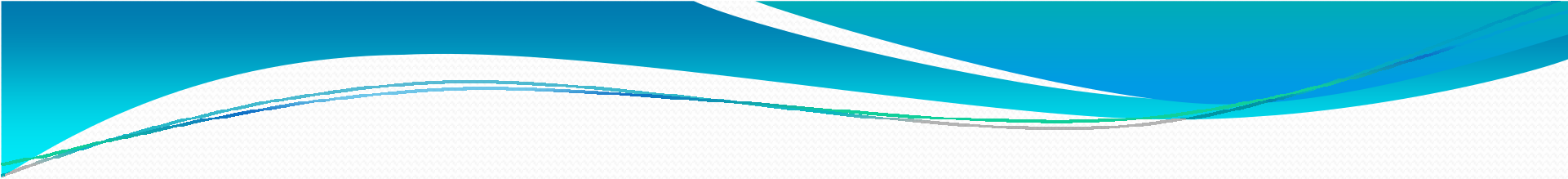






# TRANSLATION CYCLE





**ACKNOWLEDGEMENTS  
TO  
INTERNET  
FOR  
PICTURES**