(d) Chain Elongation: The elongation of polypeptide chain needs certain factors, known as Elongation Factor (EF).

~~These are — EF-Tu, In prokaryotes — EF-1~~

In prokaryotes these are → EF-Tu, EF-Ts and EF-G
and in Eukaryotes → EF-1 and EF-2.

The process goes on as →

(i) The second amino acid-t-RNA complex (aa_2-tRNA) comes to A-site of larger sub-unit. It needs EF-Tu, GTP and Mg^{++}

(ii) Peptide bond is formed by transfer of f-Met to the second amino acid (aa_2). It needs Mg^{++} and K^+ in addition to the enzyme peptidyl transferase.

(iii) Translocation → This aa_2-tRNA complex moves from the A-site to the P-site.
It needs EF-G, GTP and Mg^{++}.

(iii) There is movement of ribosome related to mRNA in 5'→3' direction.
The t-RNA which carried f-Met get released from f-Met and come down from the position 'P' releasing the ribosome.
The third amino acid-t-RNA complex (aa_3-tRNA) now come to A-site which has been vacated by second amino acid-t-RNA (aa_2-tRNA) complex.

(iv) In this way elongation of chain continues till the onset of termination codons UAA, UAG or UGA on m-RNA.

(e) Chain Termination :- This process requires

— A termination codon on m-RNA i.e.

UAA
UAG
UGA

— Release factors

x) In prokaryotes RF-1; RF-2; and RF-3.

x) In eukaryotes RF.

In prokaryotes Enzyme Deformylase and Aminopeptidase and in Eukaryotes only Aminopeptidase
The process occurs as follows.

i) For attachment of release factor to ribosomes, the signal is provided by termination codon.

ii) The release factors interacts with peptidyl transferase and cause hydrolysis of the bond between polypeptide chain and t-RNA.

(iii) Hence the chain is released from the ribosome.

~~(iv) Hydrolysis of GTP results causes the dissoci~~

(iv) Due Due to hydrolysis of GTP release factors dissociates from ribosomes.

(v) The t-RNA get released from peptide/amino acyl bonds. and become unloaded.

(vi) There is dissociation of ribosomal sub-units

(vii) m-RNA is released ~~as~~ for breakdown to nucleotides.

~~(viii)~~

b) Processing of polypeptide chain: After release of polypeptide chain from ribosome, there may be cleavage of formyl residue or of methionine. In some cases internal cleavage cuts the polypeptide chain into two or more pieces.

~~H~~ Formyl

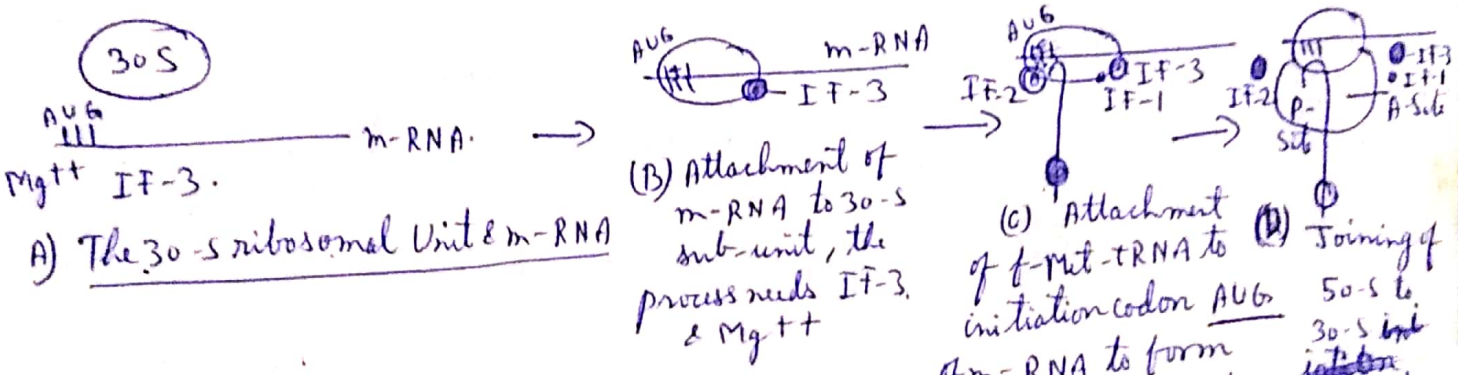
(1) ~~Formyl methionylsyl~~

(1) Formyl methionyl peptide ⟶ Formic Acid + Methionyl peptide

(2) Methionyl peptide ⟶ Methionine + Peptide.

Thus a chain may begin with alanine, serine or the threonine.

In this way a particular protein is synthesized.



Initiation