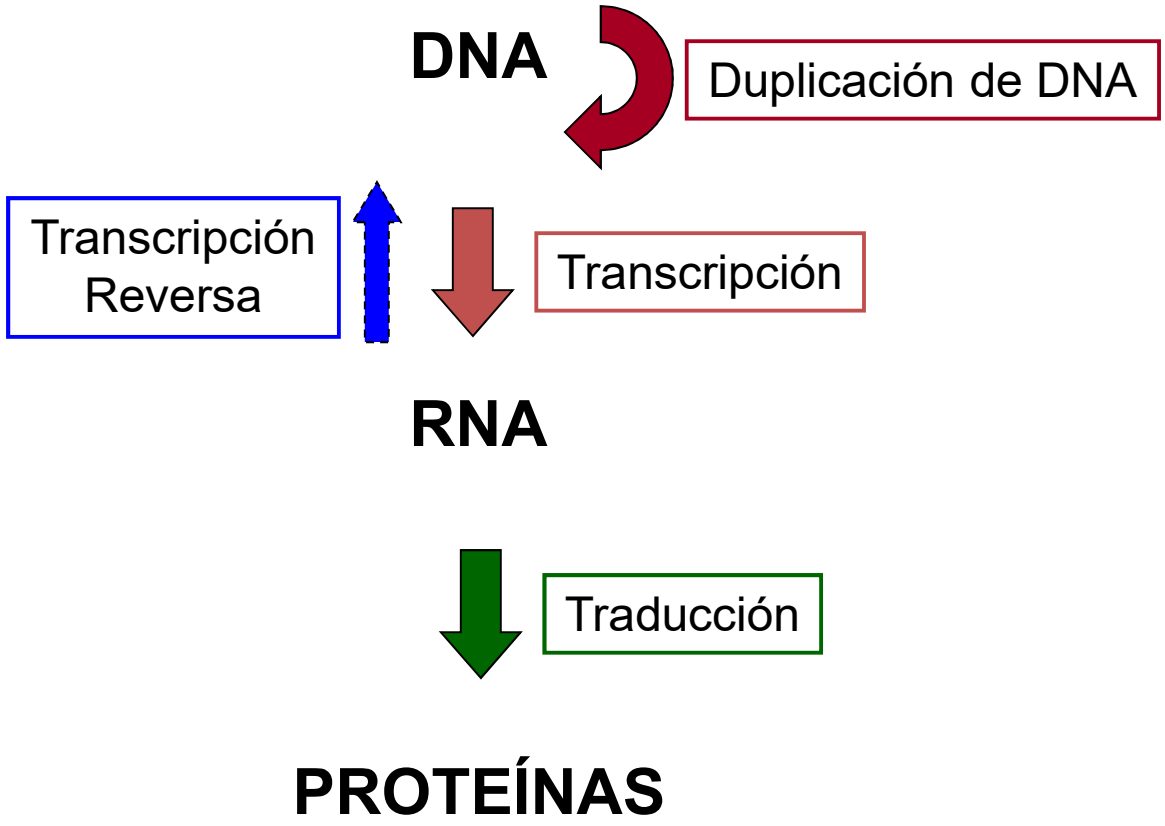
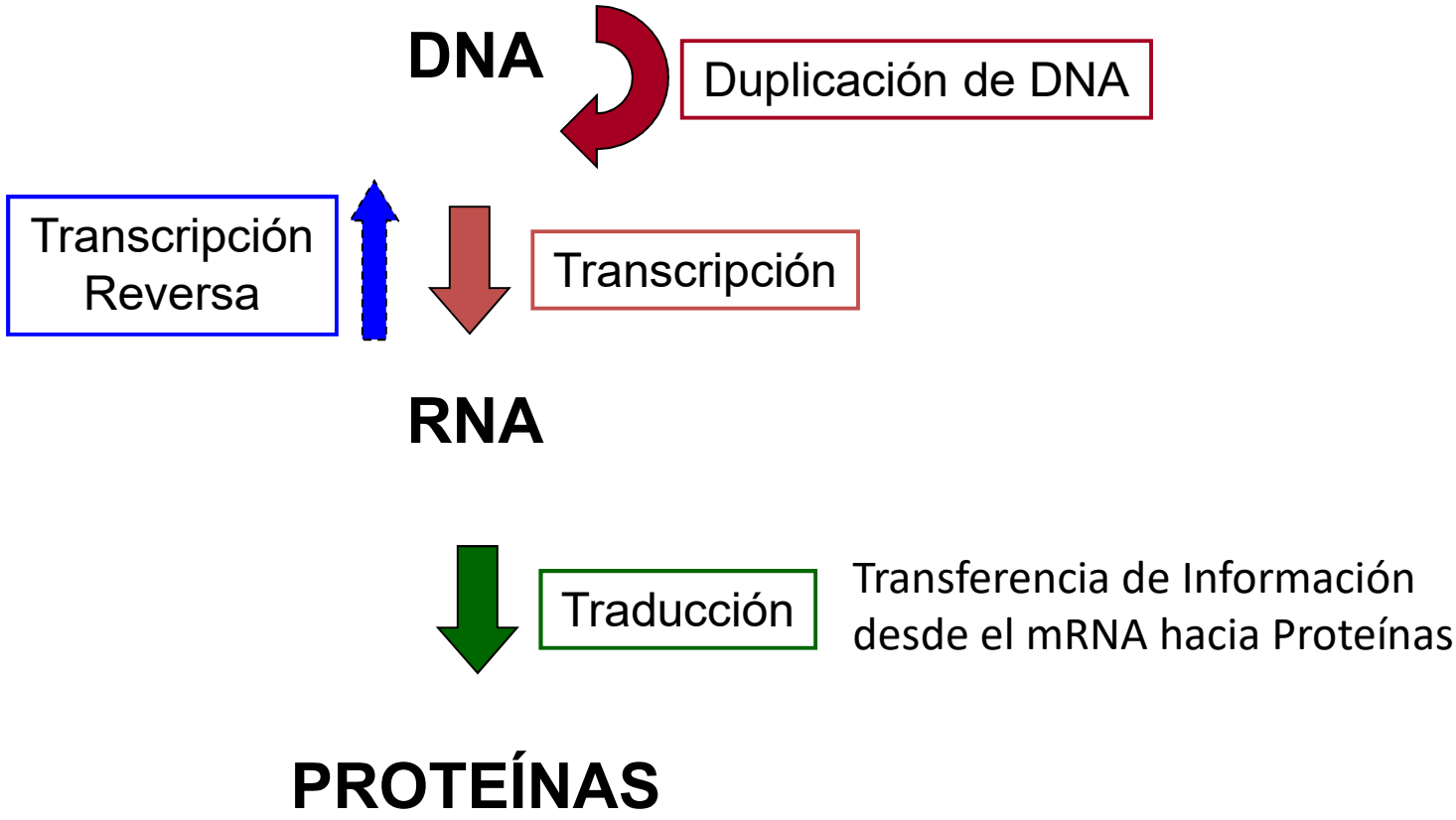
Flujo de la Información Genética

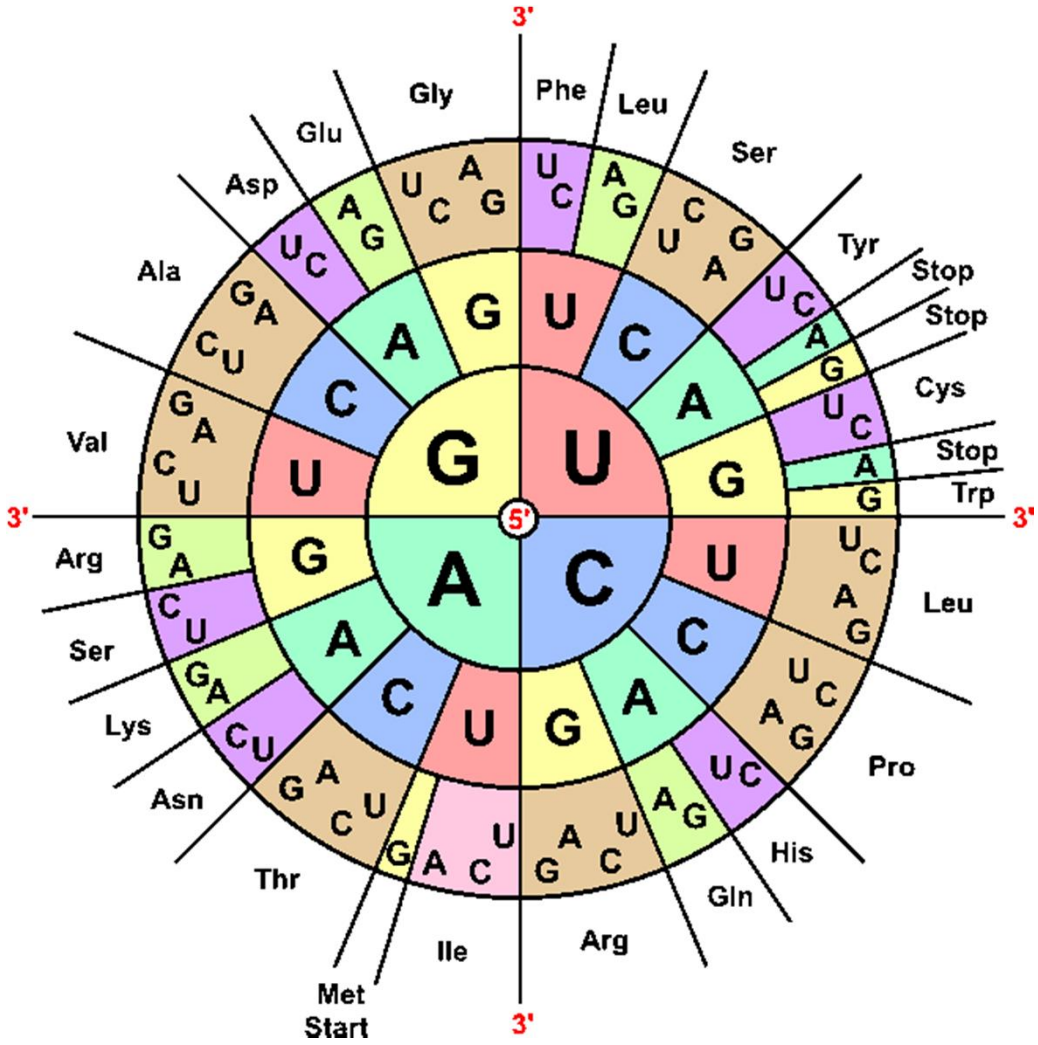


Flujo de la Información Genética



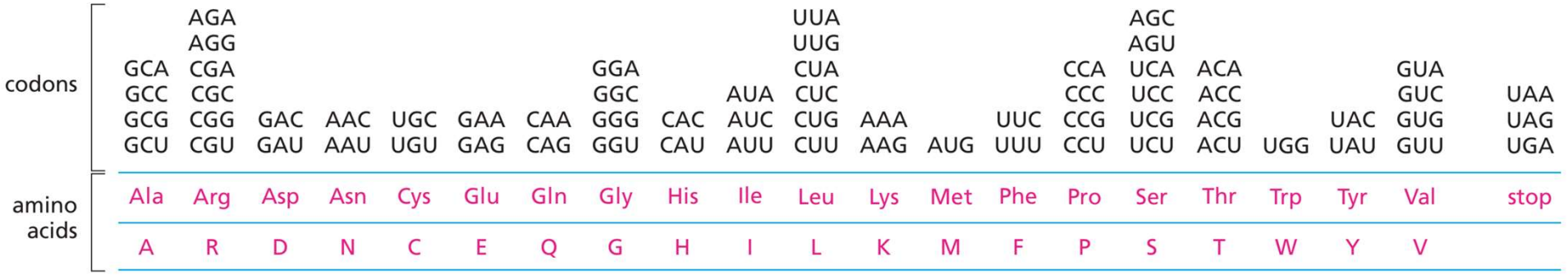
Principios Generales de la Traducción

Código Genético



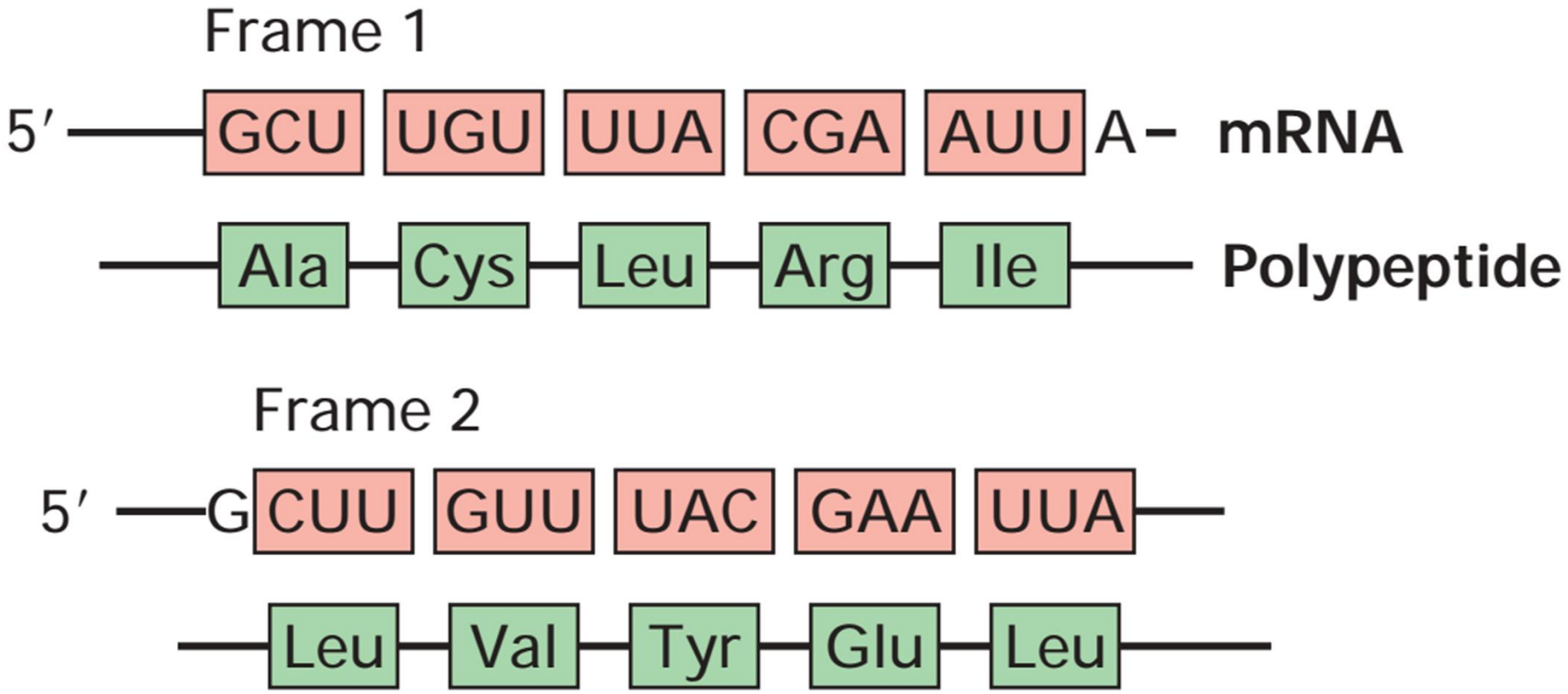
Fuente: http://www.macroevolution.net/biology-dictionary-gagd.html#genetic-code

The nucleotide sequence of an mRNA is translated into the amino acid sequence of a protein via the genetic code



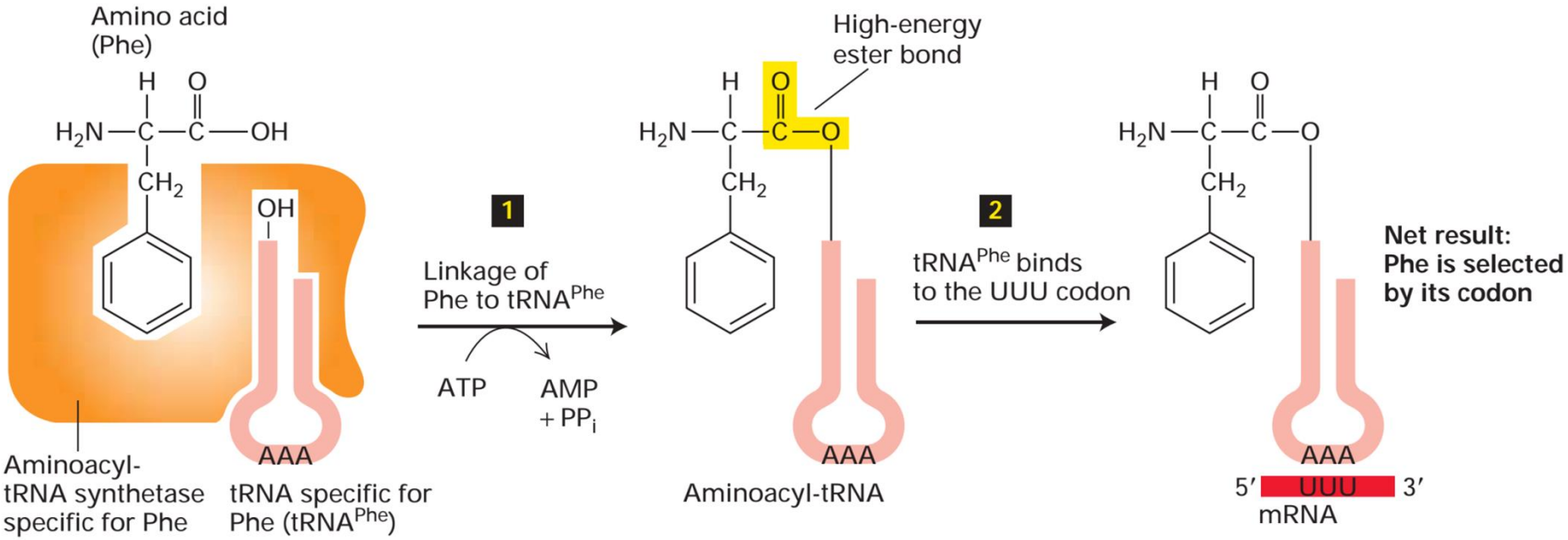
Alberts et al. 2014 Essential Cell Biology 4ta Ed.

Example of how the genetic code—a non-overlapping, comma-less triplet code—can be read in different frames



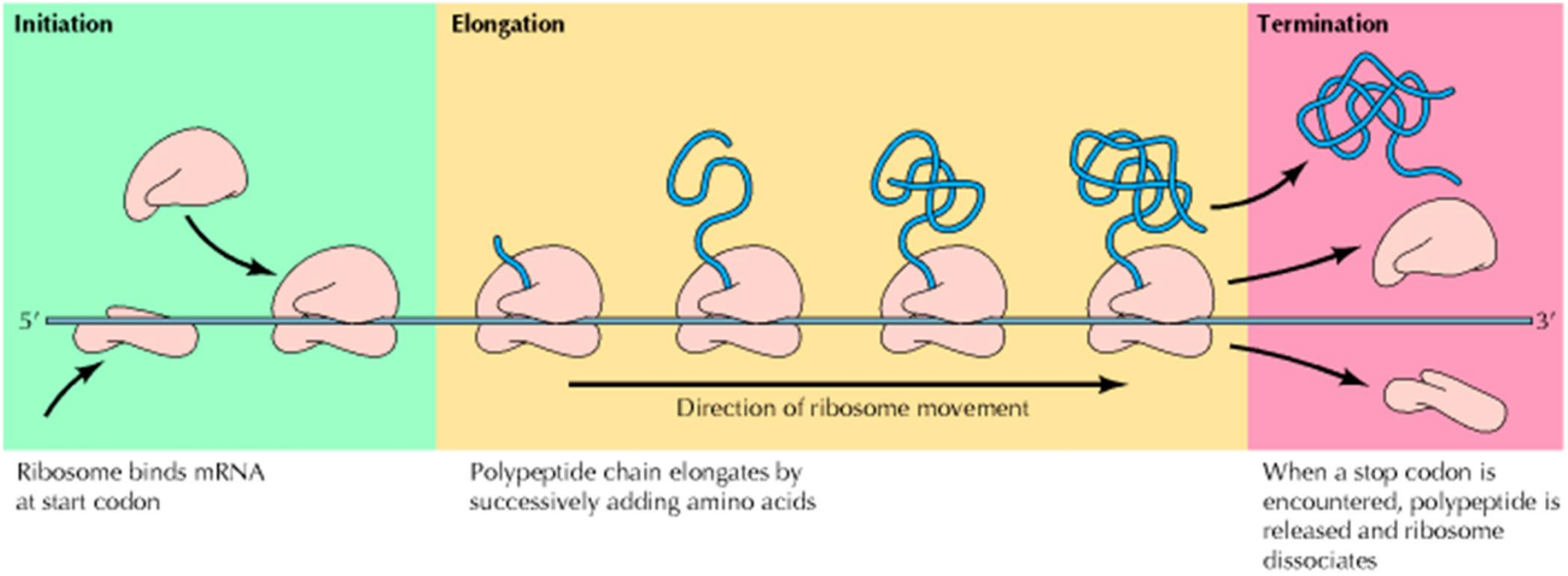
Fuente: Lodish et al. 2003

Two-step decoding process for translating nucleic acid sequences in mRNA into amino acid sequences in proteins



Fuente: Lodish et al. 2003

Resumen de la Traducción

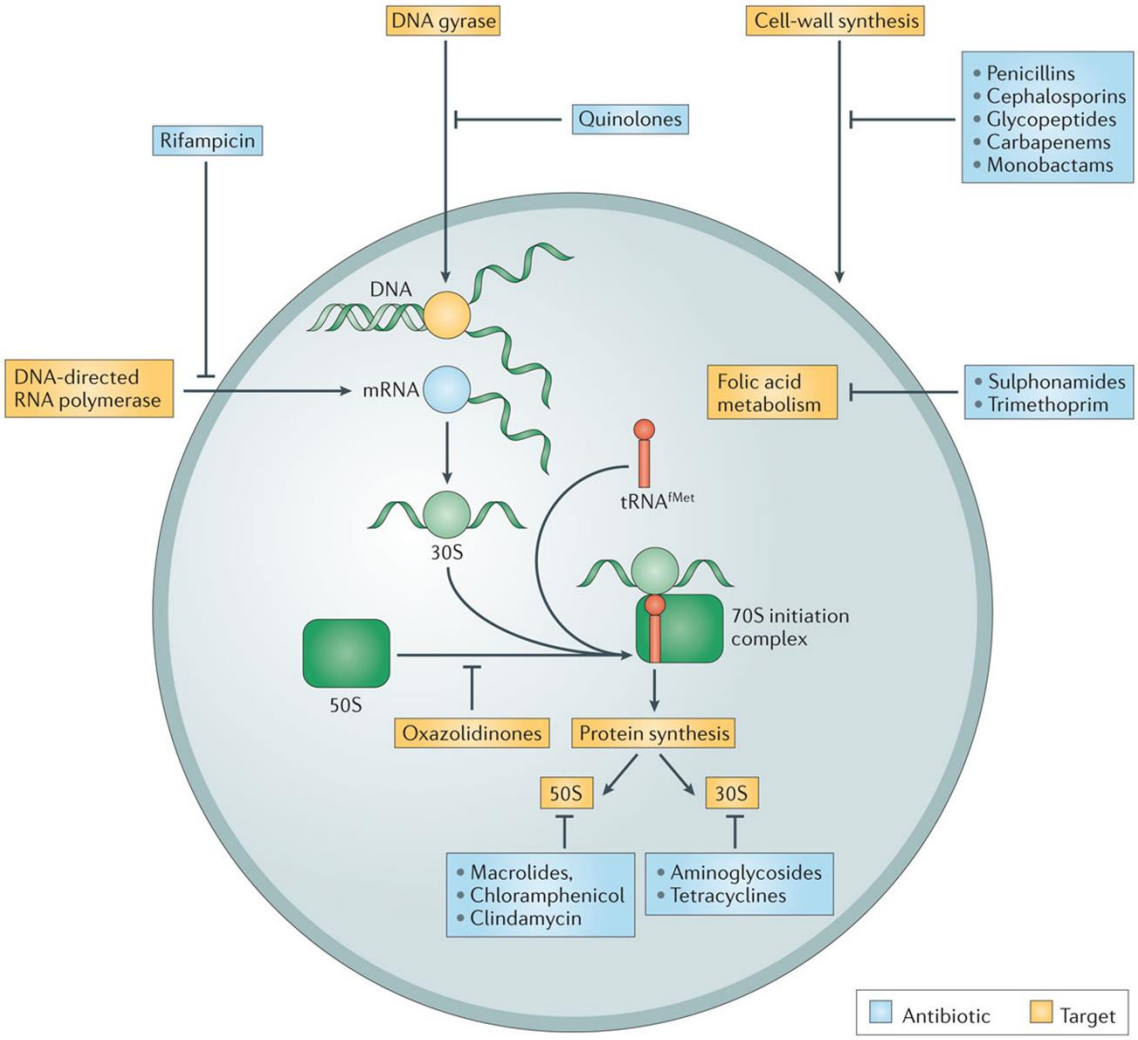


Todas estas etapas requieren de proteínas accesorias específicas y de energía en forma de ATP o GTP

Fuente: COOPER, G. M. 2000 The Cell - A Molecular Approach Second Edition, ASM Press, Washington, D.C. & Sinauer Associates, Inc., Sunderland, Massachusetts.

¿Que tal si la bloqueamos?

En Bacterias



Nature Reviews | Drug Discovery

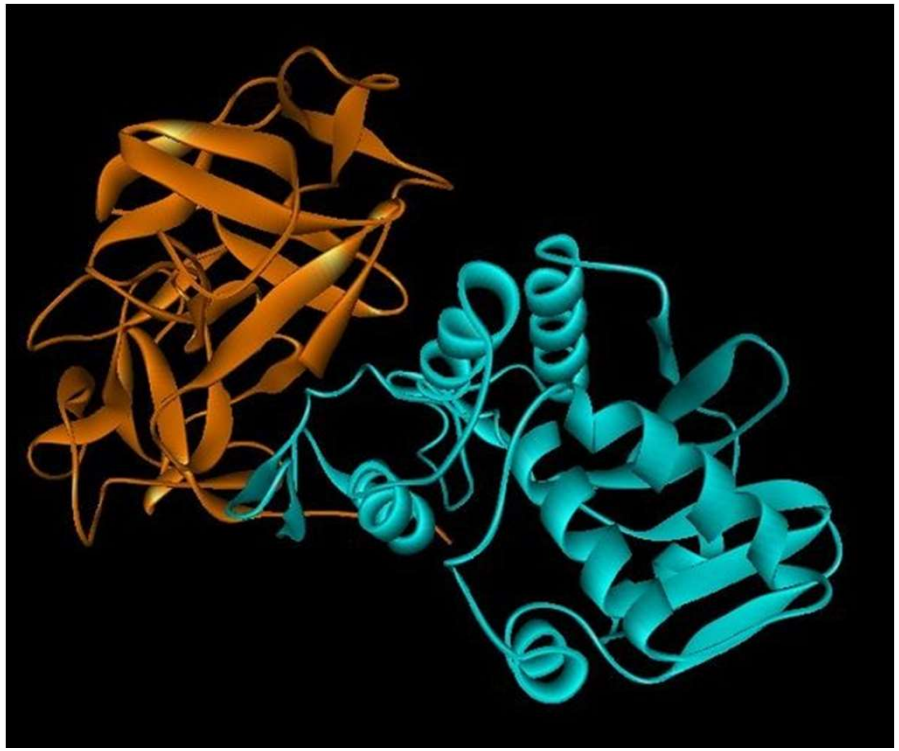
Fuente: Nature Reviews Drug Discovery 12, 371–387 (2013) doi:10.1038/nrd3975

En Mamíferos

Ricinus communis o Higuerilla

Fuente: Nature Reviews Drug Discovery 12, 371–387 (2013) doi:10.1038/nrd3975

Ricina



Cadena A 267 aminoácidos
Cadena B 262 aminoácidos
Unión por puente disulfuro

Cadena A: N-glycoside hydrolase
Depurina (A4324) del 28S rRNA
Inactiva el sitio de interacción con Factores de Elongación

B: Lectina
Se une a N-acetylgalactosamine o beta-1,4-linked galactose en Glicoproteínas

En humanos: Oral LD50 1–20 mg/kg bw

Fuente: Nature Reviews Drug Discovery 12, 371–387 (2013) doi:10.1038/nrd3975

Envenenamiento con Ricina

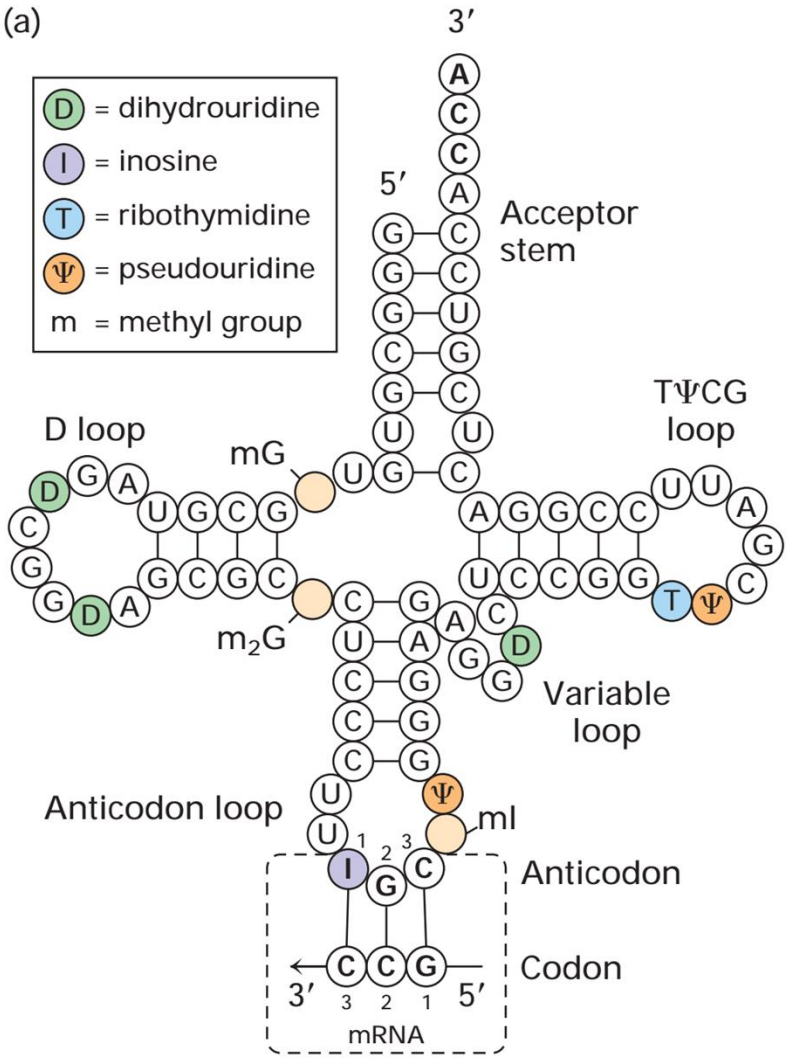
- Diarrea severa
- Daño Hepático y Renal
- Daño Renal
- Muerte a los 3-5 días luego de exposición

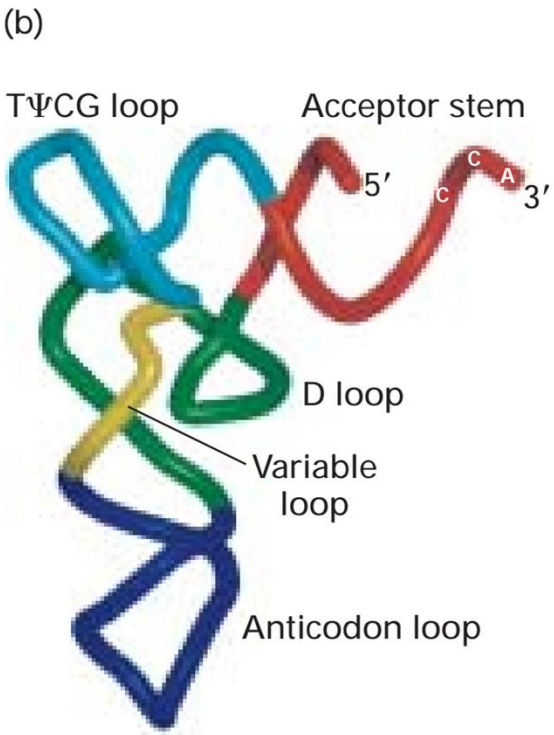
Maquinaria Celular que realiza la Traducción

Elementos Indispensables en el Proceso de Traducción

1. tRNAs
2. Ribosomas
3. mRNAs
4. Factores accesorios

Estructura de tRNAs – Moléculas Adaptadoras

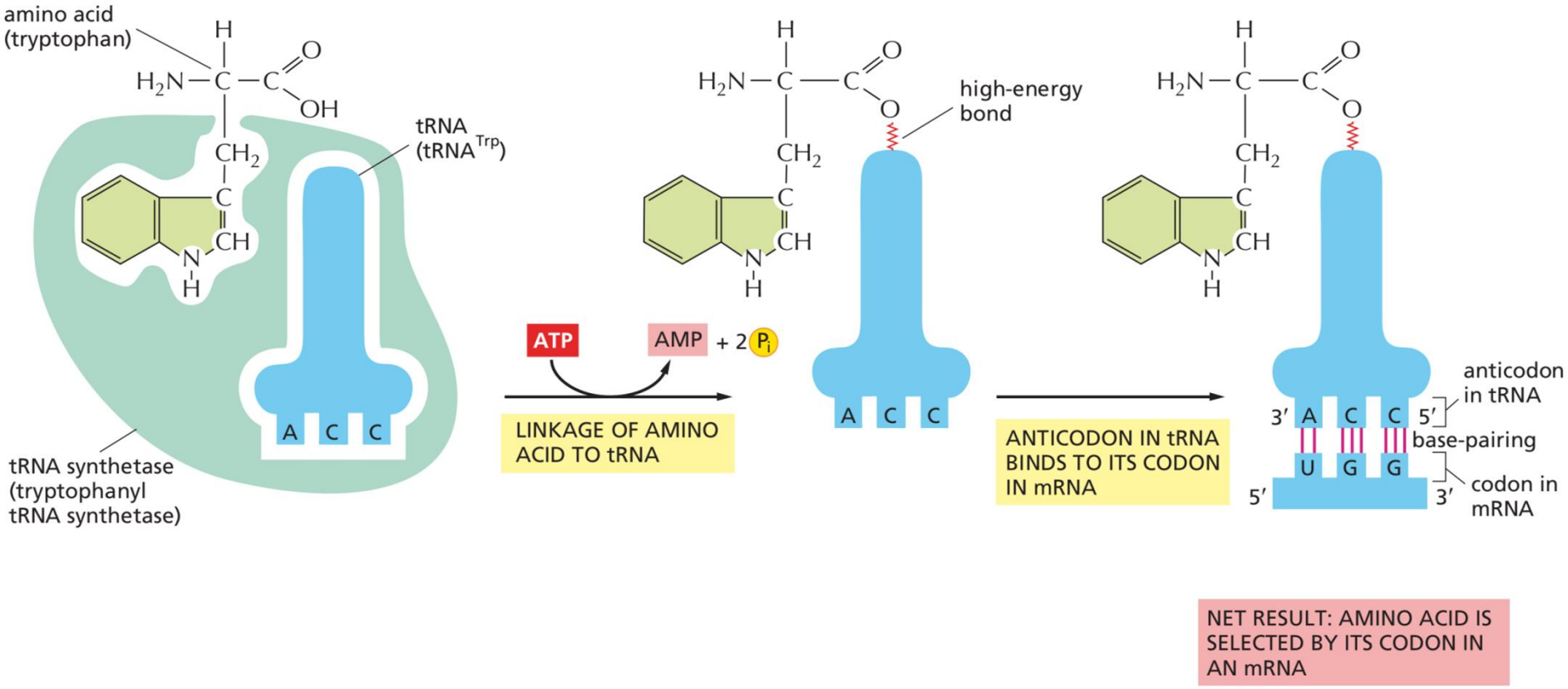




https://www.rcsb.org/3d-view/1EHZ/1

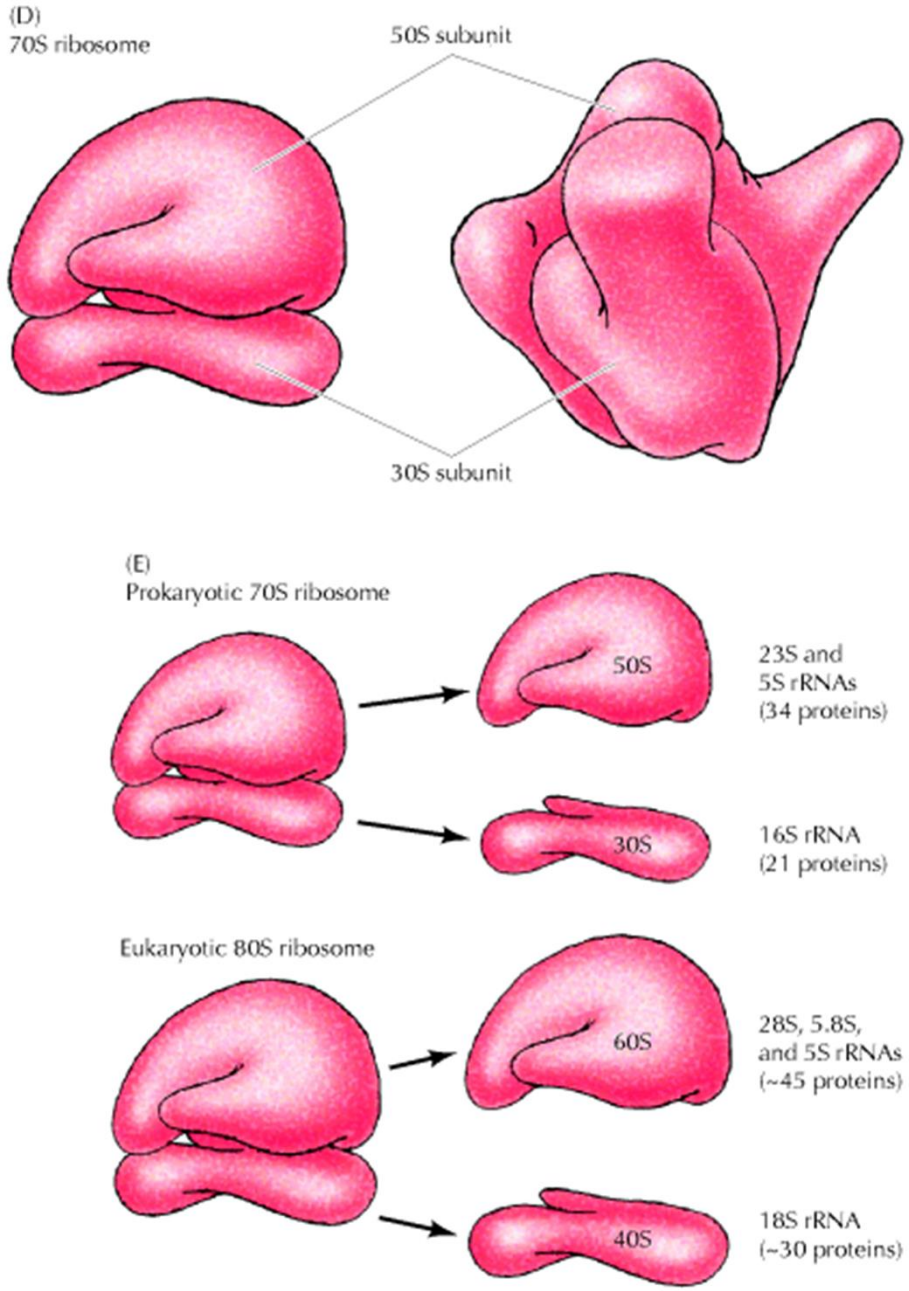
Fuente: Lodish et al. 2003

The genetic code is translated by the cooperation of two adaptors: aminoacyl-tRNA synthetases and tRNAs



https://www.rcsb.org/3d-view/1ASY/1

Alberts et al. 2014 Essential Cell Biology 4ta Ed.



Estructura de los Ribosomas

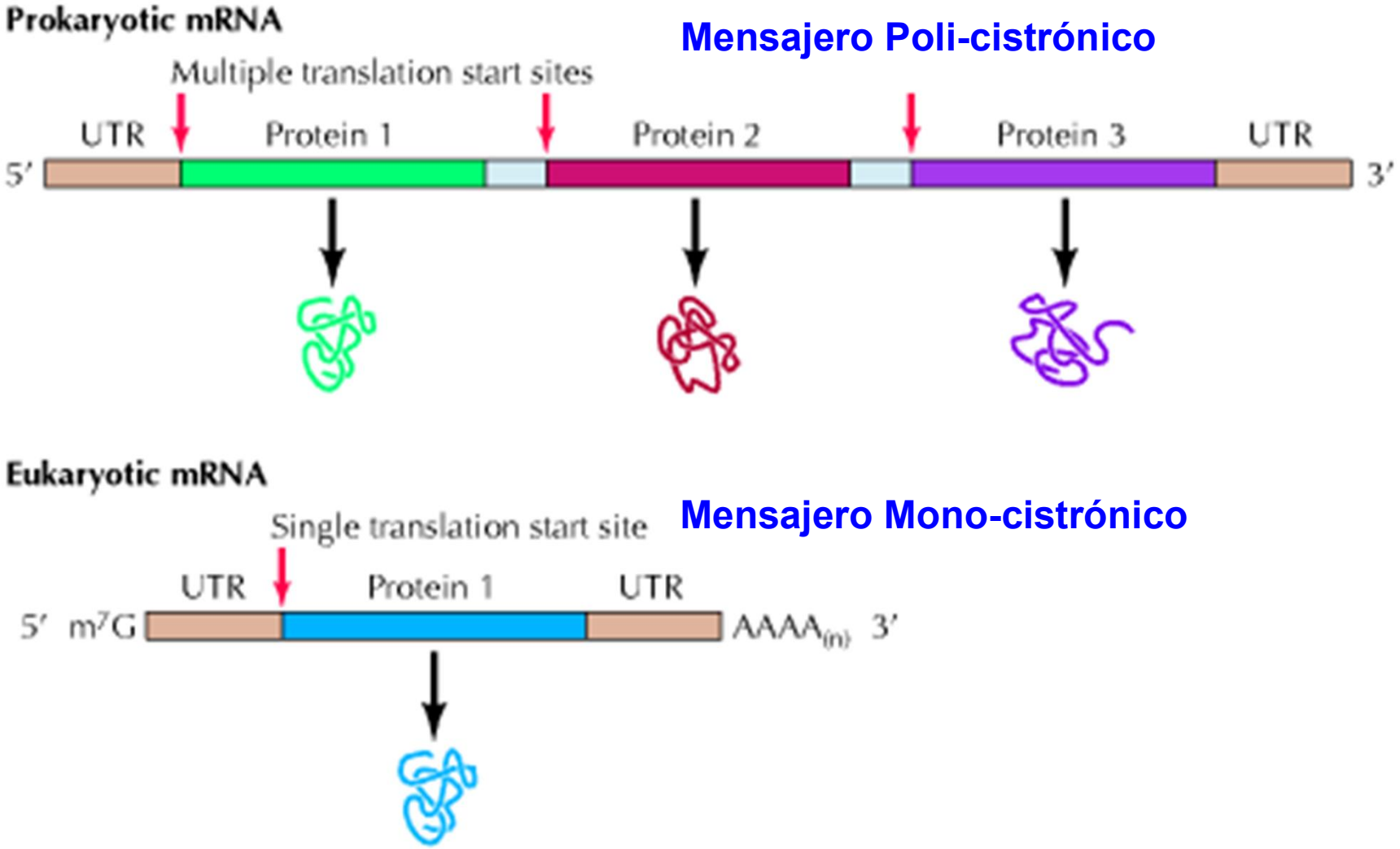
Actividad catalítica:
rRNAs

Actividad estructural:
Proteínas Ribosomales

https://www.rcsb.org/3d-view/4V4I/1

Fuente: COOPER, G. M. 2000 The Cell - A Molecular Approach Second Edition, ASM Press, Washington, D.C. & Sinauer Associates, Inc., Sunderland, Massachusetts.

Estructura de mRNAs Eucarióticos y Procarióticos



Fuente: COOPER, G. M. 2000 The Cell - A Molecular Approach Second Edition, ASM Press, Washington, D.C. & Sinauer Associates, Inc., Sunderland, Massachusetts.

Factores Accesorios

Factores de Iniciación

- IF1, IF2, IF3 (Procariotes)
- eIF1, eIF1A, eIF2, eIF3, eIF4A, eIF4B, eIF4E, eIF4G, eIF5 (Eucariotes)

Factores de Elongación

- EF-Tu, EF-G (Procariotes)
- eEF1-alpha, eEF2 (Eucariotes)

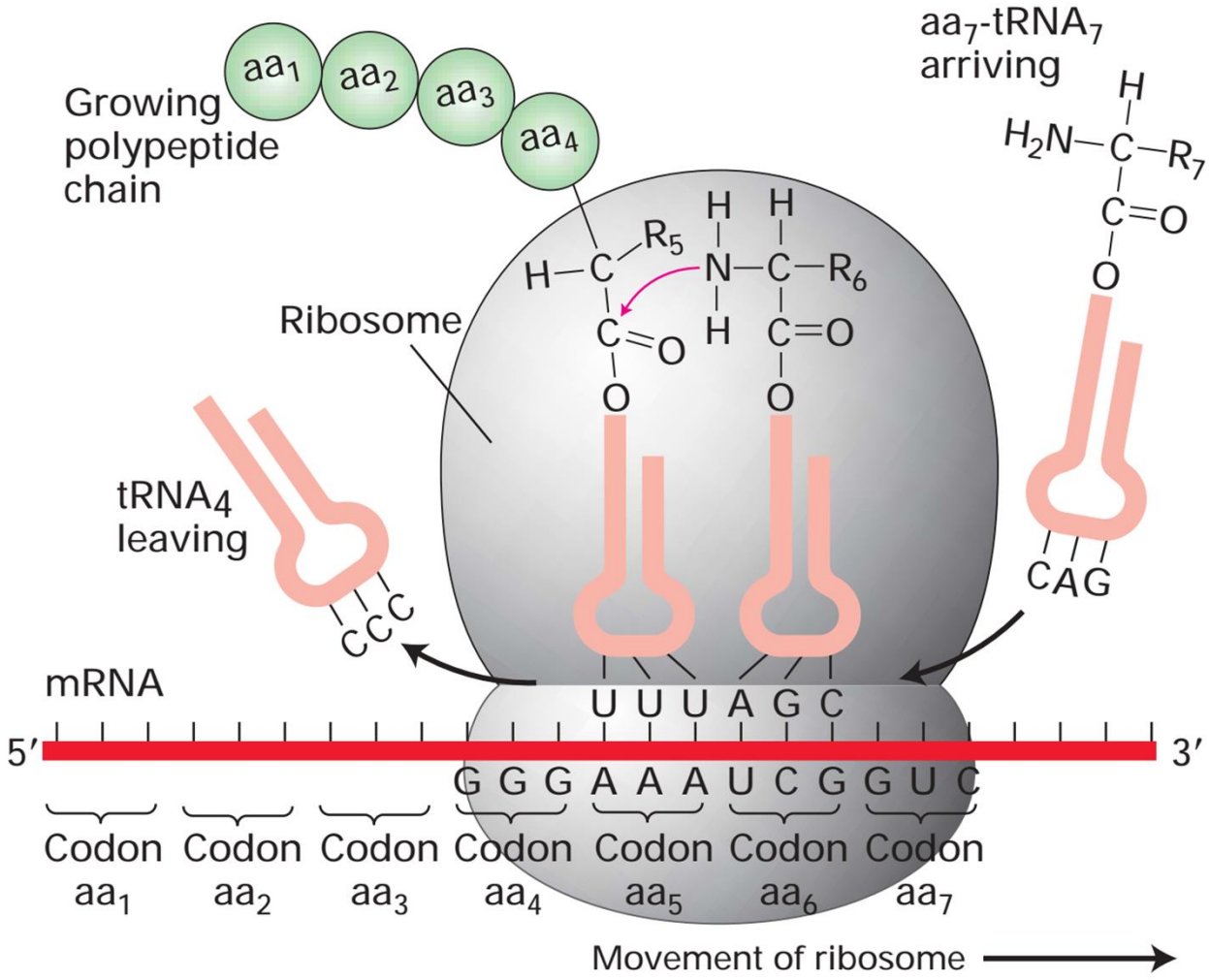
Factores de Terminación

- RF (Procariotes)
- eRF1 (Eucariotes)

Otros Factores

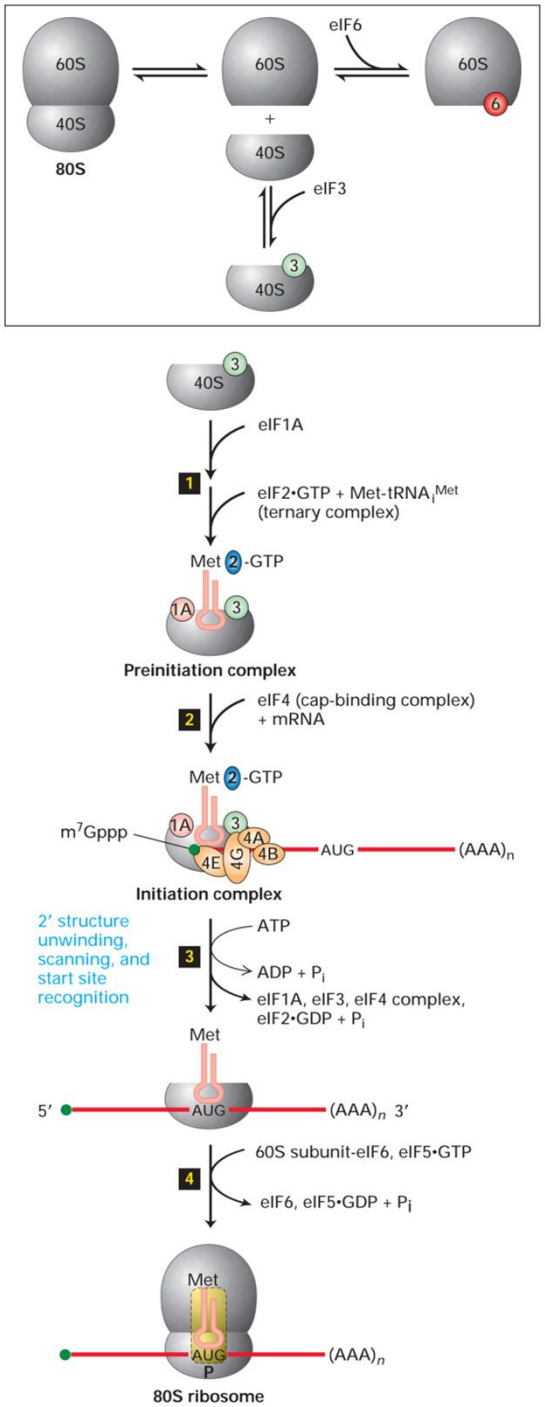
- PABP (Eucariotes)

The three roles of RNA in protein synthesis



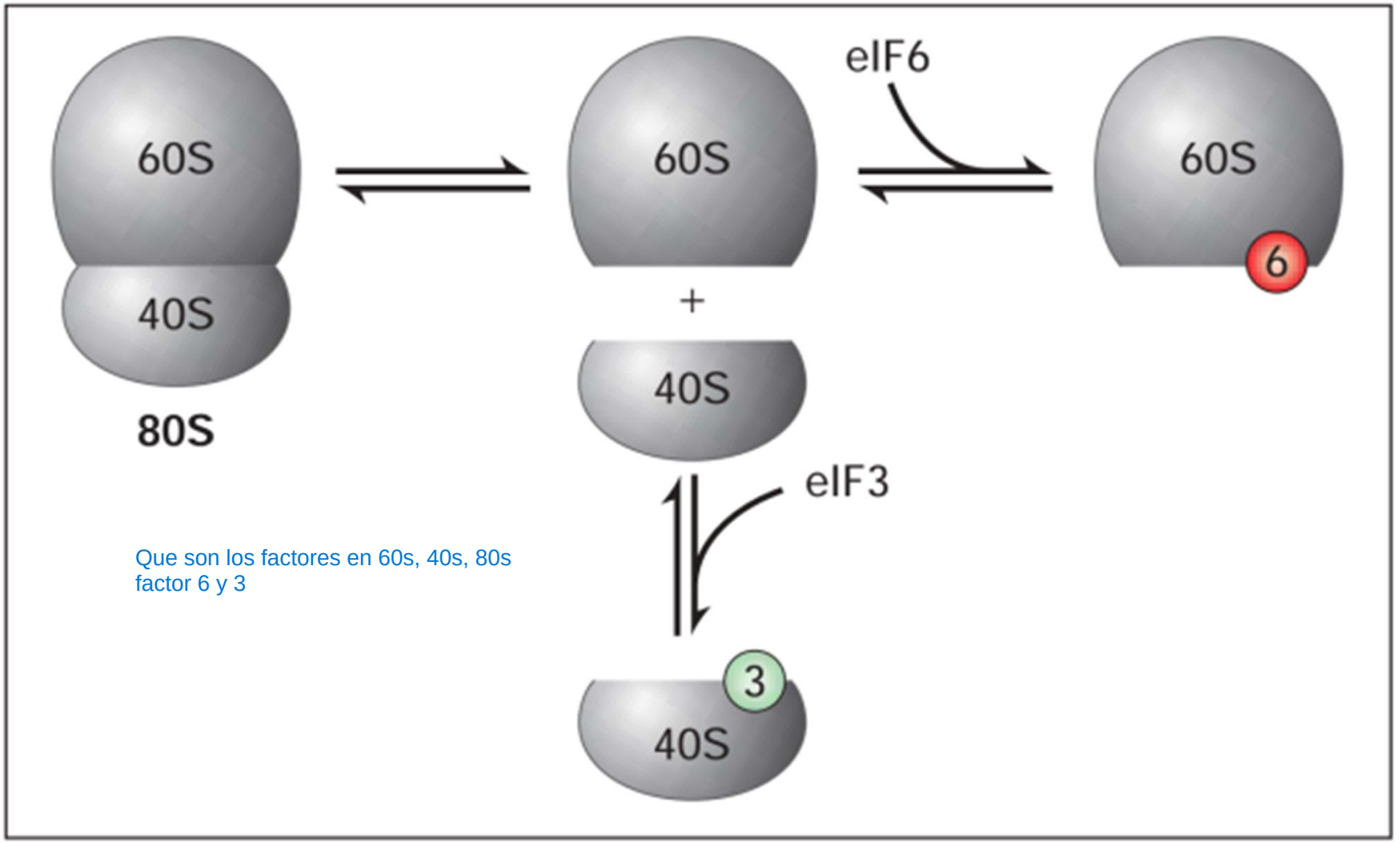
Fuente: Lodish et al. 2003

Initiation of translation in eukaryotes



Fuente: Lodish et al. 2003

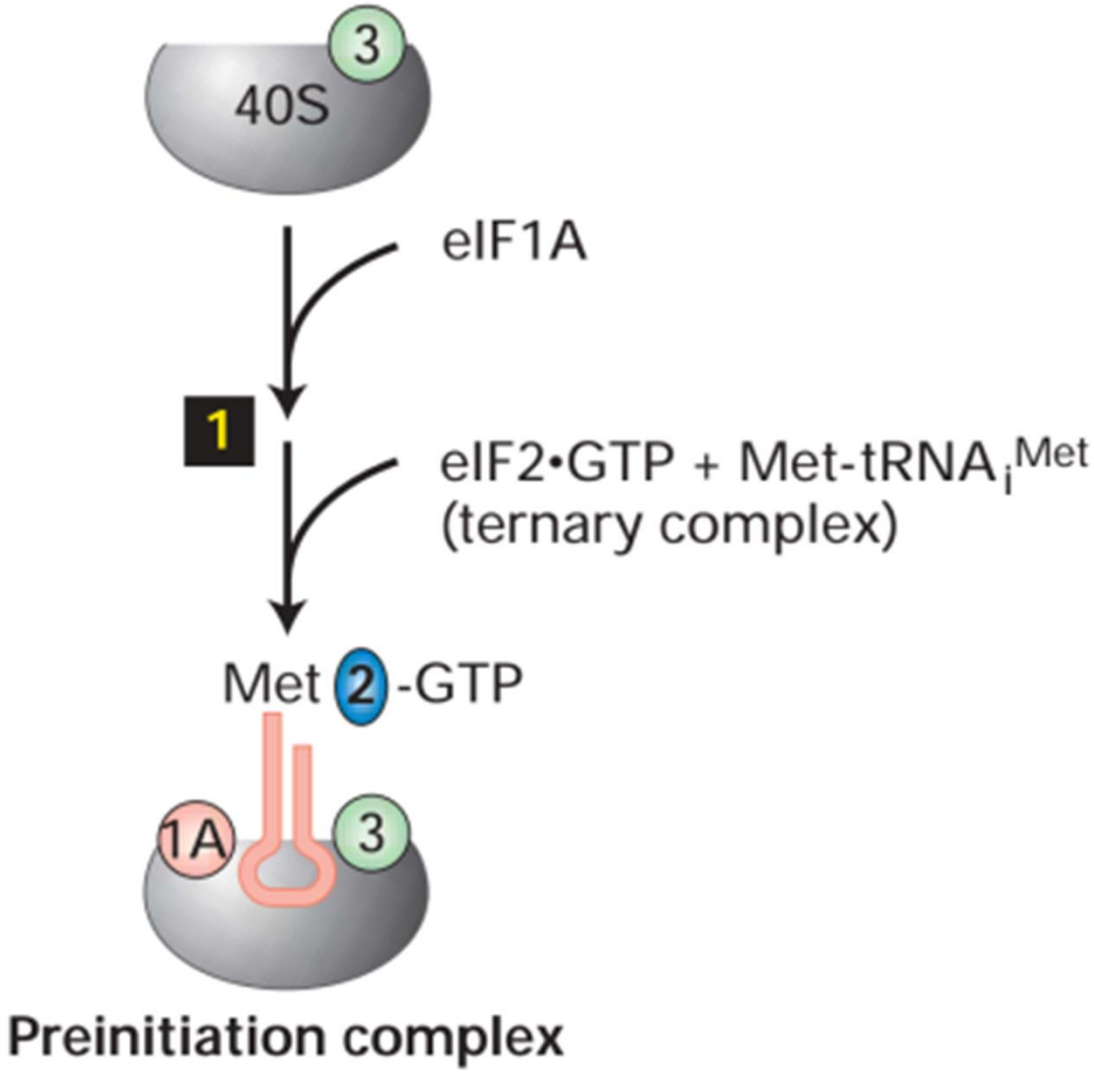
Initiation of translation in eukaryotes



Que son los factores en 60s, 40s, 80s factor 6 y 3

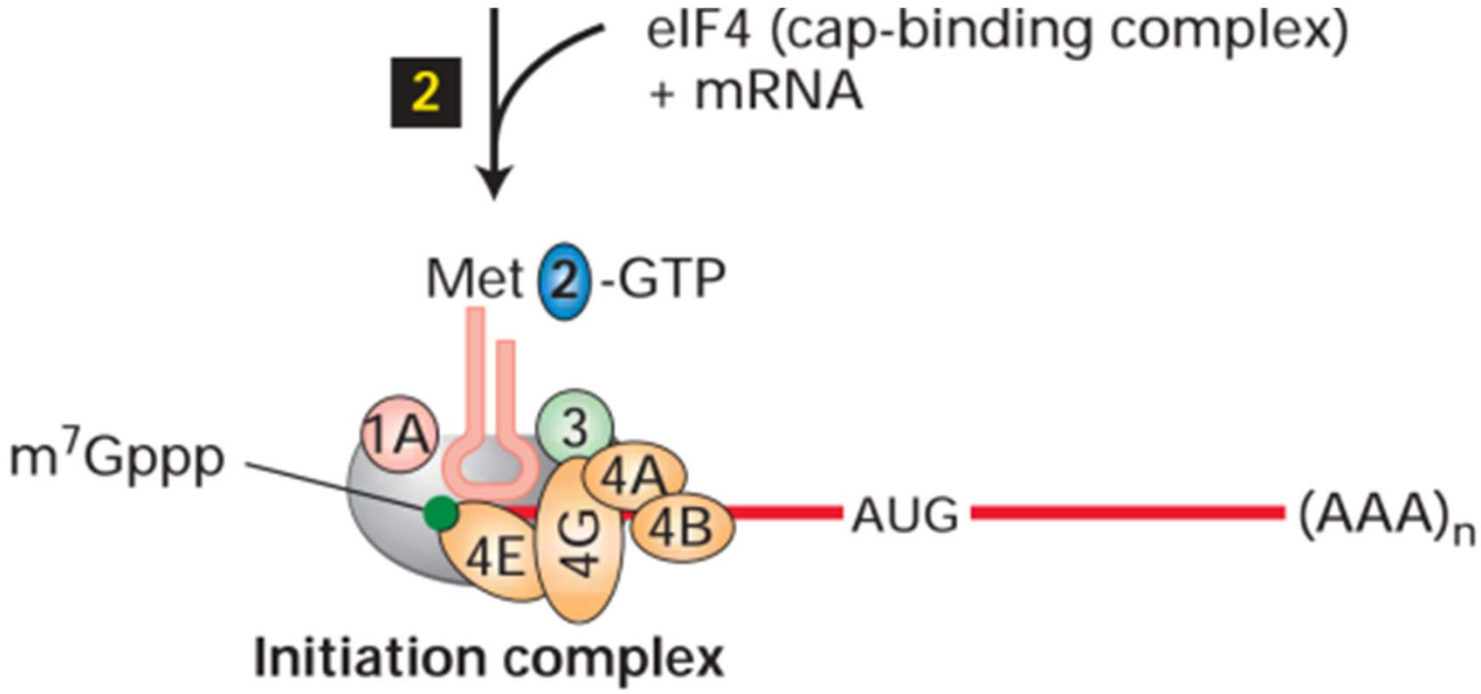
Fuente: Lodish et al. 2003

Initiation of translation in eukaryotes



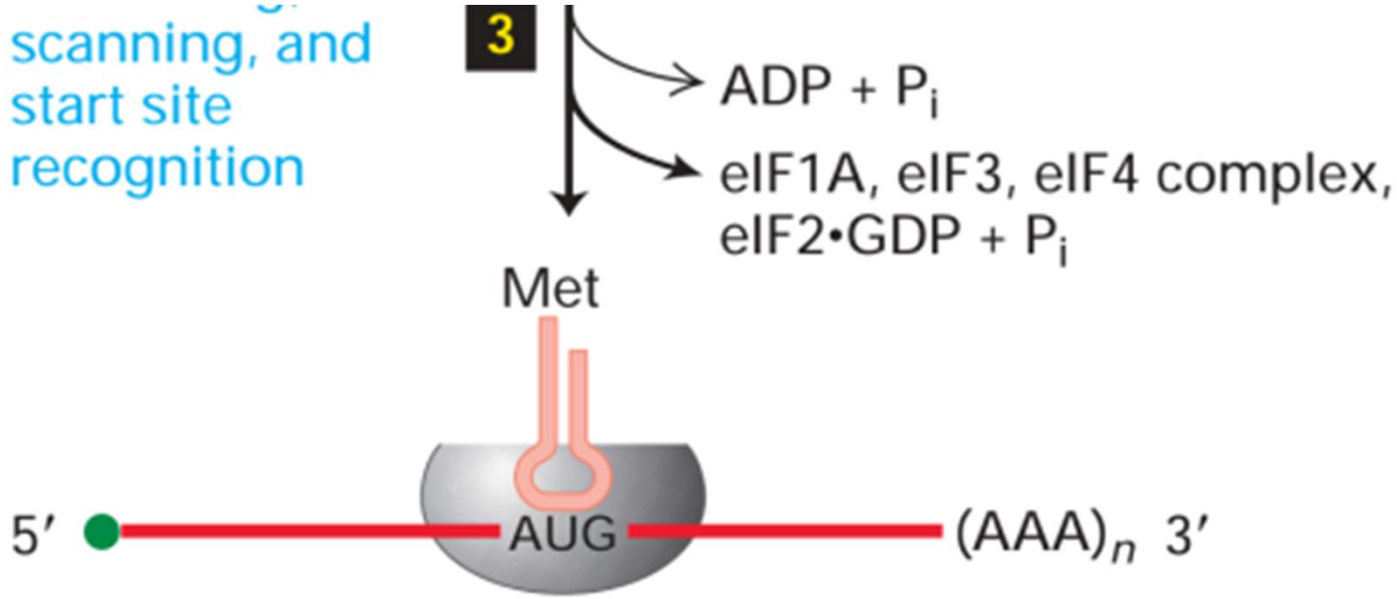
Fuente: Lodish et al. 2003

Initiation of translation in eukaryotes



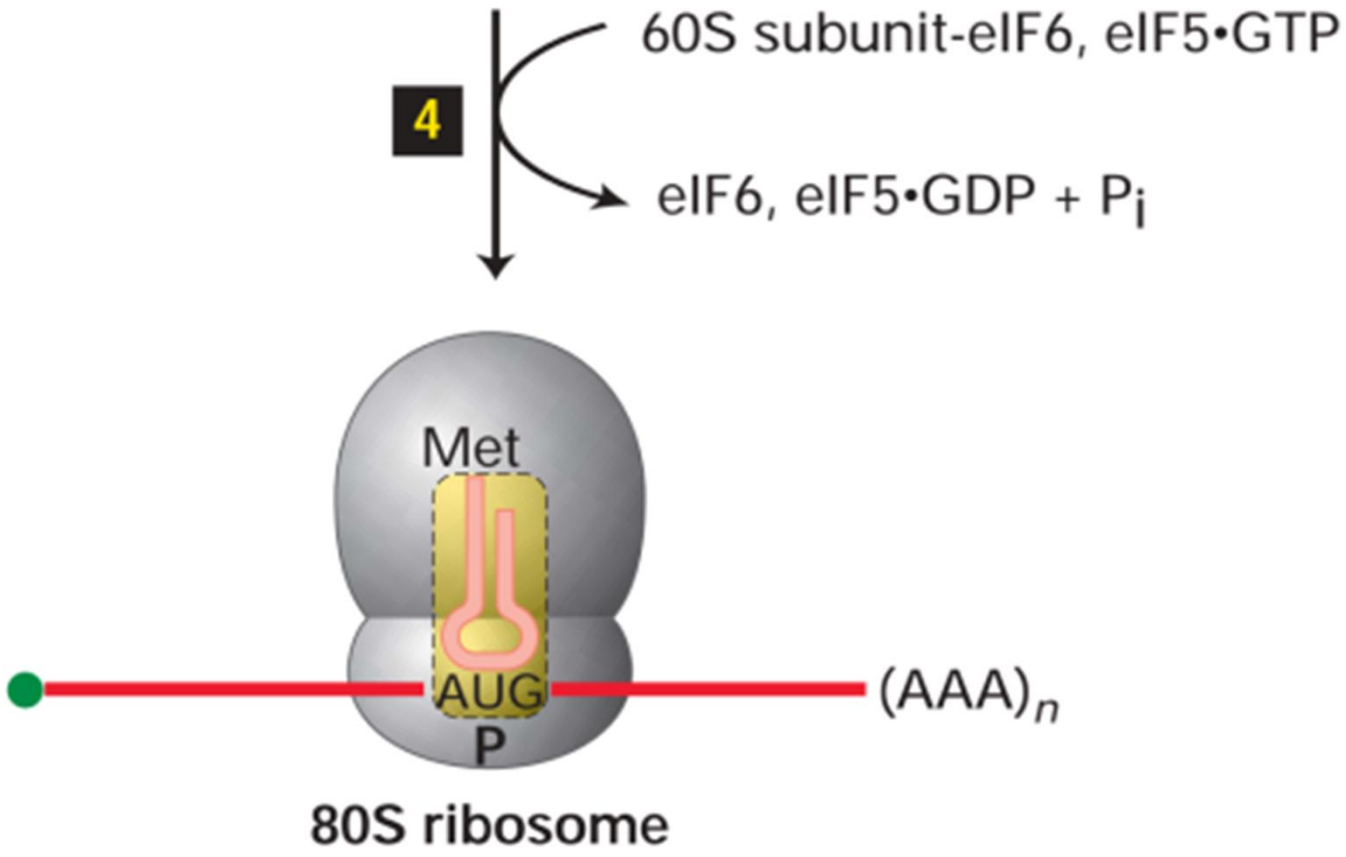
Fuente: Lodish et al. 2003

Initiation of translation in eukaryotes



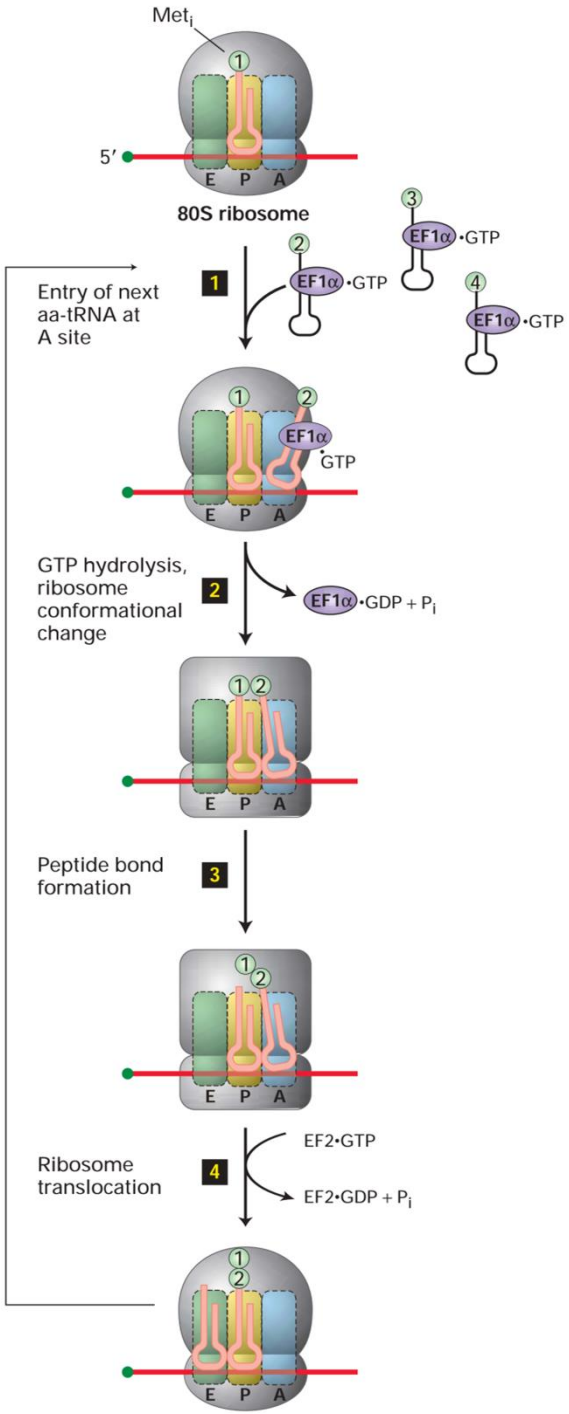
Fuente: Lodish et al. 2003

Initiation of translation in eukaryotes



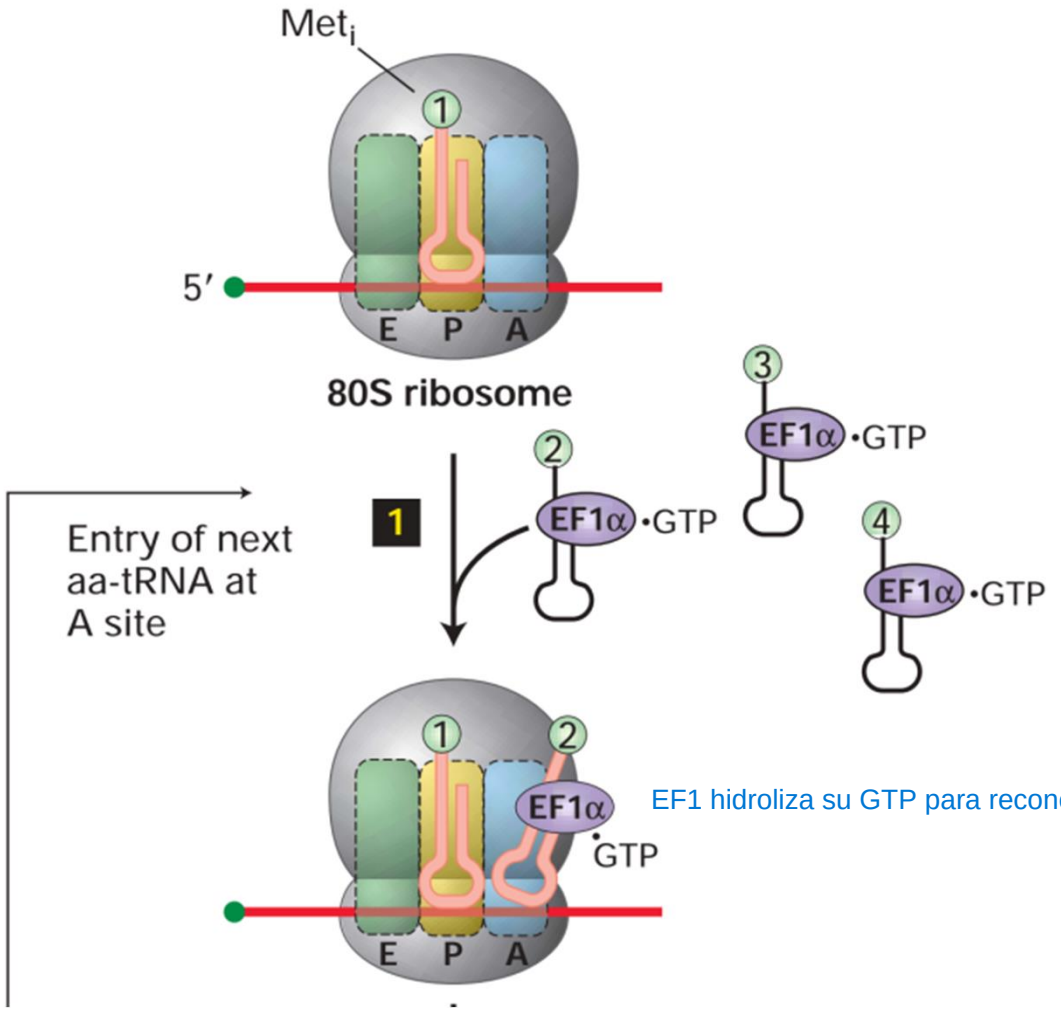
Fuente: Lodish et al. 2003

Cycle of peptidyl chain elongation during translation in eukaryotes



Fuente: Lodish et al. 2003

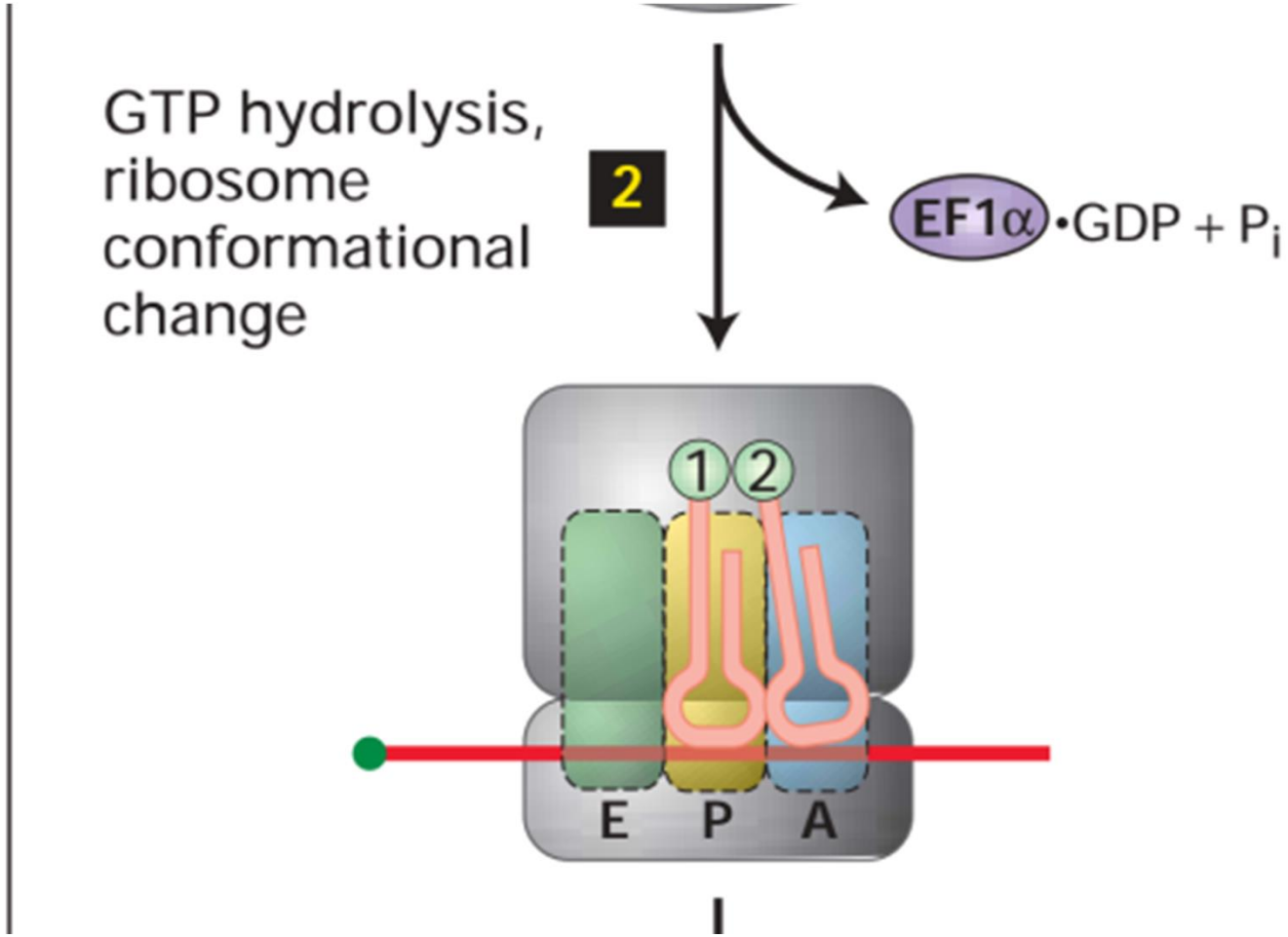
Cycle of peptidyl chain elongation during translation in eukaryotes



EF1 hidroliza su GTP para reconocer el anticodon complementario

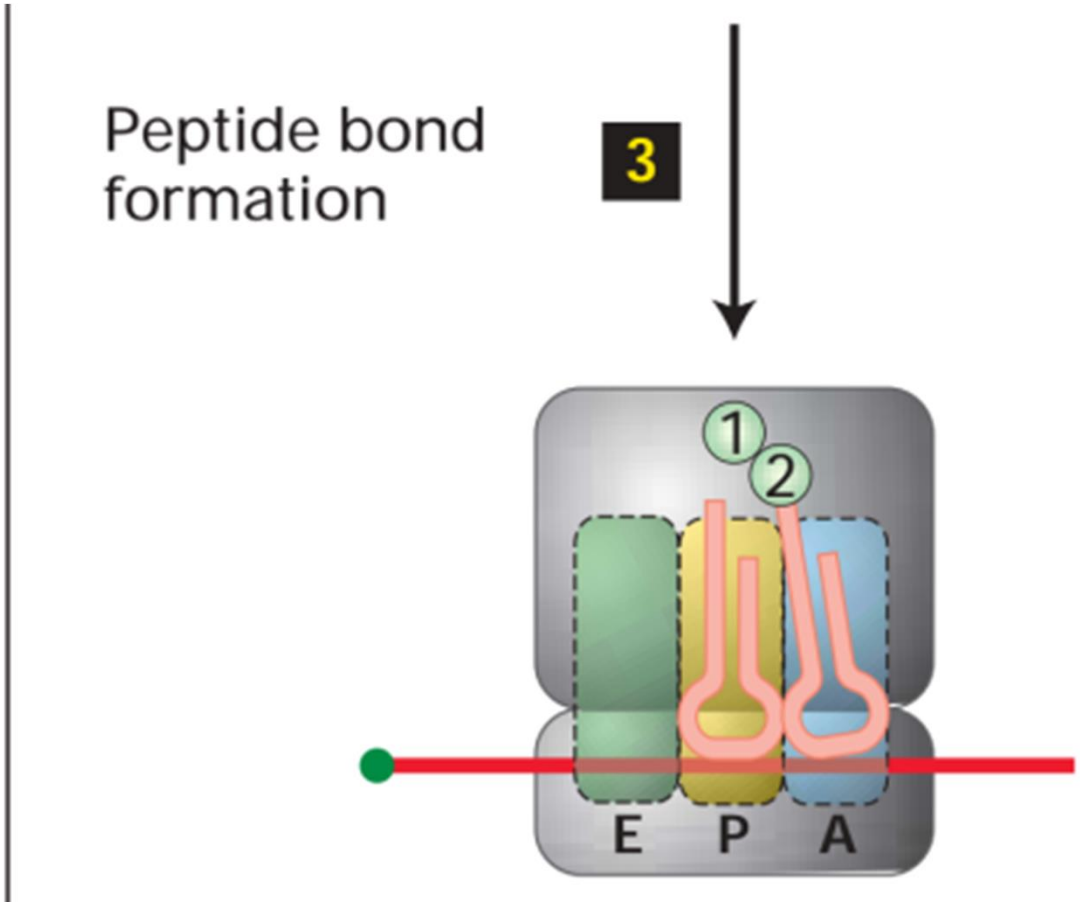
Fuente: Lodish et al. 2003

Cycle of peptidyl chain elongation during translation in eukaryotes



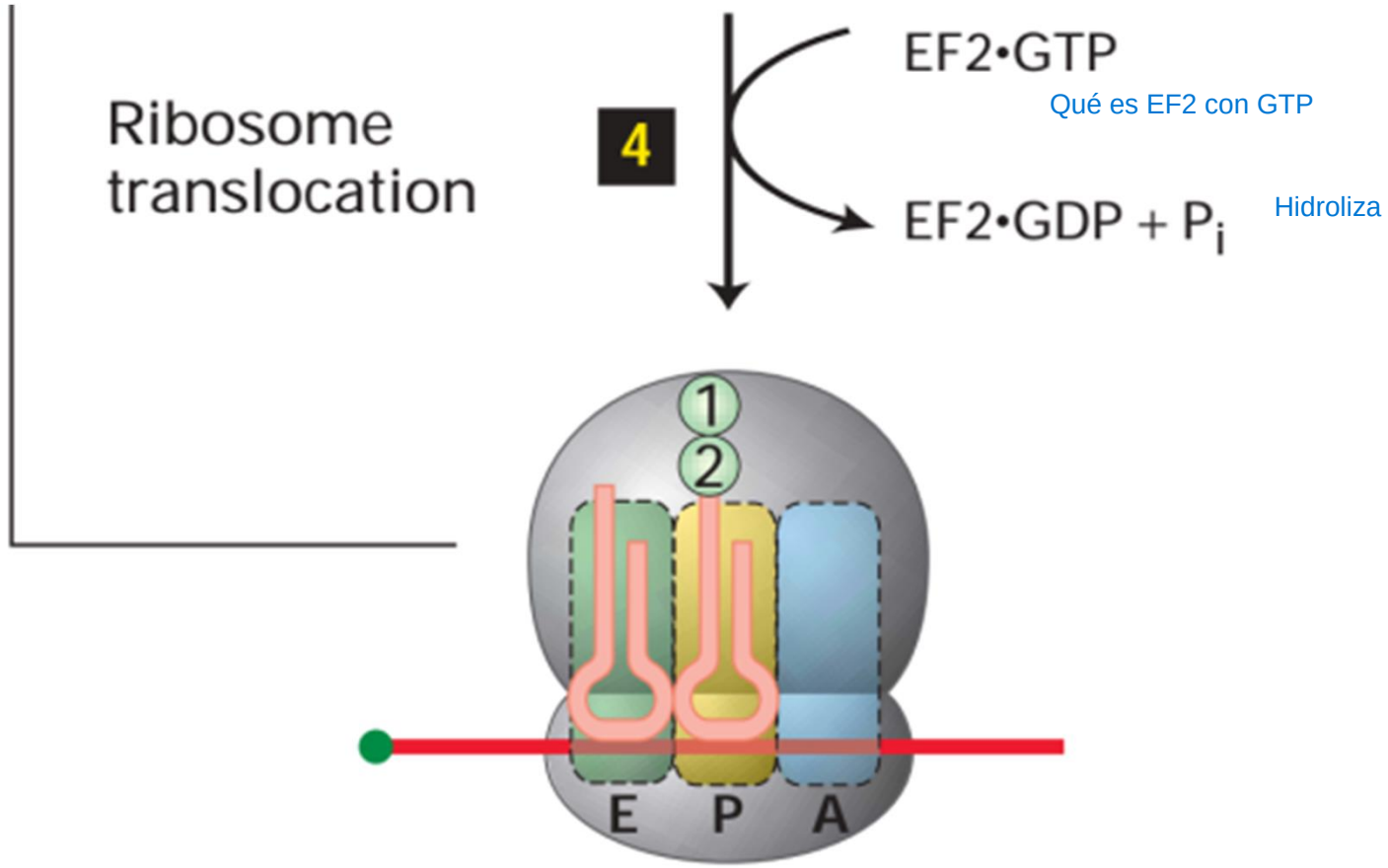
Fuente: Lodish et al. 2003

Cycle of peptidyl chain elongation during translation in eukaryotes



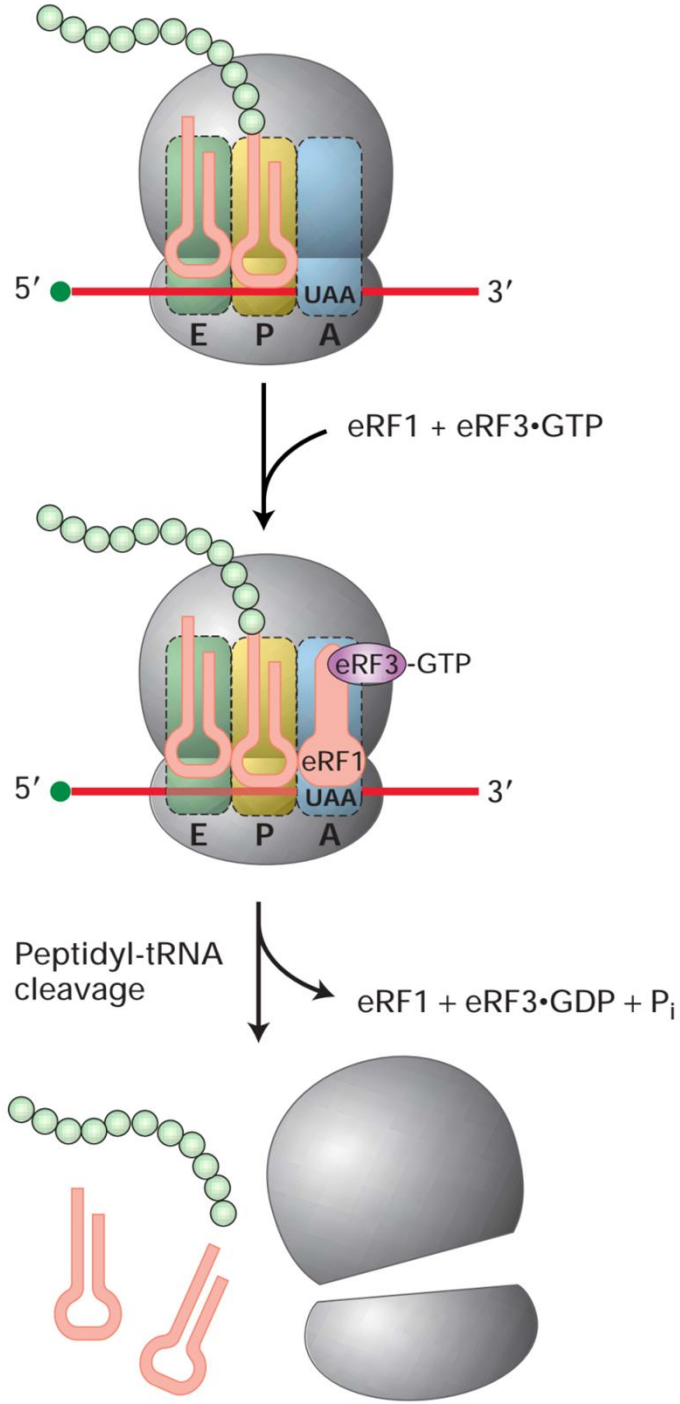
Fuente: Lodish et al. 2003

Cycle of peptidyl chain elongation during translation in eukaryotes



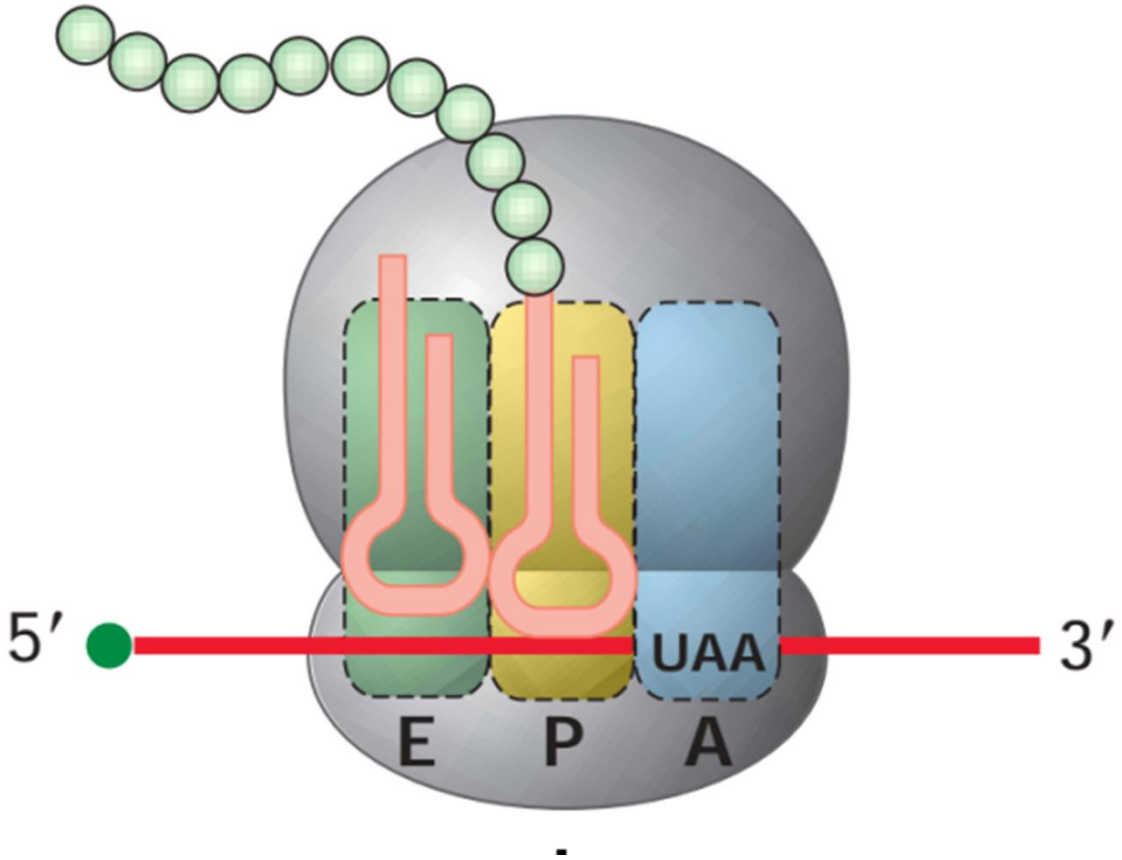
Fuente: Lodish et al. 2003

Termination of translation in eukaryotes



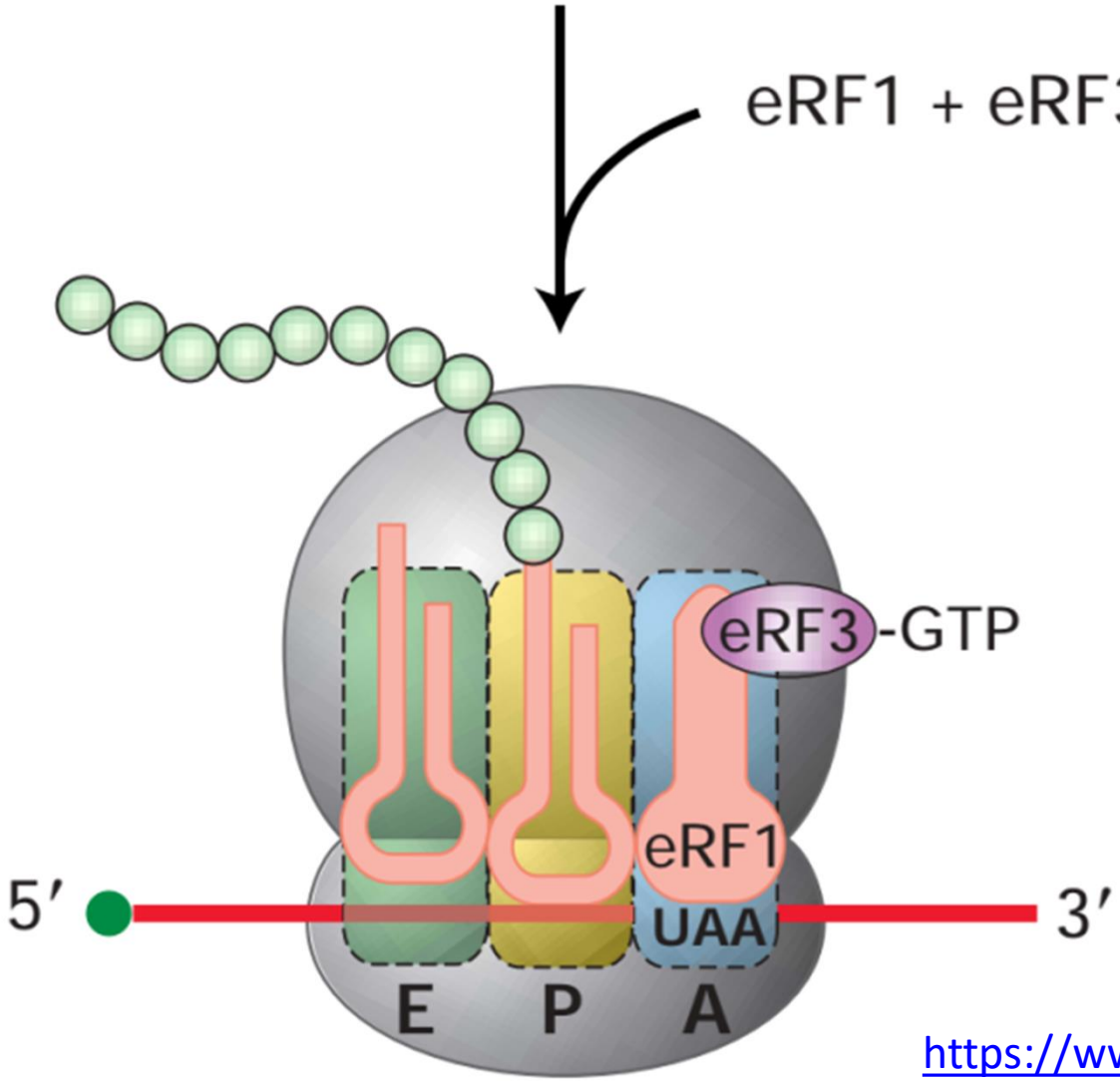
Fuente: Lodish et al. 2003

Termination of translation in eukaryotes



Fuente: Lodish et al. 2003

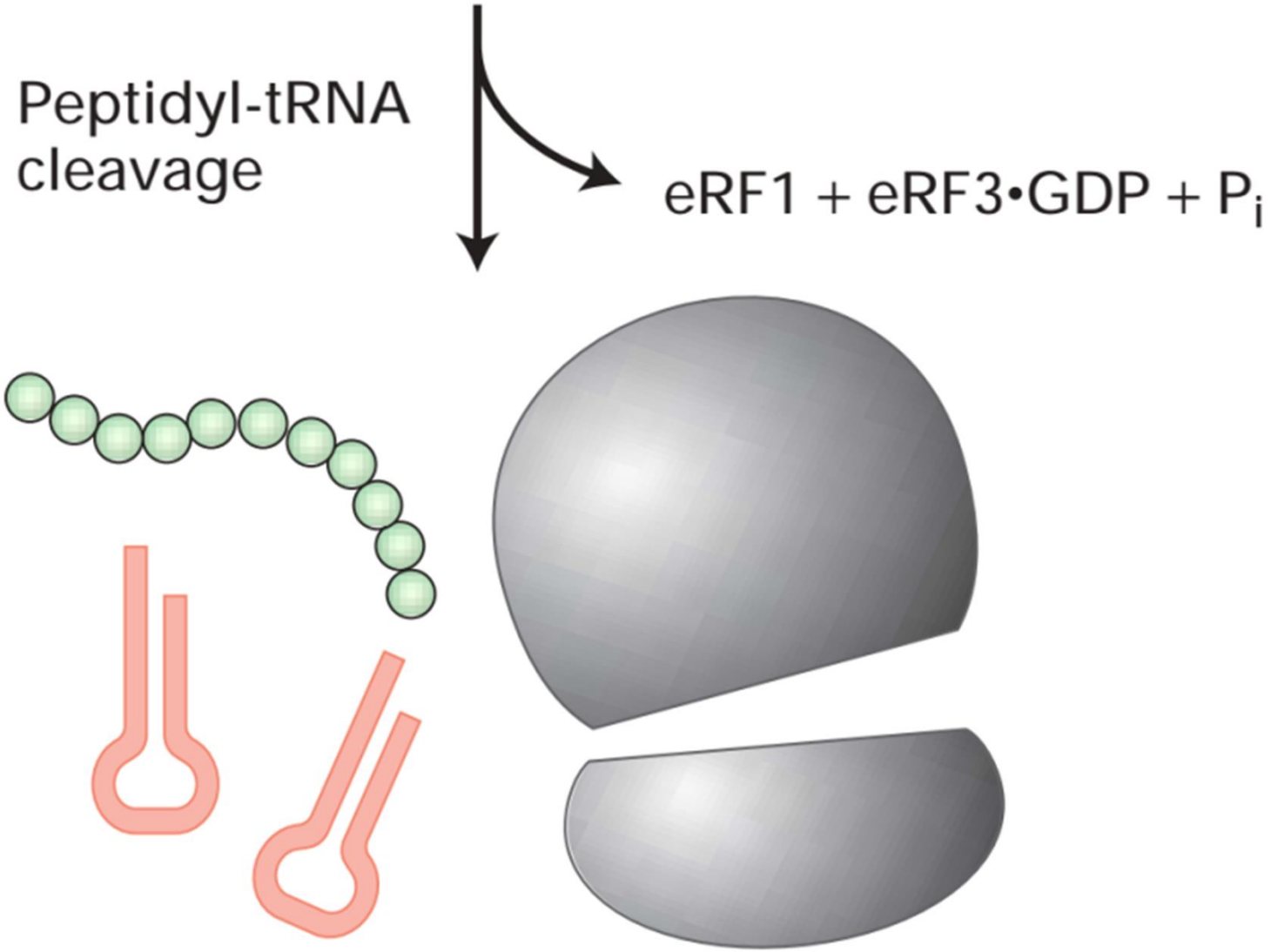
Termination of translation in eukaryotes



https://www.rcsb.org/3d-view/1DT9/1

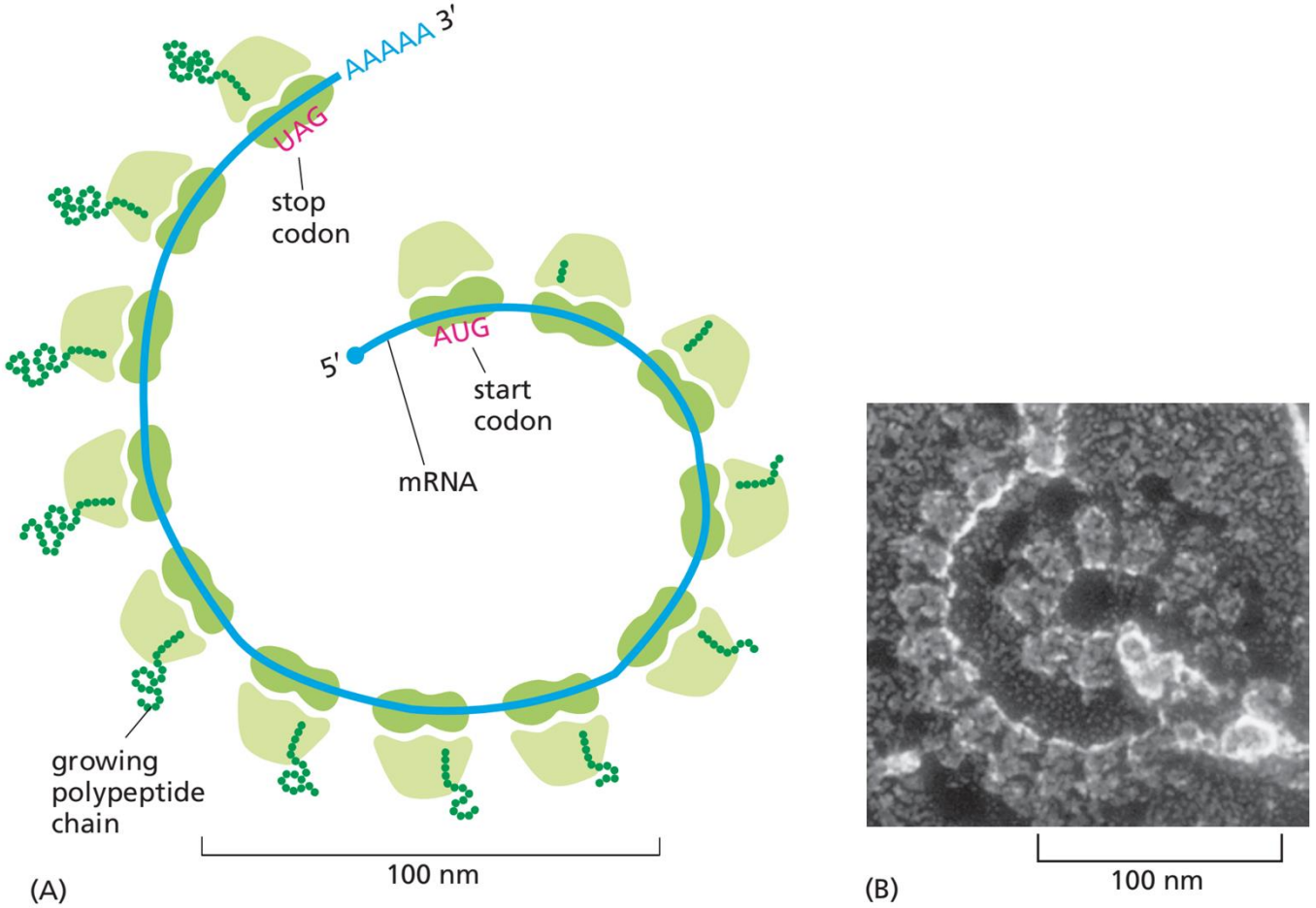
Fuente: Lodish et al. 2003

Termination of translation in eukaryotes



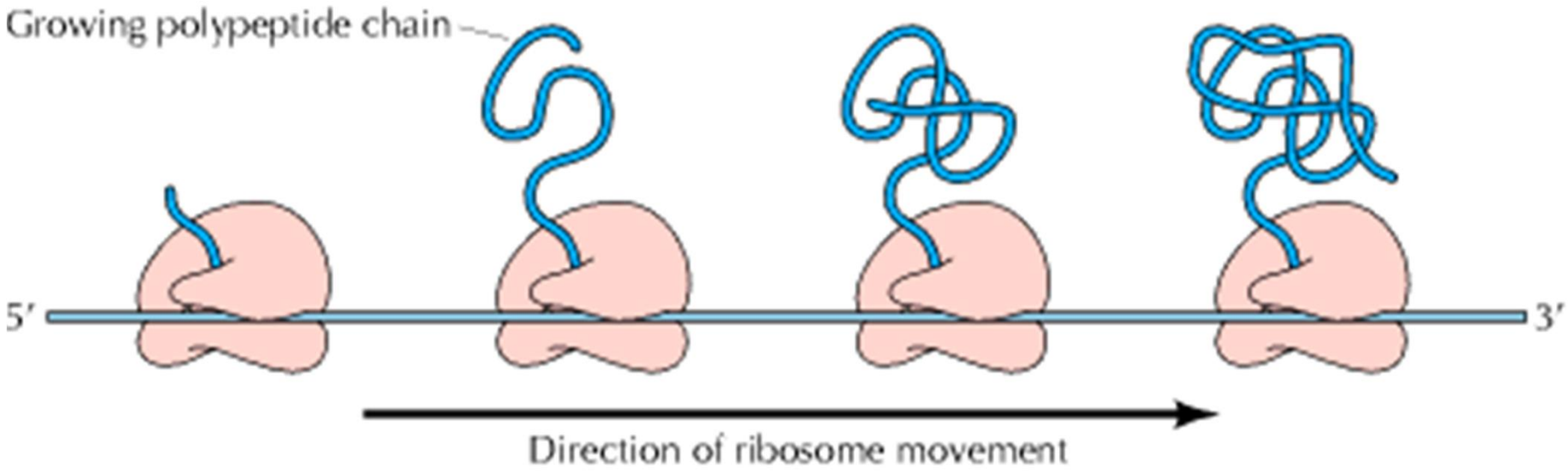
Fuente: Lodish et al. 2003

Proteins are synthesized on polyribosomes



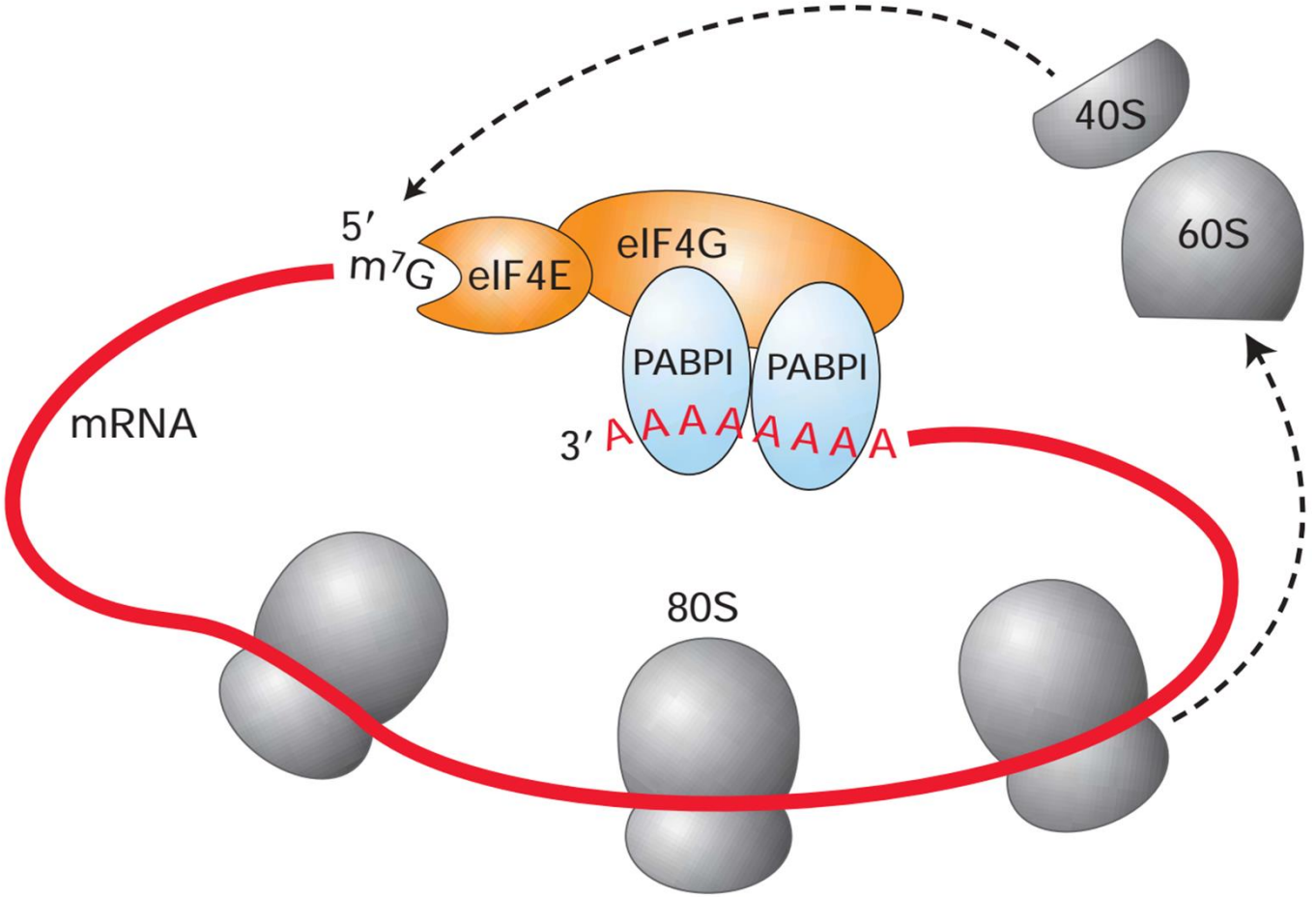
Alberts et al. 2014 Essential Cell Biology 4ta Ed.

Polisomas o Poli-ribosomas



Fuente: COOPER, G. M. 2000 The Cell - A Molecular Approach Second Edition, ASM Press, Washington, D.C. & Sinauer Associates, Inc., Sunderland, Massachusetts.

Model of protein synthesis on circular polysomes and recycling of ribosomal subunits.



Fuente: Lodish et al. 2003