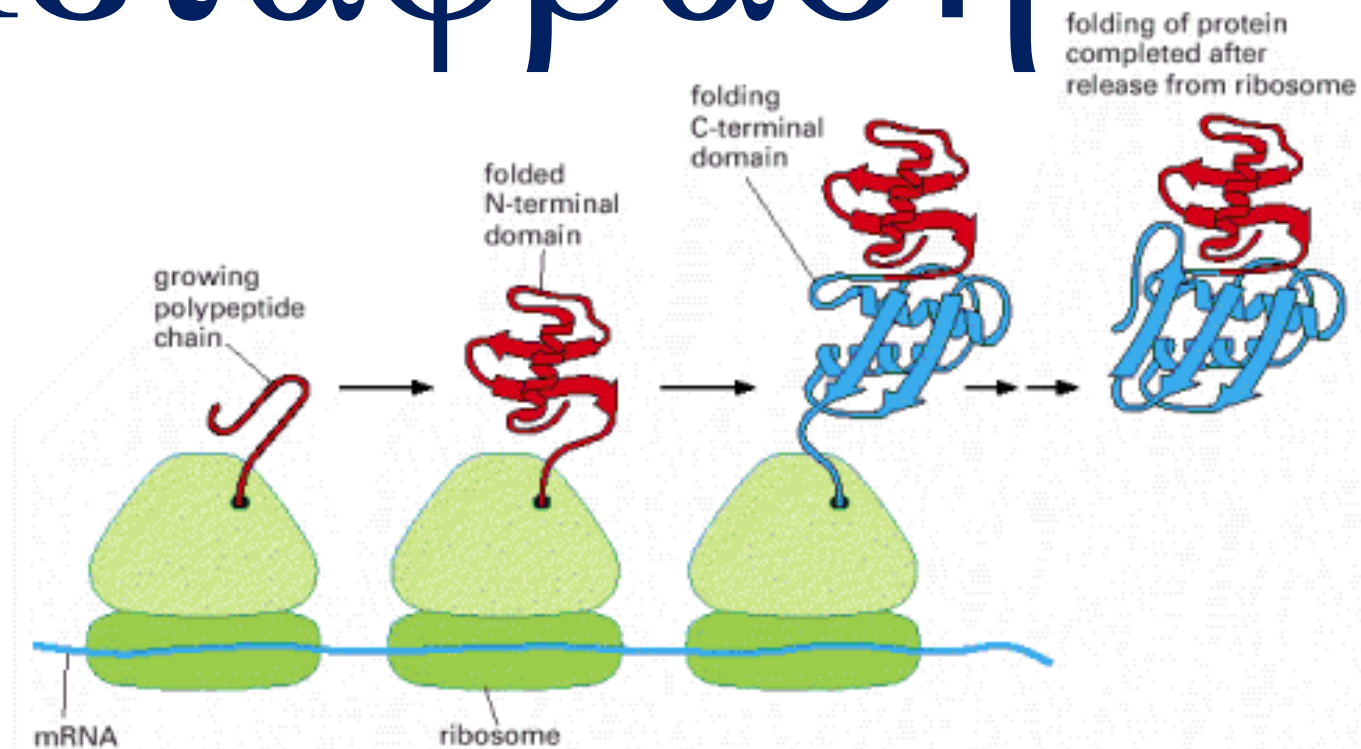


Μετάφραση



Γενετικός κώδικας

Second letter

First letter

	U	C	A	G	
U	<div style="border: 1px solid black; padding: 2px; display: inline-block;">UUU UUC</div> Phenylalanine <div style="border: 1px solid black; padding: 2px; display: inline-block;">UUA UUG</div> Leucine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">UCU UCC UCA UCG</div> Serine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">UAU UAC</div> Tyrosine <div style="border: 1px solid black; padding: 2px; display: inline-block; background-color: yellow;">UAA UAG</div> Stop codon Stop codon	<div style="border: 1px solid black; padding: 2px; display: inline-block;">UGU UGC</div> Cysteine <div style="border: 1px solid black; padding: 2px; display: inline-block; background-color: yellow;">UGA</div> Stop codon <div style="border: 1px solid black; padding: 2px; display: inline-block;">UGG</div> Tryptophan	U C A G
C	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CUU CUC CUA CUG</div> Leucine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CCU CCC CCA CCG</div> Proline	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CAU CAC</div> Histidine <div style="border: 1px solid black; padding: 2px; display: inline-block;">CAA CAG</div> Glutamine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">CGU CGC CGA CGG</div> Arginine	U C A G
A	<div style="border: 1px solid black; padding: 2px; display: inline-block;">AUU AUC AUA</div> Isoleucine <div style="border: 1px solid black; padding: 2px; display: inline-block; background-color: yellow;">AUG</div> Methionine, initiation codon	<div style="border: 1px solid black; padding: 2px; display: inline-block;">ACU ACC ACA ACG</div> Threonine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">AAU AAC</div> Asparagine <div style="border: 1px solid black; padding: 2px; display: inline-block;">AAA AAG</div> Lysine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">AGU AGC</div> Serine <div style="border: 1px solid black; padding: 2px; display: inline-block;">AGA AGG</div> Arginine	U C A G
G	<div style="border: 1px solid black; padding: 2px; display: inline-block;">GUU GUC GUA GUG</div> Valine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">GCU GCC GCA GCG</div> Alanine	<div style="border: 1px solid black; padding: 2px; display: inline-block;">GAU GAC</div> Aspartic acid <div style="border: 1px solid black; padding: 2px; display: inline-block;">GAA GAG</div> Glutamic acid	<div style="border: 1px solid black; padding: 2px; display: inline-block;">GGU GGC GGA GGG</div> Glycine	U C A G

- ⇒ Πολλά αα ← >1 κωδικόνια
- ⇒ Τα κωδικόνια του ιδίου αα συνήθως διαφέρουν στην 3^η θέση ΜΟΝΟ
- ⇒ 3 κωδικόνια λήξης
- ⇒ AUG σηματοδοτεί: α) το εναρκτήριο κωδικόνιο και β) μεθειονίνη

- Ο γενετικός κώδικας είναι **οικουμενικός** => κοινή προέλευση όλων των οργανισμών
.... Με μικρές αποκλίσεις

Γενετικός κώδικας

Second letter

First letter

	U	C	A	G					
U	<div style="border: 1px solid black; padding: 2px;">UUU</div> <div style="border: 1px solid black; padding: 2px;">UUC</div> Phenylalanine	<div style="border: 1px solid black; padding: 2px;">UCU</div> <div style="border: 1px solid black; padding: 2px;">UCC</div> <div style="border: 1px solid black; padding: 2px;">UCA</div> <div style="border: 1px solid black; padding: 2px;">UCG</div> Serine	<div style="border: 1px solid black; padding: 2px;">UAU</div> <div style="border: 1px solid black; padding: 2px;">UAC</div> Tyrosine	<div style="border: 1px solid black; padding: 2px;">UGU</div> <div style="border: 1px solid black; padding: 2px;">UGC</div> Cysteine	<div style="border: 1px solid black; padding: 2px;">UUA</div> <div style="border: 1px solid black; padding: 2px;">UUG</div> Leucine	<div style="border: 1px solid black; padding: 2px;">UAA</div> <div style="border: 1px solid black; padding: 2px;">UAG</div> Stop codon Stop codon	<div style="border: 1px solid black; padding: 2px;">UGA</div> Stop codon	<div style="border: 1px solid black; padding: 2px;">UGG</div> Tryptophan	U C A G
C	<div style="border: 1px solid black; padding: 2px;">CUU</div> <div style="border: 1px solid black; padding: 2px;">CUC</div> <div style="border: 1px solid black; padding: 2px;">CUA</div> <div style="border: 1px solid black; padding: 2px;">CUG</div> Leucine	<div style="border: 1px solid black; padding: 2px;">CCU</div> <div style="border: 1px solid black; padding: 2px;">CCC</div> <div style="border: 1px solid black; padding: 2px;">CCA</div> <div style="border: 1px solid black; padding: 2px;">CCG</div> Proline	<div style="border: 1px solid black; padding: 2px;">CAU</div> <div style="border: 1px solid black; padding: 2px;">CAC</div> Histidine	<div style="border: 1px solid black; padding: 2px;">CGU</div> <div style="border: 1px solid black; padding: 2px;">CGC</div> <div style="border: 1px solid black; padding: 2px;">CGA</div> <div style="border: 1px solid black; padding: 2px;">CGG</div> Arginine	<div style="border: 1px solid black; padding: 2px;">CAA</div> <div style="border: 1px solid black; padding: 2px;">CAG</div> Glutamine			U C A G	
A	<div style="border: 1px solid black; padding: 2px;">AUU</div> <div style="border: 1px solid black; padding: 2px;">AUC</div> <div style="border: 1px solid black; padding: 2px;">AUA</div> Isoleucine	<div style="border: 1px solid black; padding: 2px;">ACU</div> <div style="border: 1px solid black; padding: 2px;">ACC</div> <div style="border: 1px solid black; padding: 2px;">ACA</div> <div style="border: 1px solid black; padding: 2px;">ACG</div> Threonine	<div style="border: 1px solid black; padding: 2px;">AAU</div> <div style="border: 1px solid black; padding: 2px;">AAC</div> Asparagine	<div style="border: 1px solid black; padding: 2px;">AGU</div> <div style="border: 1px solid black; padding: 2px;">AGC</div> Serine	<div style="border: 1px solid black; padding: 2px;">AUG</div> Methionine; initiation codon	<div style="border: 1px solid black; padding: 2px;">AAA</div> <div style="border: 1px solid black; padding: 2px;">AAG</div> Lysine	<div style="border: 1px solid black; padding: 2px;">AGA</div> <div style="border: 1px solid black; padding: 2px;">AGG</div> Arginine	U C A G	
G	<div style="border: 1px solid black; padding: 2px;">GUU</div> <div style="border: 1px solid black; padding: 2px;">GUC</div> <div style="border: 1px solid black; padding: 2px;">GUA</div> <div style="border: 1px solid black; padding: 2px;">GUG</div> Valine	<div style="border: 1px solid black; padding: 2px;">GCU</div> <div style="border: 1px solid black; padding: 2px;">GCC</div> <div style="border: 1px solid black; padding: 2px;">GCA</div> <div style="border: 1px solid black; padding: 2px;">GCG</div> Alanine	<div style="border: 1px solid black; padding: 2px;">GAU</div> <div style="border: 1px solid black; padding: 2px;">GAC</div> Aspartic acid	<div style="border: 1px solid black; padding: 2px;">GGU</div> <div style="border: 1px solid black; padding: 2px;">GGC</div> <div style="border: 1px solid black; padding: 2px;">GGA</div> <div style="border: 1px solid black; padding: 2px;">GGG</div> Glycine		<div style="border: 1px solid black; padding: 2px;">GAA</div> <div style="border: 1px solid black; padding: 2px;">GAG</div> Glutamic acid		U C A G	

Μετάφραση ... όπως στα ριβοσώματα

AAC CTG GAC CCT TAT CGG CTT AGA C
Asn Glu Aps Pro Tyr Arg Leu Arg

Πλαίσιο ανάγνωσης 1

AAC CTG GAC CCT TAT CGG CTT AGA C
Asn Glu Aps Pro Tyr Arg Leu Arg

A ACC TGG ACC CTT ATC GGC TTA GAC
Ser Trp Ser Leu Ile Gly Leu Asp

Πλαίσιο ανάγνωσης 2

AAC CTG GAC CCT TAT CGG CTT AGA C
Asn Glu Aps Pro Tyr Arg Leu Arg

A ACC TGG ACC CTT ATC GGC TTA GAC
Ser Trp Ser Leu Ile Gly Leu Asp

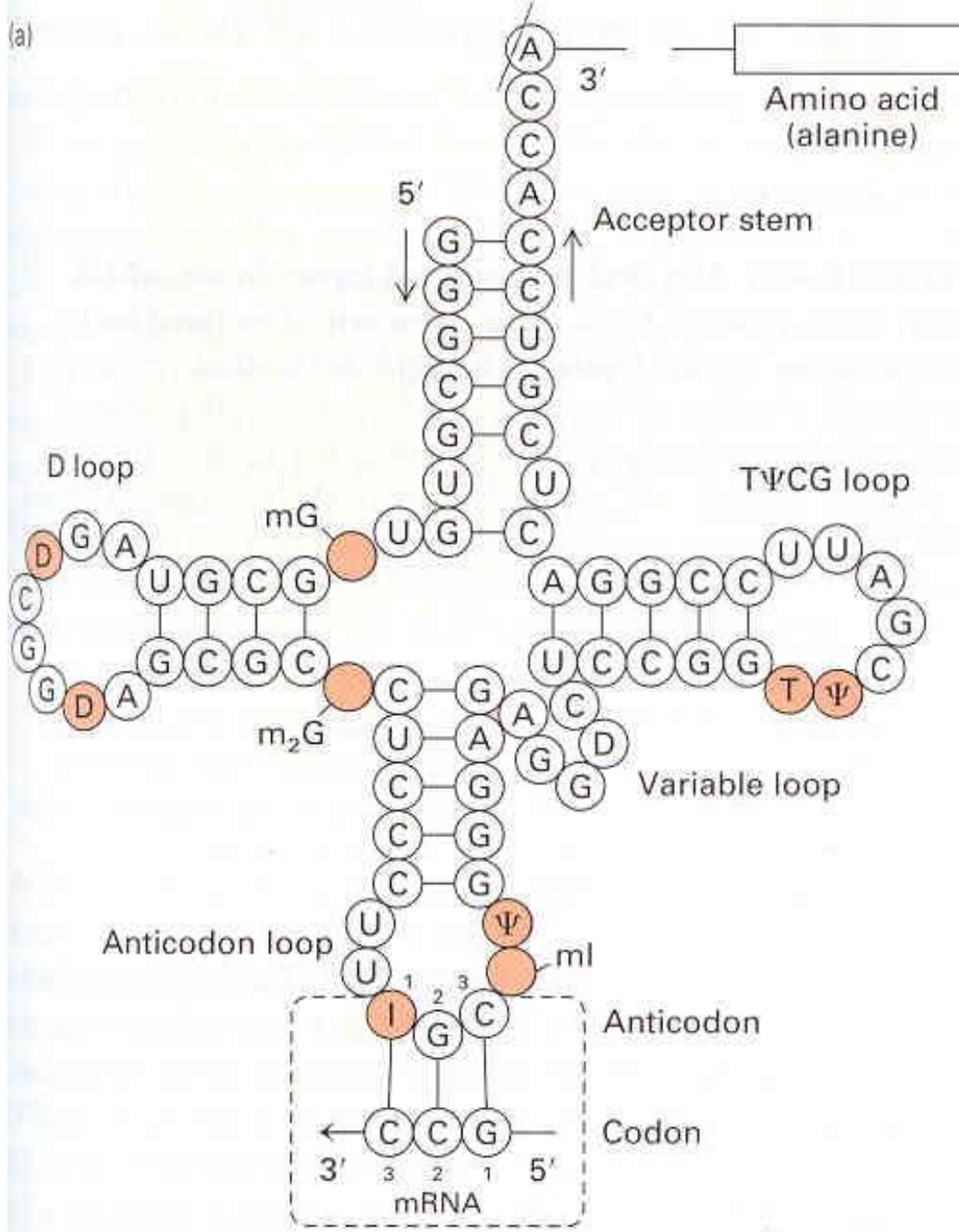
AA CCT GGA CCC TTA TCG GCT TAG AC
Pro Gly Pro Leu Ser Ala STOP

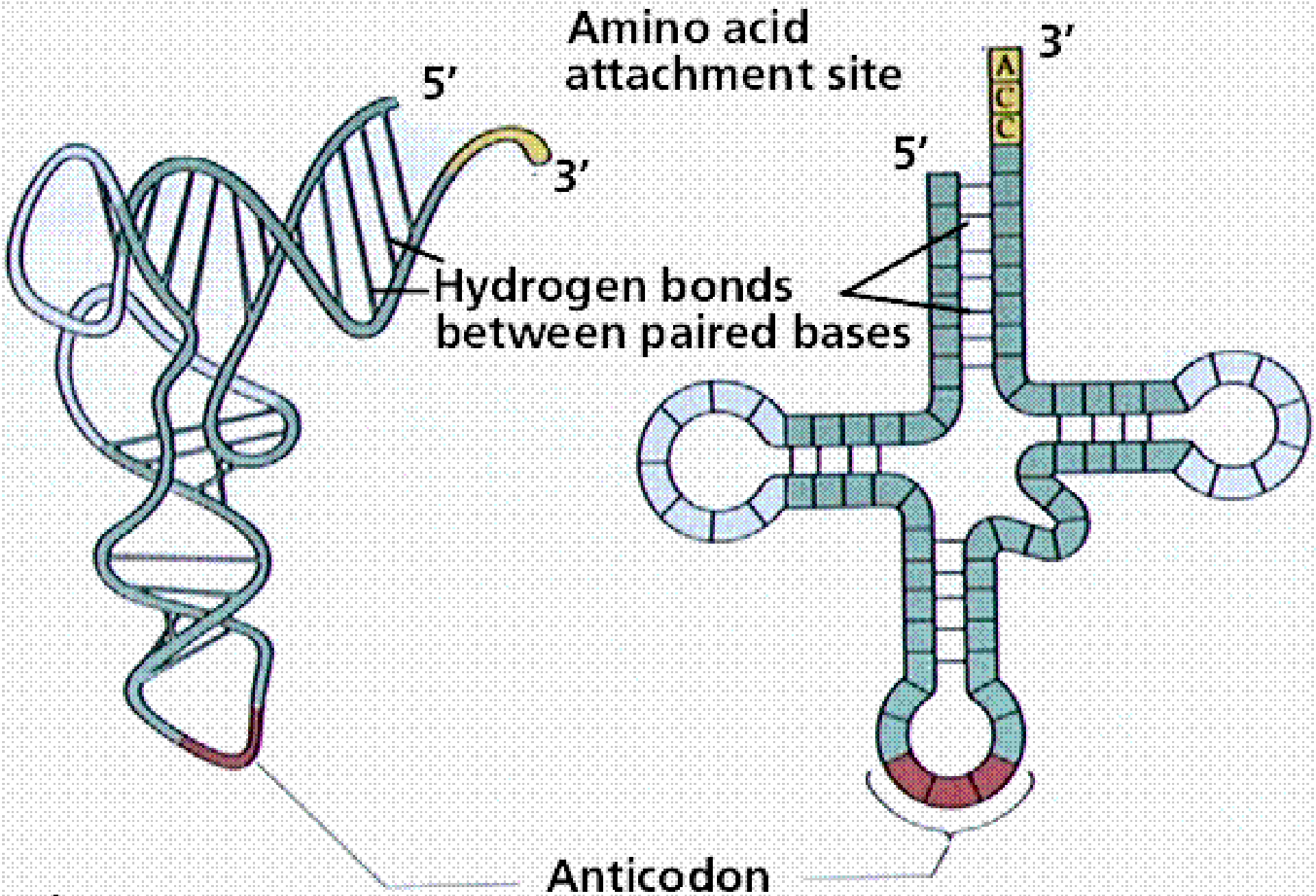
Πλαίσιο ανάγνωσης 3

Ανοιχτό πλαίσιο ανάγνωσης



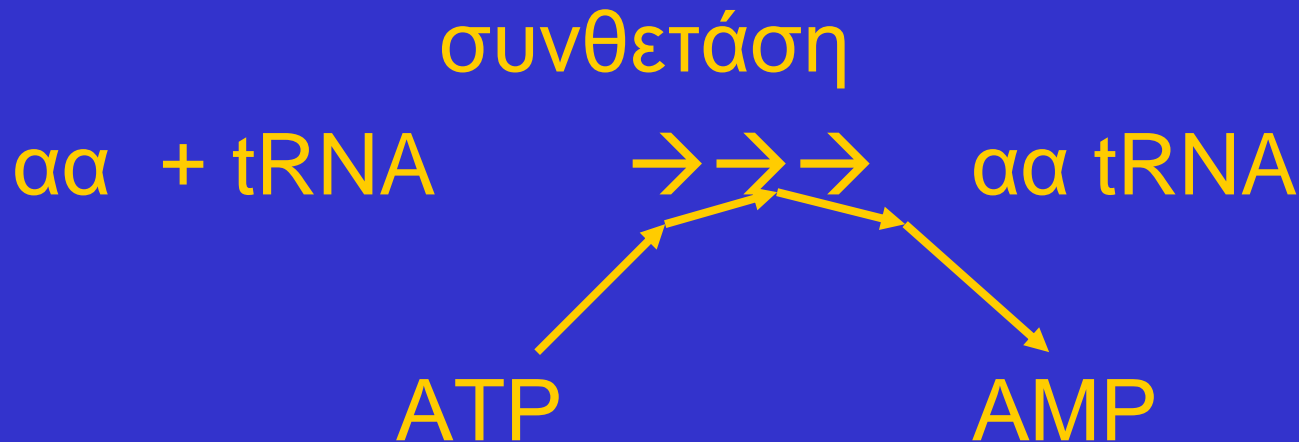
(a)



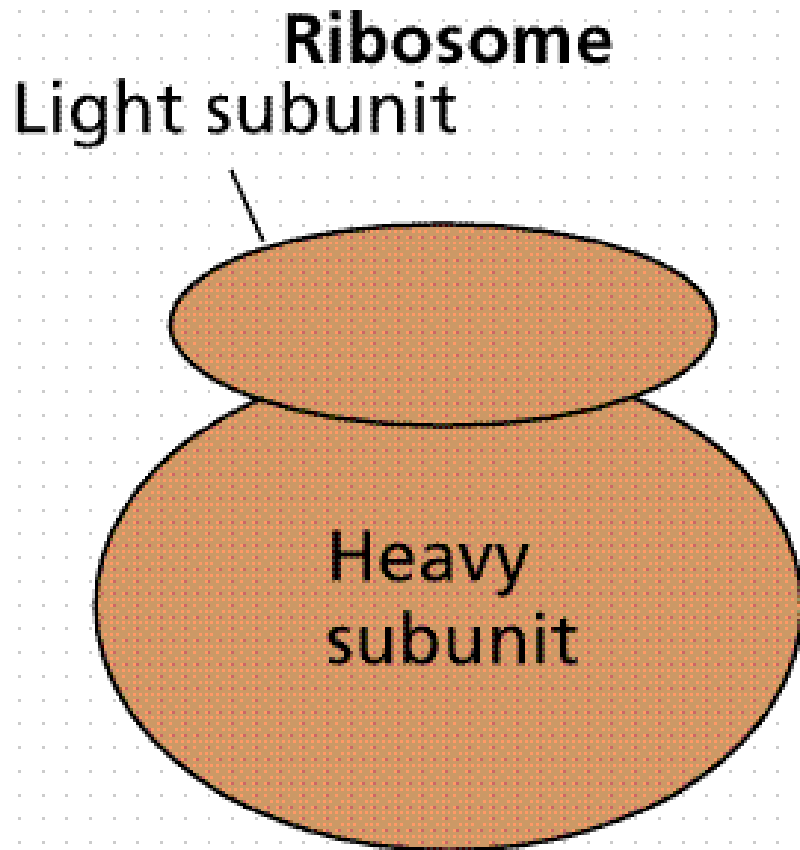


Το κάθε αμινοξύ (αα)
συνδέεται με το
κατάλληλο μόριο tRNA
ομοιοπολικά με τη
βοήθεια ενζύμων
**(συνθετάσες των
αμινοακυλο-tRNA)**

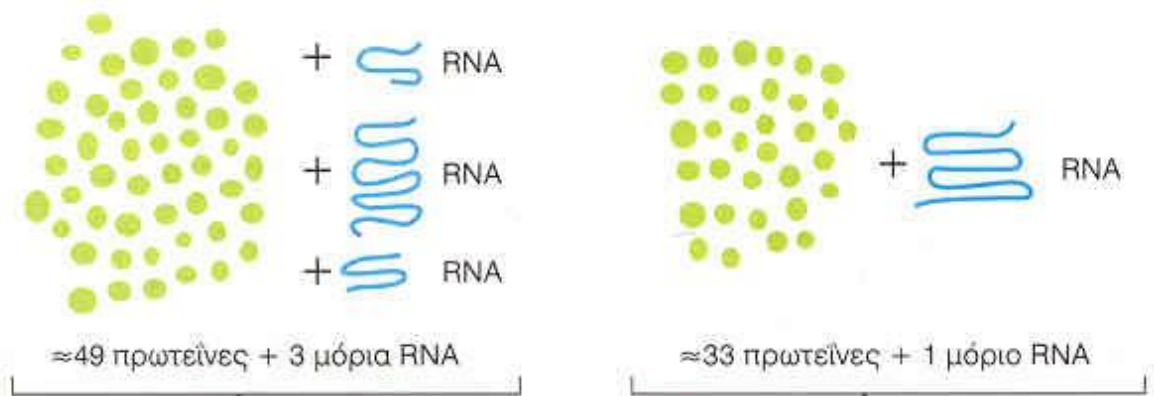
Για κάθε αα υπάρχει μια διαφορετική
συνθετάση του αμινοακυλο tRNA



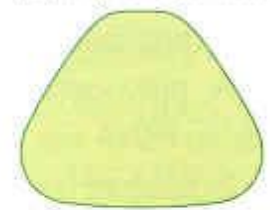
Ριβοσώματα



- Μικρή και μεγάλη υπομονάδα



μεγάλη υπομονάδα



MW = 2,800,000

μικρή υπομονάδα

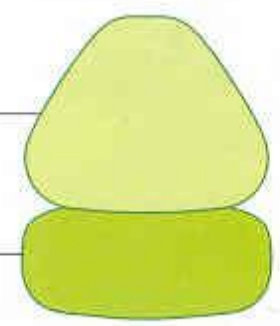


MW = 1,400,000



μεγάλη υπομονάδα

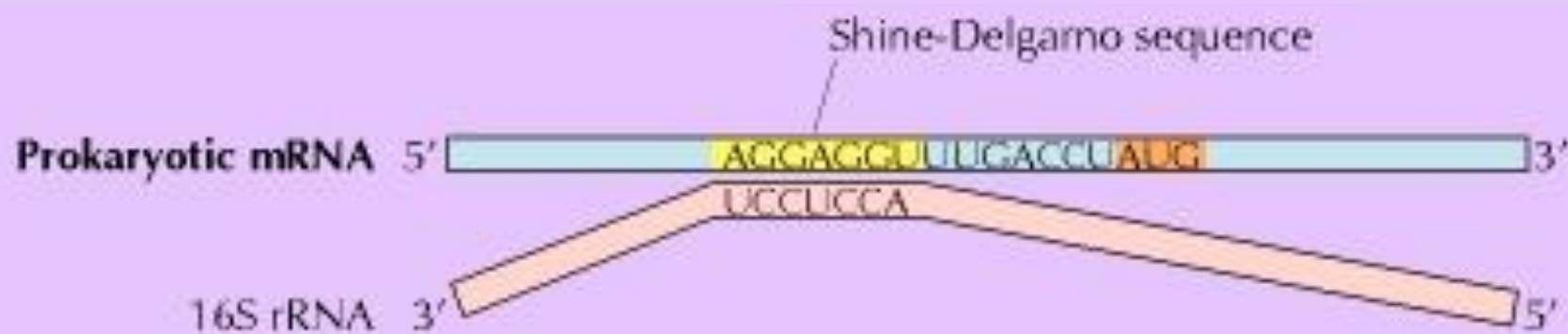
μικρή υπομονάδα



≈ 82 πρωτεΐνες + 4 μόρια RNA

πλήρες ριβοσωμάτιο

MW = 4,200,000



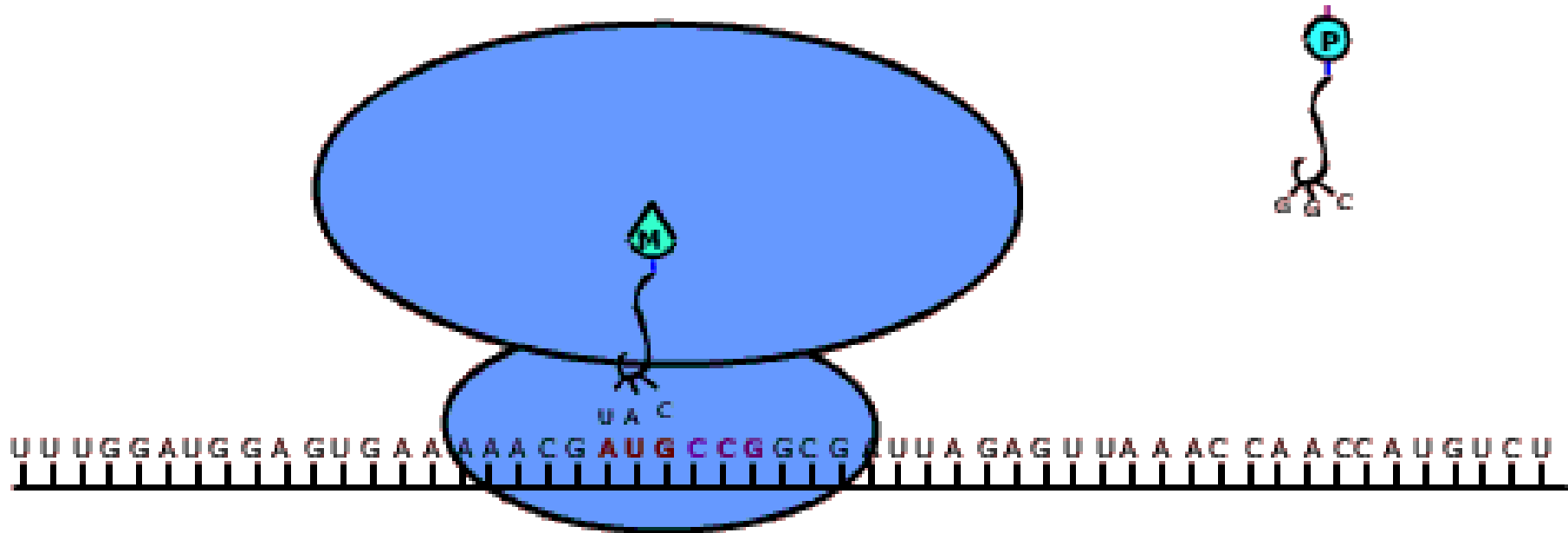
Eukaryotic mRNA

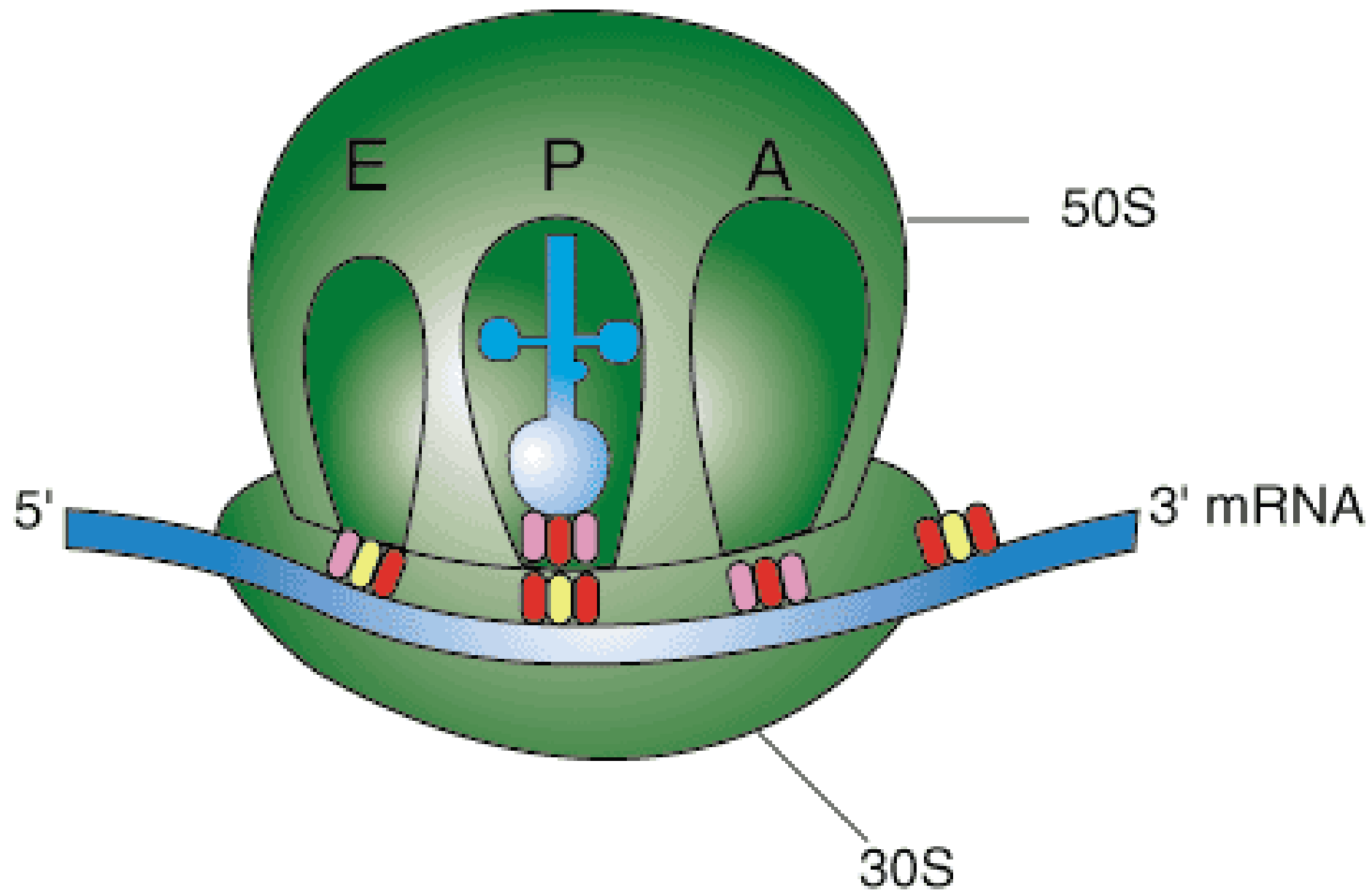
5' cap m^7G **AUG** 3'

40S ribosomal subunit

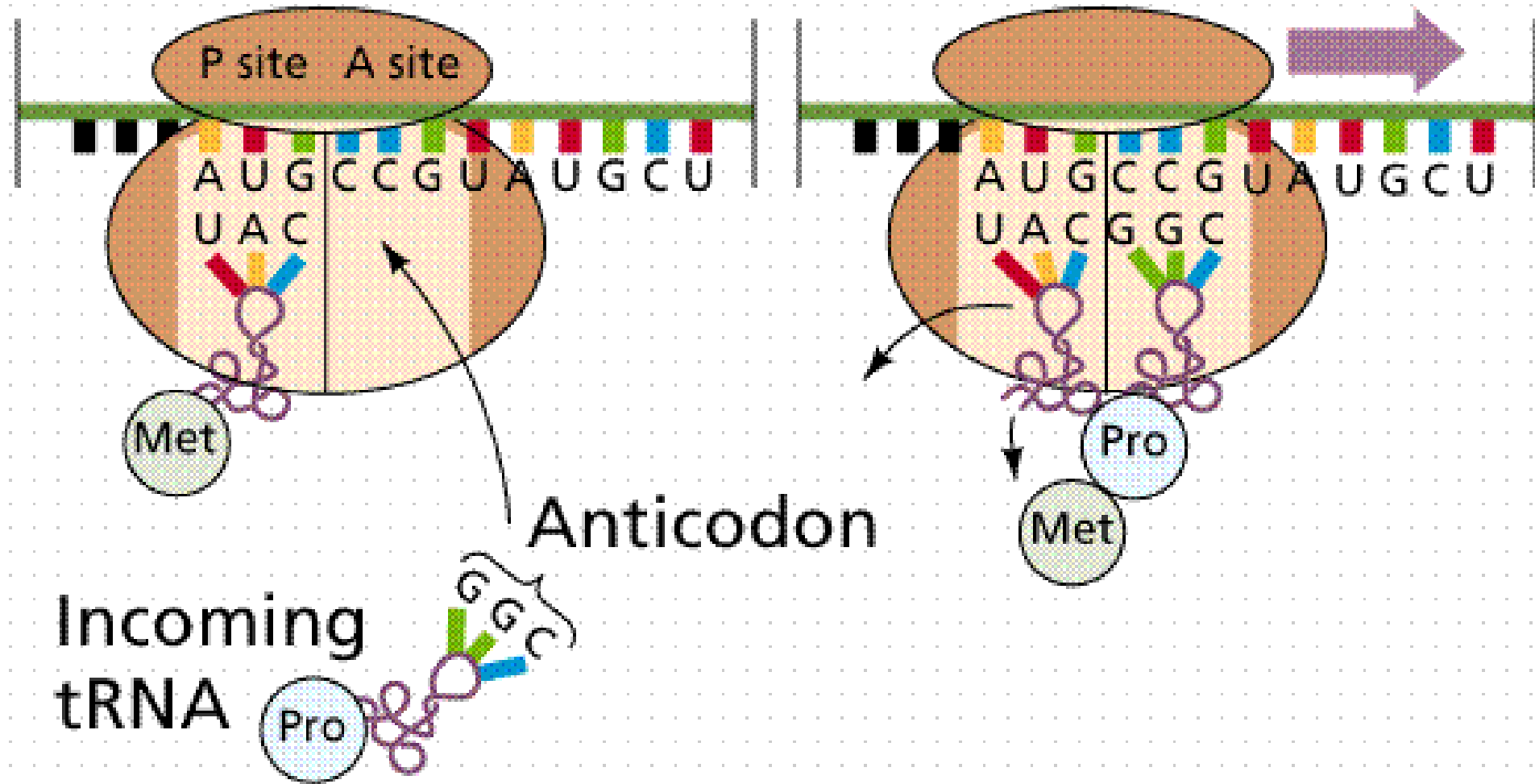
Ribosome scanning

5' cap m^7G **AUG** 3'

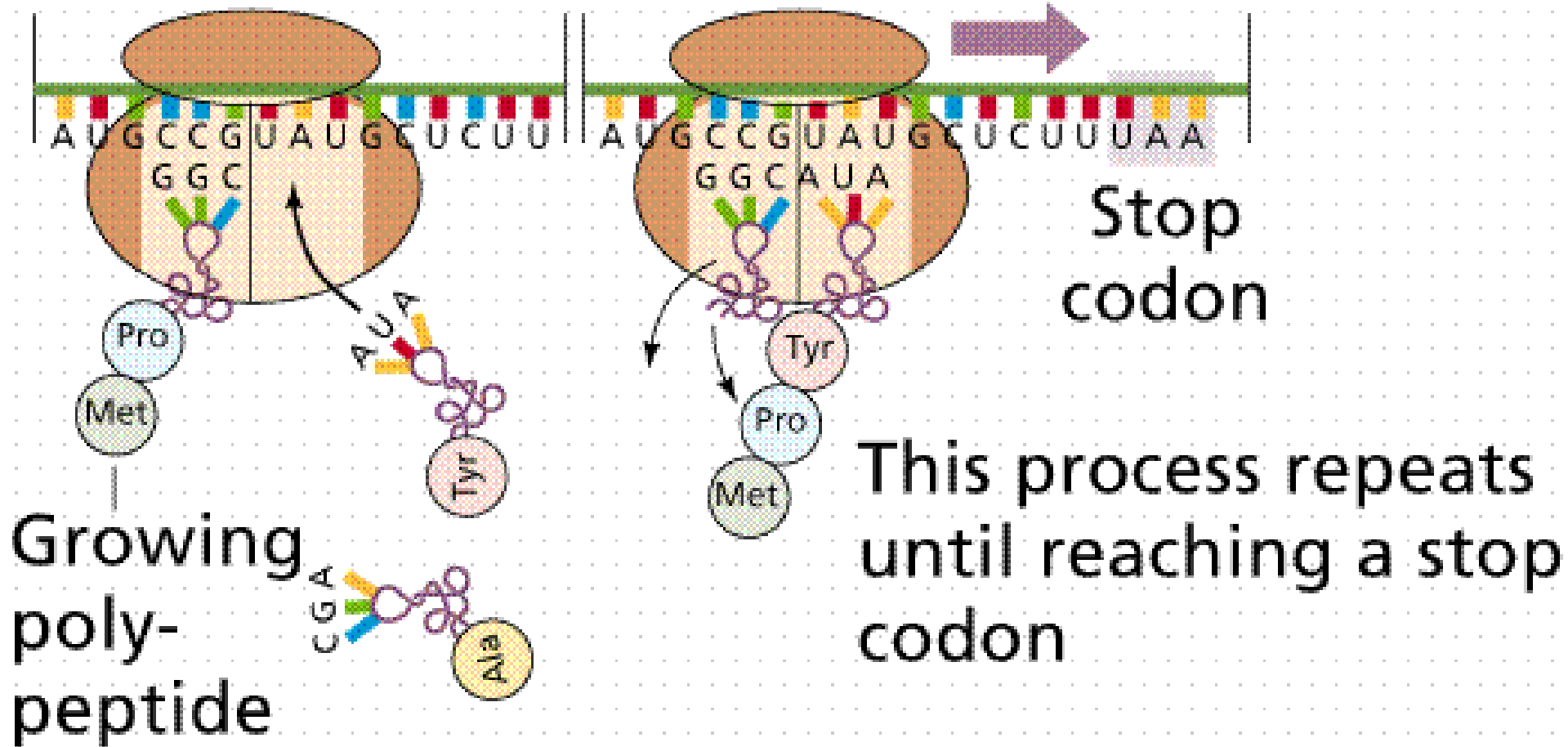




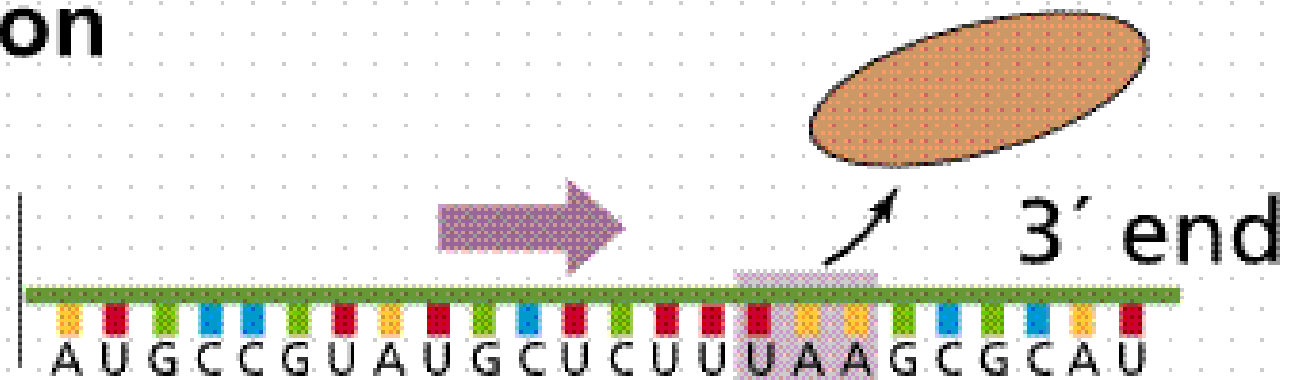
Elongation (translation)



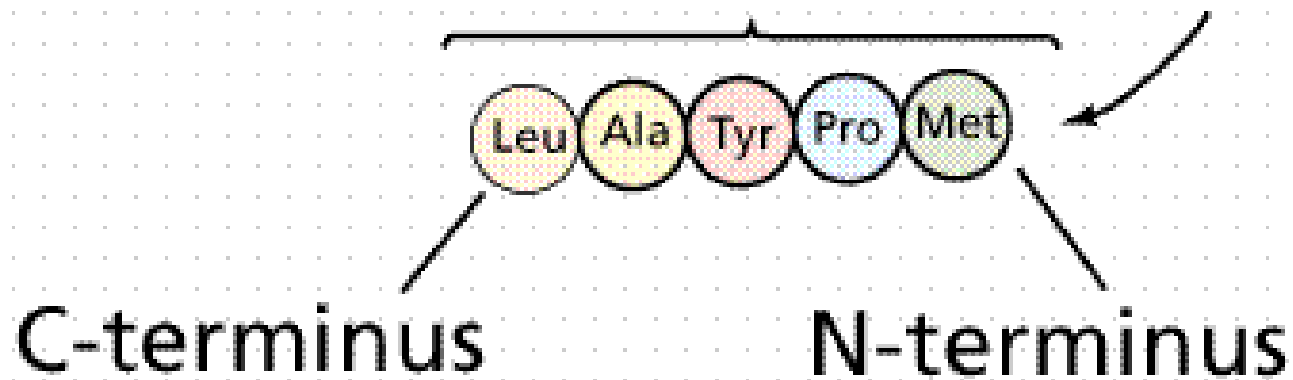
Elongation continues



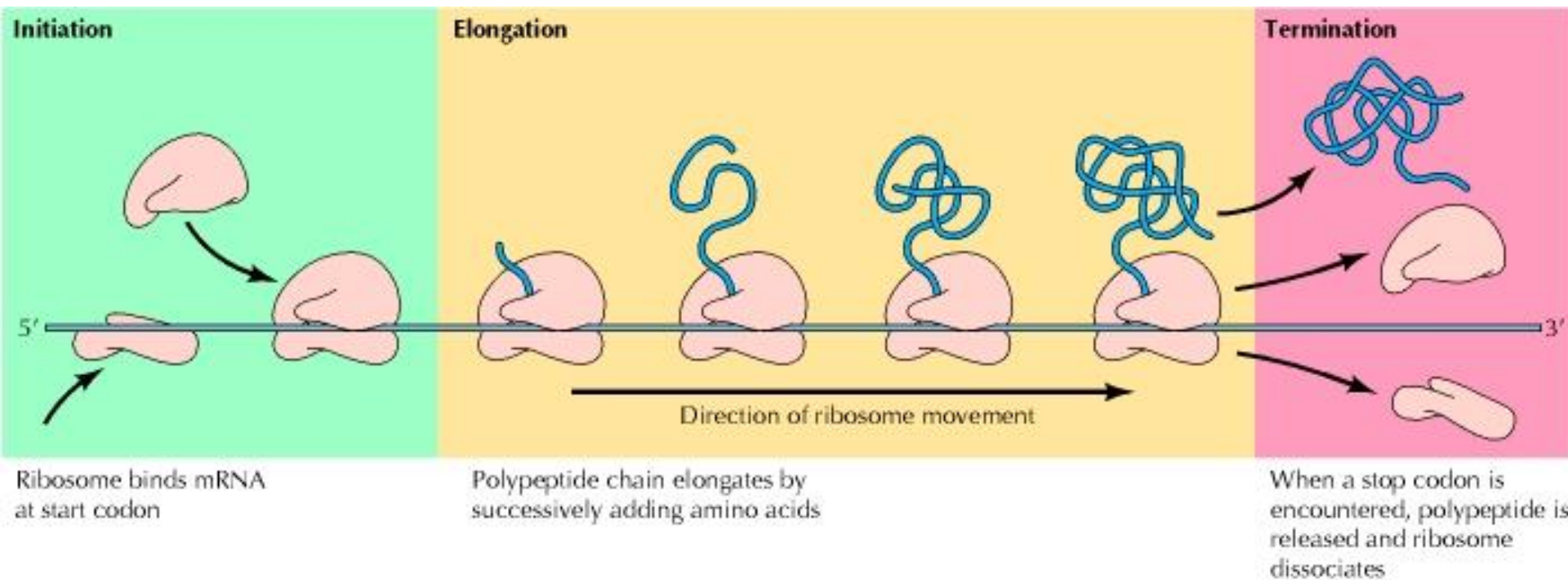
Termination

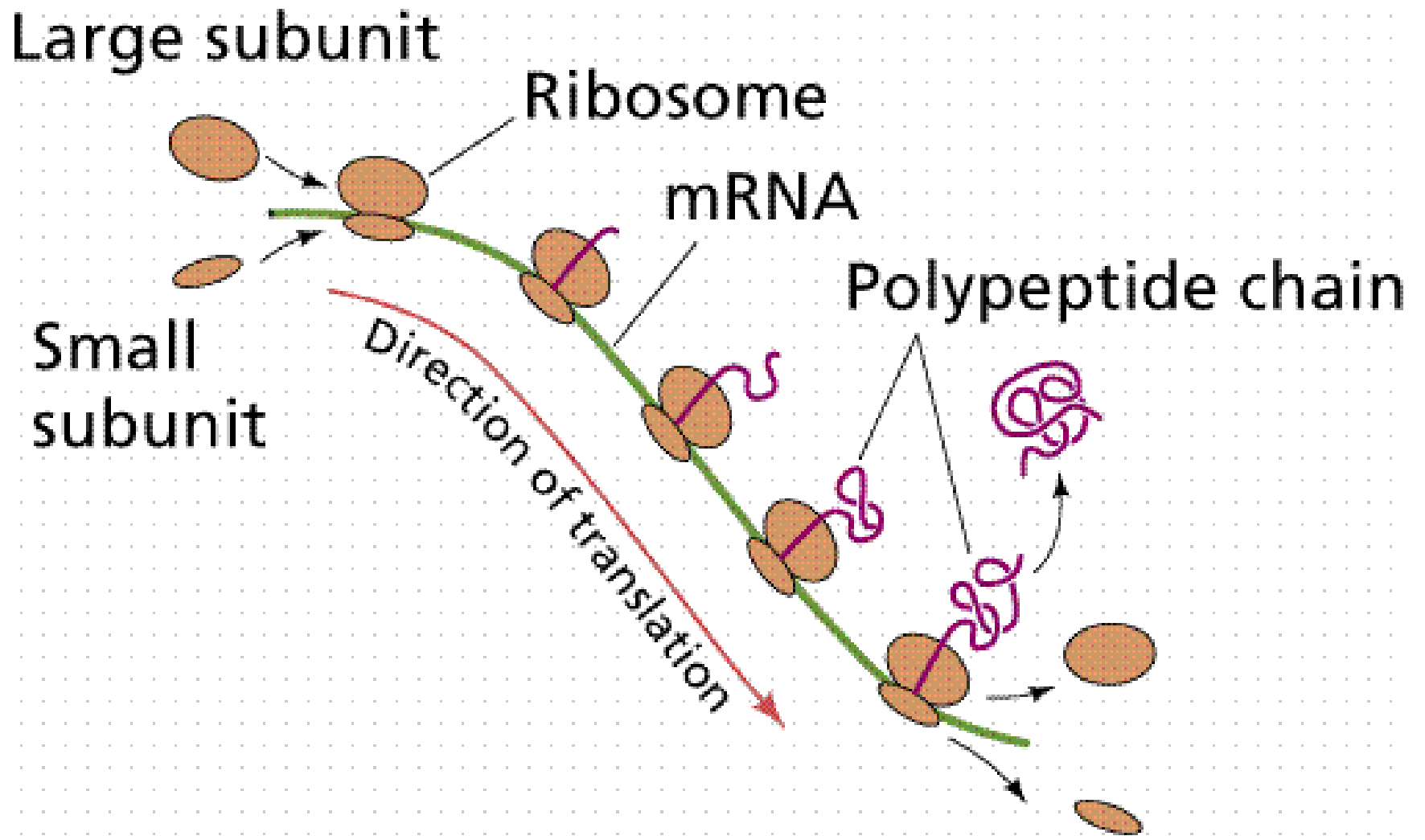


Newly synthesized protein

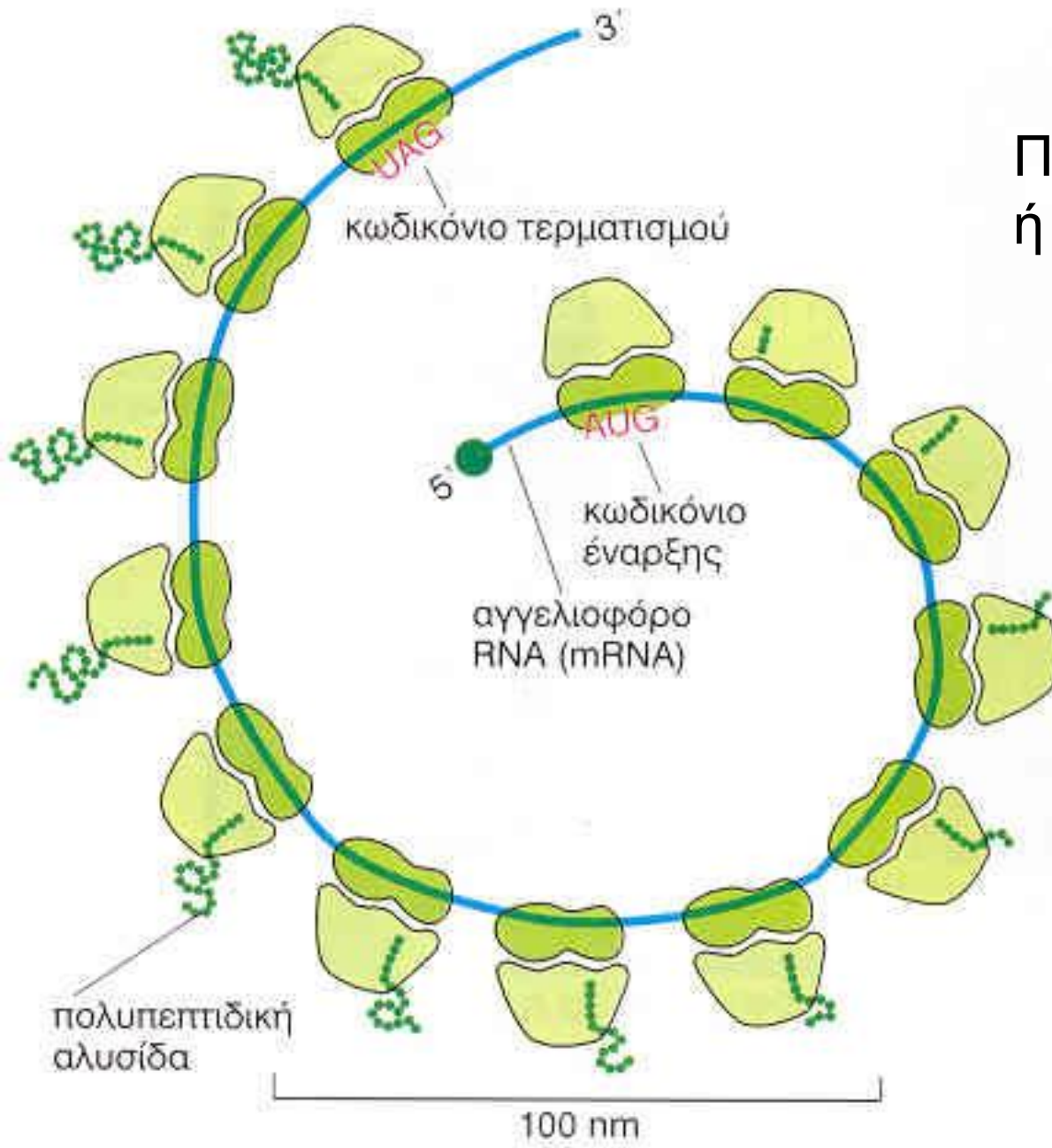


Μετάφραση

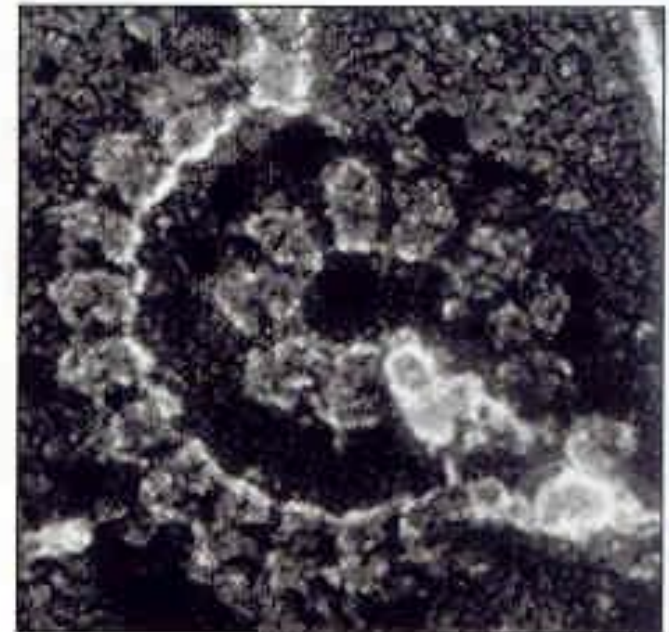




Πολυριβόσωμα ή πολύσωμα



(A)



(B)

<https://www.sciencedirect.com/science/article/pii/S0968000419300556>