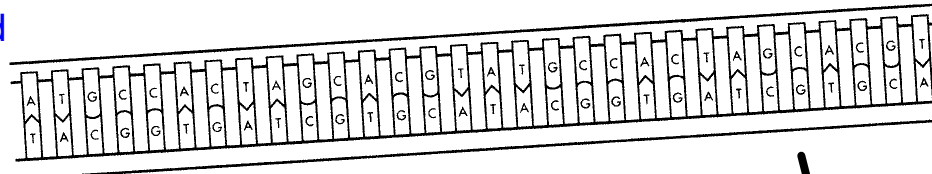


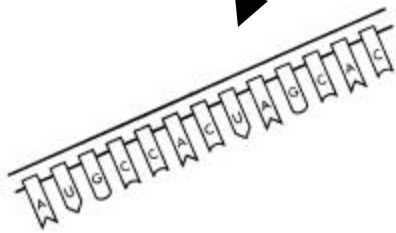
PROTEIN SYNTHESIS

DNA

- Double stranded
- Sugar = deoxyribose
- Bases = ATCG



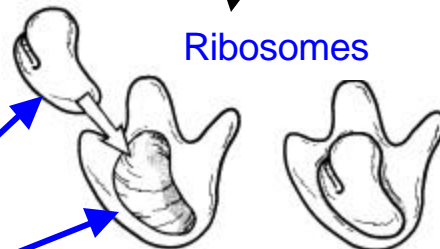
Transcription



mRNA

- messenger RNA
- single stranded
- sugar = ribose
- bases = AUCG
- carries code for making proteins from DNA in nucleus to ribosomes in cytoplasm

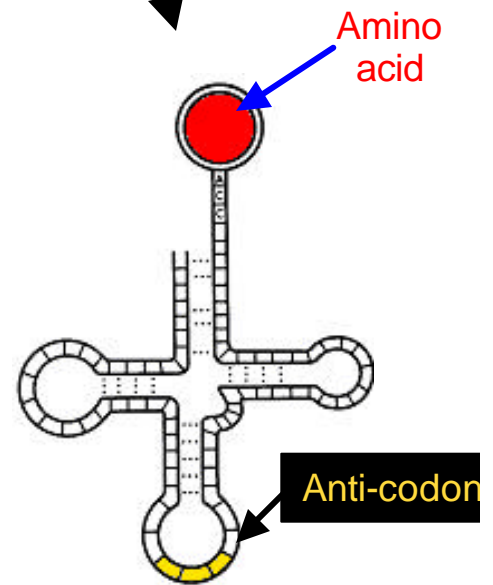
2 subunits
small
large



Ribosomes

60% ribosomal RNA (rRNA)
40% protein
Site of protein synthesis

Transcription



tRNA

- transfer RNA
- carries amino acid to ribosomes
- Anti-codon base pairs with codon on mRNA
- specific

GENETIC CODE

1 codon = 3 consecutive bases

1 codon codes for 1 amino acid (A.A.)

There are 4 bases (A, T, C, G)

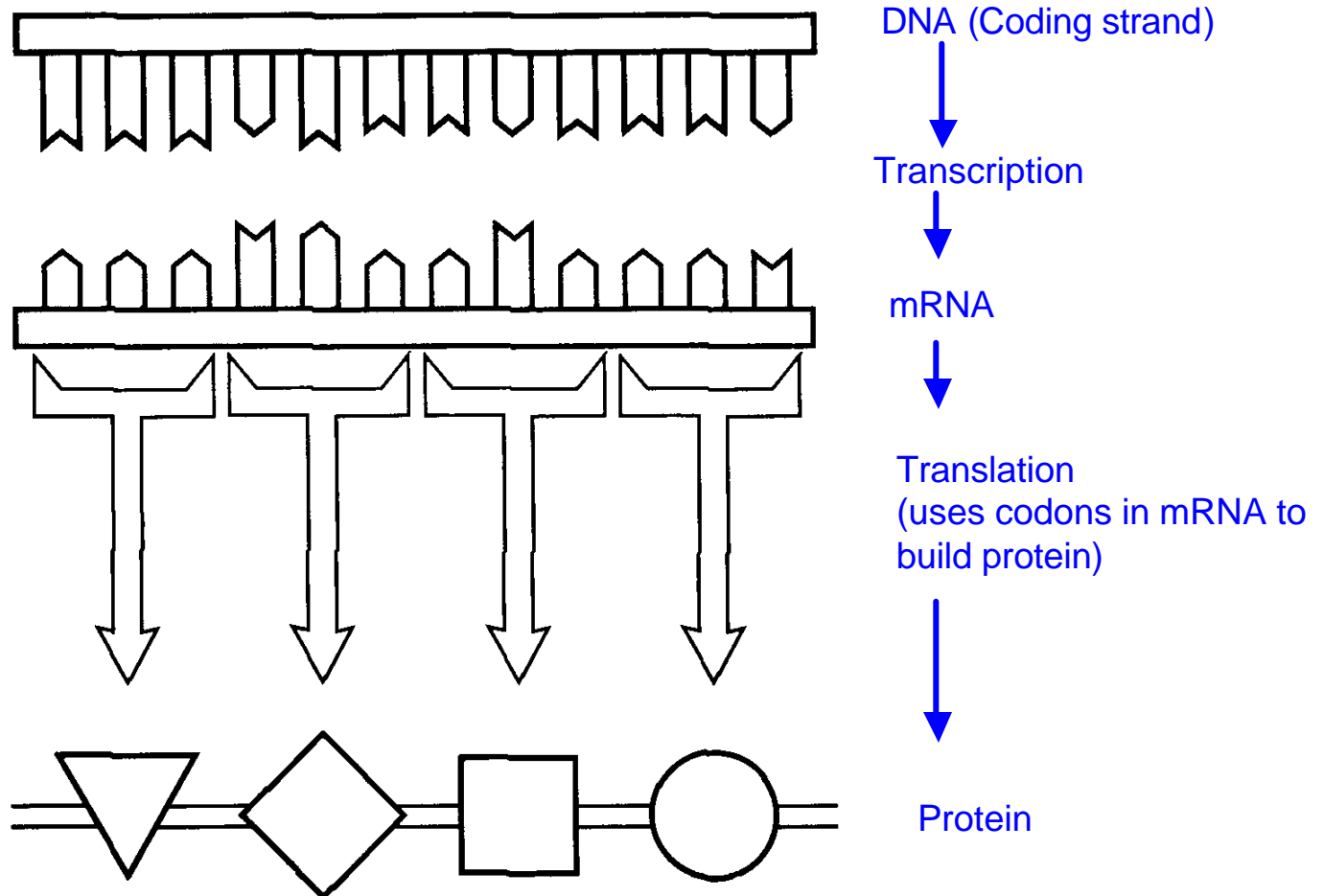
Thus 4^3 (64) possible combinations of codons

There are 20 amino acids

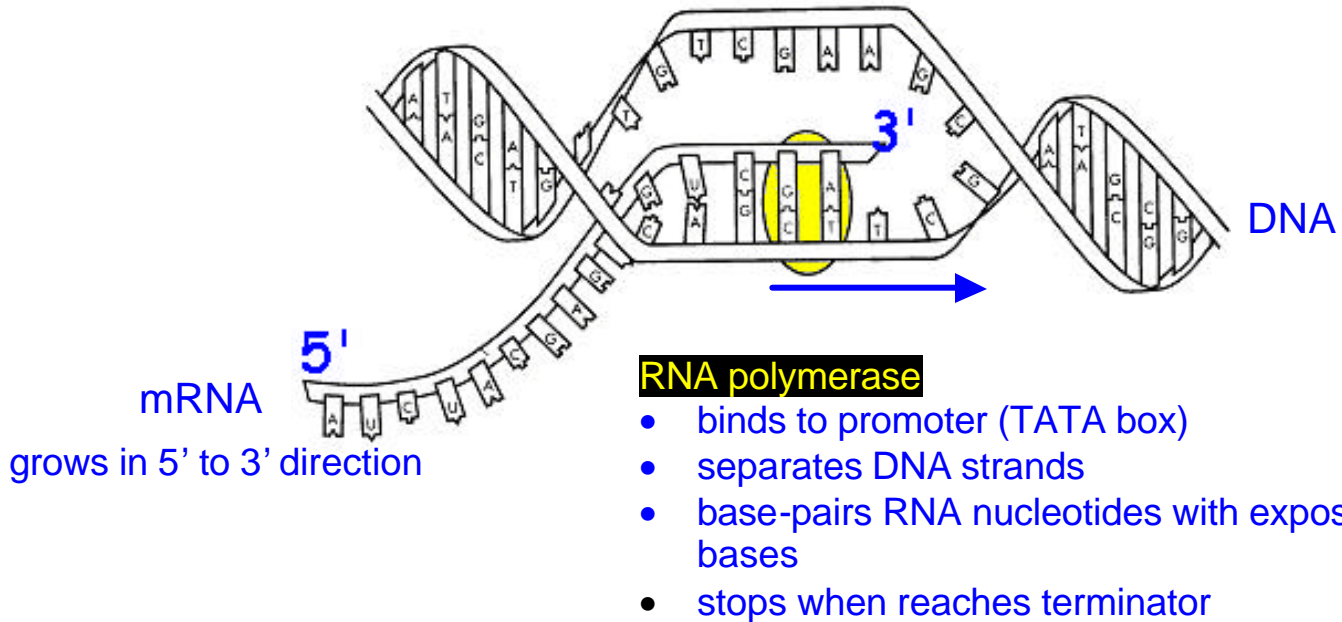
Code is redundant (2 or more codons code for same amino acid)

but not ambiguous (no codon codes for more than 1 amino acid)

PROTEIN SYNTHESIS – OVERVIEW



PROTEIN SYNTHESIS – TRANSCRIPTION

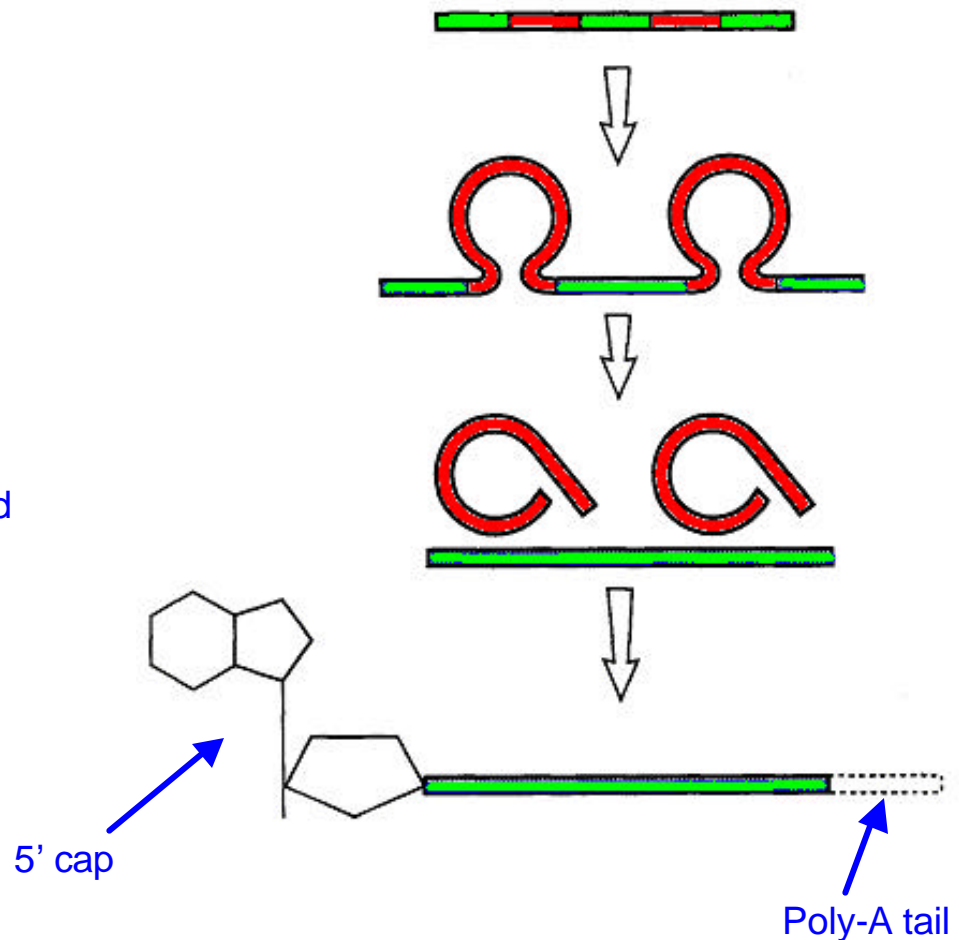


RNA Processing


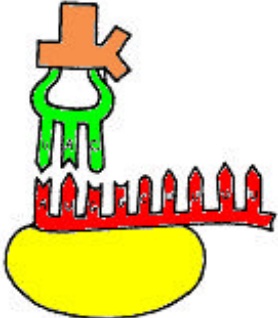
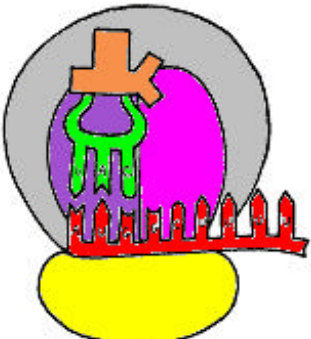
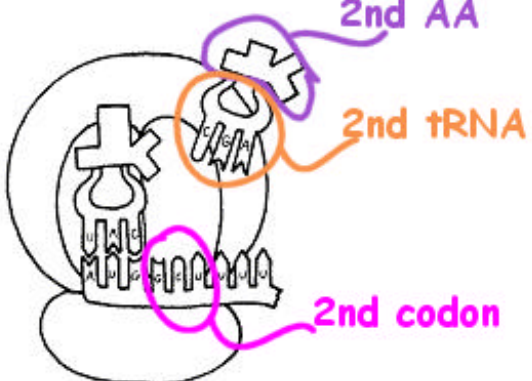
- occurs in eukaryotic cells
- **Introns** removed
- **Exons** linked
- 5' cap added
- Poly-A tail added

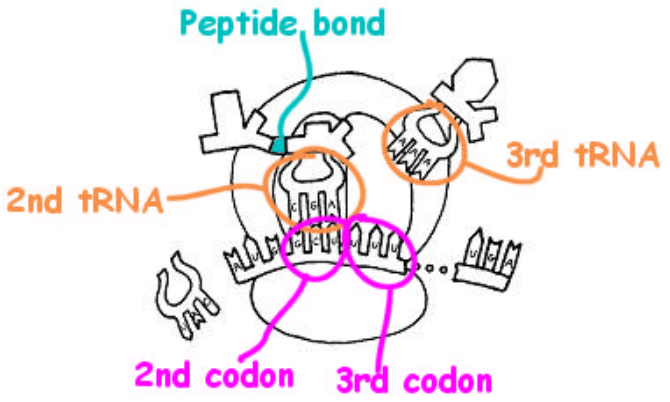
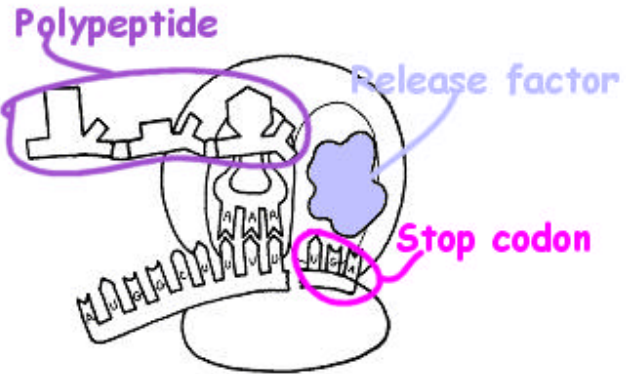
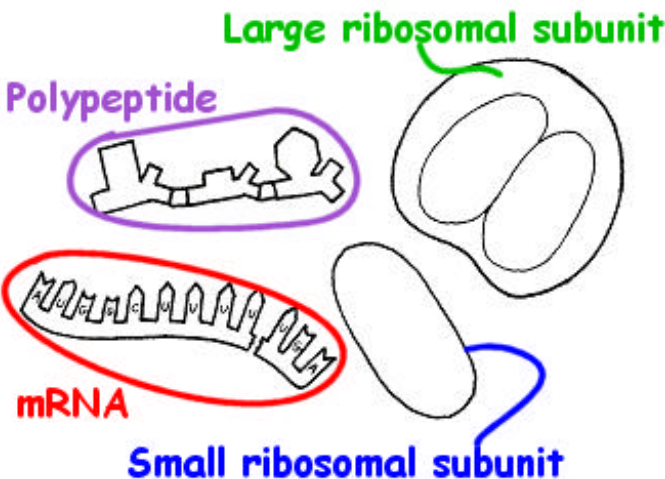
Spliceosome

- Cut out introns
- Slice exons together
- consist of protein and snRNPs



PROTEIN SYNTHESIS – TRANSLATION

Initiation	
	<p>mRNA binds to small ribosomal subunit</p>
	<p>Initiator tRNA base pairs with 1st codon (start codon) on mRNA 1st amino acid - methionine</p>
	<p>Large ribosomal subunit binds to complex Initiator tRNA located at P site P site – peptidyl-tRNA binding site A site = Aminoacyl-tRNA binding site</p>
Elongation	
	<p>2nd tRNA base pairs with 2nd codon on mRNA at A site</p>

	<ul style="list-style-type: none"> • Peptidyl transferase forms peptide bond between 1st and 2nd amino acids • 1st tRNA exits • mRNA shifts position by 1 codon • 2nd tRNA now at P site • 3rd tRNA base pairs with 3rd codon at A site • process continues until stop codon reaches A site
<p>Termination</p>	
	<ul style="list-style-type: none"> • Stop codon (UGA, UAA, UAG) reaches A site • Release factor binds to stop codon • Polypeptide hydrolyzed from tRNA at P site
	<ul style="list-style-type: none"> • Complex disassembles • mRNA can be used again • Polypeptide released