

Transcription, Translation, and Protein Folding

I. RNA Structure

Ribose vs Deoxyribose
Uracil vs Thymine
Properties: Reactivity, Stability, Secondary and Tertiary Structures

II. Transcription

RNA Polymerase and Chain Elongation 5'-3'
Transcription Initiation: promoters
Transcription Termination: factor independent and dependent termination
Independent termination: stable hairpin and AAAAs
Factor Dependent Termination: rho. Bind and Chase the polymerase

III. Ribosomal RNA (rRNA) and Transfer RNA (tRNA)

The bridge from transcription to translation

IV. Protein Structure

Amino acids join to make peptides and eventually proteins
Primary, Secondary, Tertiary, Quaternary Structures

V. Translation

Ribosomes
50S (31 proteins + 23S rRNA + 5S rRNA)
30S (21 proteins + 16S rRNA)
70S the whole shabang

tRNAs
cognate aminoacyl-tRNA,

Reading Frames
The Genetic Code and Codons
Redundant (The Wobble effect)
Nonsense (stop) codons, Initiation codons, Codon Usage

Translation Elongation
EF-Tu, EF-G, P-site, A-site

Translation Initiation
formylmethionyl-tRNA^{fmet}, initiation factors EF1 EF2 EF3
Removal of the Formyl Group and Methionine

Translation Termination
RF1 RF2 RF3, release?

VI. Polycistronic RNA

Polarity (translation influences transcription) and Coupling

VII. Protein Folding

Chaperones
Cysteine and Disulfide isomerases
Membrane sequences

VIII. Antibiotics that Block Transcription and Translation