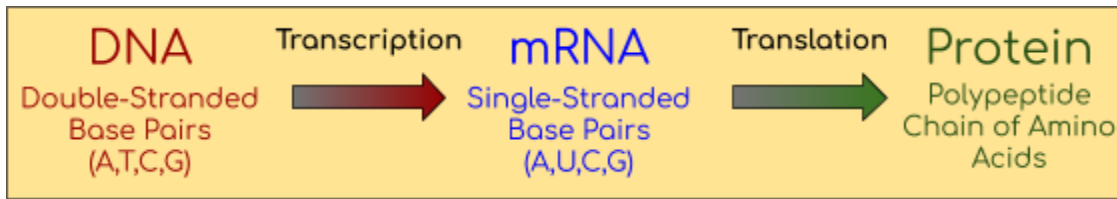
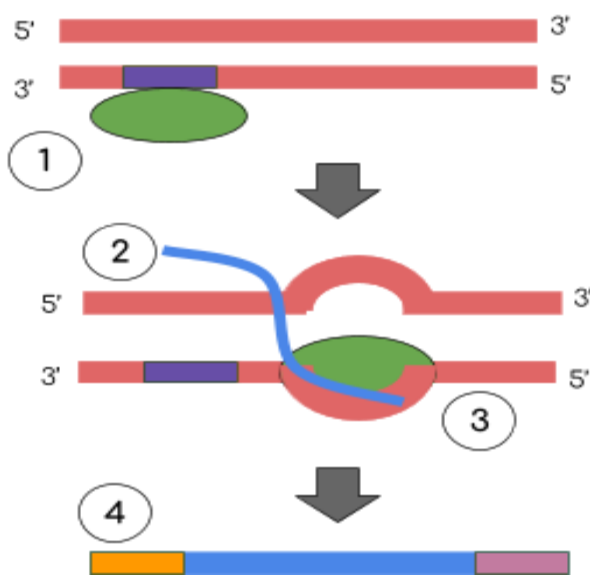


Transcription and Translation



All information for eukaryotic cell survival and function is stored in the nucleus as **DNA**. The processes of transcription and translation allow the cell to communicate genetic information as **messenger RNA** (mRNA), which is then used as a blueprint to build proteins.

Transcription: From DNA to mRNA



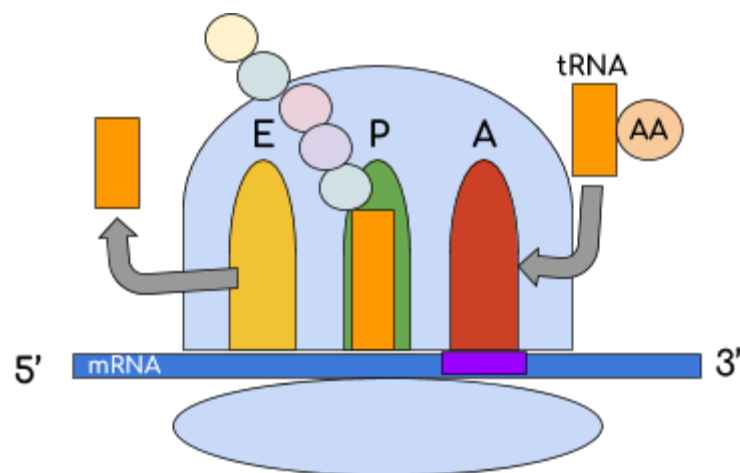
- 1. Initiation:** RNA polymerase binds at the promoter region of a specific gene to open the DNA double helix.
- 2. Elongation:** Base-pairs (A-U, C-G) are added in the 5' to 3' direction
Note: In RNA, uracil replaces thymine as the base-pair for adenosine
- 3. Termination:** mRNA is released.
- 4. Processing:**
 - Prevent degradation: add 5' cap + poly-A tail
 - Splicing: remove introns and join exons

Translation: mRNA to protein

*Note: 3 nucleotides, referred to as a **codon**, encode one amino acid, carried to the ribosome by a tRNA molecule.*

Ribosomes are composed of a large and small subunit that come together to form 3 sites:

- **A:** A tRNA molecule carrying a specific amino acid binds to the corresponding mRNA codon
- **P:** An amino acid is added to the growing polypeptide chain
- **E:** tRNA is released from the ribosome



*Memory Trick: APE
A = Acceptor, P = Polypeptide, E = Exit*