

Define: gene, codon, reading frame

List the major pieces of evidence that led to the hypothesis that DNA influences the production of proteins.

Define and describe the process of transcription.

Define introns and exons. Discuss their occurrence and possible roles.

Summarize the sequence of events that occur in translation.

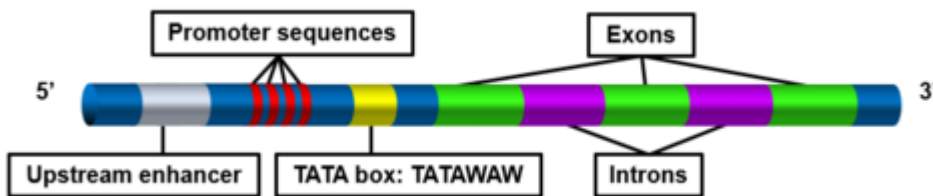
Describe the functions of mRNA, tRNA, and rRNA.

Distinguish between the processes of initiation, elongation, and termination in protein synthesis.

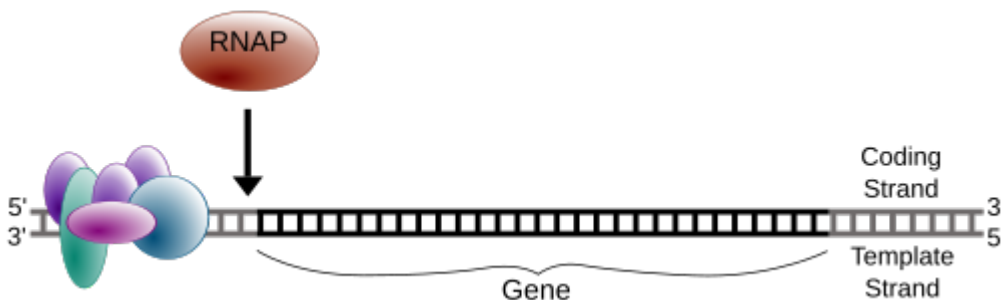
Contents

## Genes

### Transcription



Eukaryotic transcription involves more players. Promoter regions of genes in eukaryotes contain a highly conserved region called the **TATA box**. The name derives from the alternating sequence of T and A nucleotides which are bound to by a protein called TATA Binding Protein (**TBP**). TBP binding helps to recruit additional transcription factors that then recruit **RNA Polymerase II**, one of 3 RNA Polymerases, to transcribe the mRNA. RNA Polymerase I is largely responsible for transcription of ribosomal RNAs (rRNAs) while RNA Polymerase III mainly plays a role in transcription of tRNAs.



General Transcription factors bind to promoters of their respective genes and recruit RNA Pol II. Initiation of transcription occurs in a 5'-3' direction reading off of the template strand from 3'-5'. The major difference in the structure of prokaryotic genes compared to eukaryotic genes is that eukaryotic genes are often interrupted by non-coding sequences called introns that must be processed out during the maturation of the nascent pre-mRNA into the mature mRNA that leaves the nucleus for translation.

