Central Dogma

**Prokaryotic promoter site**

-35

DNA template | TTGACA | TATAAT
---|---|---
-35 Region | Pribnow box | Start of RNA

**Eukaryotic promoter site**

-75

DNA template | GGNCAATCT | TATAAA
---|---|---
CAAT box (sometimes present) | TATA box (Hogness box) | Start of RNA

Eukaryotic RNA polymerases

<table>
<thead>
<tr>
<th>Type</th>
<th>Localization</th>
<th>Cellular transcripts</th>
<th>Effect of α-amanitin</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Nucleolus</td>
<td>18S, 5.8S, and 28S rRNA</td>
<td>Insensitive</td>
</tr>
<tr>
<td>II</td>
<td>Nucleoplasm</td>
<td>mRNA precursors and snRNA</td>
<td>Strongly inhibited</td>
</tr>
<tr>
<td>III</td>
<td>Nucleoplasm</td>
<td>tRNA and 5S rRNA</td>
<td>Inhibited by high concentrations</td>
</tr>
</tbody>
</table>

5'-GCAGCGACGGCCAGUGUAUAUCCACAGCCGCAAGUCCGCUUGGCGGCAUUU-3'
5'-GGCGAGCGGCACTTGTACCATCCCACAGCCGCAAGTCCGCTTGCGGCTTTT

mRNA

Template strand of DNA

Coding strand of DNA

![Lipoprotein assembly](image)

Apo B-100

Translation

CAAA

Unedited mRNA

NH₄⁺ addition by deamination

UAA

Edited mRNA

Translation

Apo B-48

Figure 33.23

RNA editing of apolipoprotein B mRNA. Enzyme-catalyzed deamination of a specific C in the mRNA for apolipoprotein B-100 changes the codon for glutamine (CAA) to a stop signal (UAA). Apo B-48, a truncated version of the protein lacking the LDL receptor binding domain, is generated by this post-transcriptional change in mRNA sequence. (After P. Hodges and J. Scott, Trends Biochem. Sci. 17(1992):77.)
RNA Processing

β-Globin gene

Transcription, cap formation, and poly(A) addition

Primary transcript

Splicing

β-Globin mRNA

Table 29-3
Base sequences of splice points in transcripts containing introns

<table>
<thead>
<tr>
<th>Gene region</th>
<th>Exon 1</th>
<th>Intron</th>
<th>Exon 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovalbumin intron 2</td>
<td>UAAAGUGAGAGCG</td>
<td>UUACAGGUUG</td>
<td></td>
</tr>
<tr>
<td>Ovalbumin intron 3</td>
<td>UCAGGUACAGG</td>
<td>AUUCAGUCUG</td>
<td></td>
</tr>
<tr>
<td>β-Globin intron 1</td>
<td>GCAGGUGUGGU</td>
<td>CUCUAGGCGU</td>
<td></td>
</tr>
<tr>
<td>β-Globin intron 2</td>
<td>CAGGGUGAGUG</td>
<td>CACAGGUC</td>
<td></td>
</tr>
<tr>
<td>Immunoglobulin λ, intron 1</td>
<td>UCAAGGUACAGC</td>
<td>UUGCAGGCG</td>
<td></td>
</tr>
<tr>
<td>SV40 virus early T-antigen</td>
<td>UAAAGGUAAAU</td>
<td>UUUUAGAUC</td>
<td></td>
</tr>
</tbody>
</table>

Figure 29-31
Structure of caps at the 5' end of eukaryotic mRNAs. All caps contain 7-methylguanylate (shown in green) attached by a triphosphate linkage to the sugar at the 5' end. None of the riboses are methylated in cap 0, one is methylated in cap 1, and two are methylated in cap 2.

Figure 33-32
Cleavage and polyadenylation of a primary transcript. A specific endonuclease cleaves the RNA downstream of AAUAAA. Poly(A) polymerase then adds about 250 A residues.