10

POST-TRANSCRIPTIONAL GENE CONTROL

REVIEW THE CONCEPTS

1. In the case of a protein coding gene, gene control beyond regulation of transcriptional initiation can be regulated in several ways: 1) by controlling the stability of the corresponding mRNA in the cytoplasm; 2) by controlling the rate of translation; and 3) by controlling the cellular location so that newly synthesized protein is concentrated where it is needed.

2. True. Enzymes involved in mRNA capping, splicing, and polyadenylation are recruited to the phosphorylated CTD, which activates them. As only RNA polymerase II possesses a CTD, and RNA polymerase II is responsible for mRNA transcription, this ensures that these forms of processing only occur with mRNA.

3. These sequences are found near the intron/exon junctions, not the middle of the intron. Because of these sequences, the snRNPs of the spliceosome are recruited to the proper location on the mRNA. The role of the branch point A is to perform the first transesterification reaction, which eliminates the phosphodiester bond connecting the intron and the upstream exon. While RNA nucleotides have an OH group at both the 2′ and 3′ carbons, the 3′ carbon of the branch point A is connected to an adjacent nucleotide. Thus, the OH group involved in this reaction must be at the 2′ carbon.

4. The term hnRNA describes heterogeneous nuclear RNAs that consist of several different types of RNA molecules that are found in the nucleus. Small nuclear RNAs (snRNAs) bind to splice sites and participate in splicing reactions. Small nucleolar RNAs play a similar role in rRNA processing and can help to position