Name:_____Key_____ Dr. Reichler's Bio 325 TTh 7:30-9pm Fall 2007 Quiz 9/20

1) Nucleotides should be able to be added to either end of RNA, but are only added at the 3' end. Why?

The need for error repair. If a nucleotide is excised from the 5' end, there are no incoming tri-phosphates to provide energy for the formation of the covalent bond.

2) What is different about the size of prokaryotic and eukaryotic promoters, and how does this affect transcription initiation?

Eukaryotic promoter are much larger and have many transcription factors that need to bind to them for transcription to initiate. Prokaryotic promoters are much smaller and typically only need sigma factor to bind for transcription initiation.

3) How is the information in a mature mRNA different from the coding region of the gene?

Addition of the 5'-cap and poly-A tail. Deletion of introns. Possible addition of nucleotides during RNA editing.

4) Are the number of genes comprising an organisms genome necessarily indicative of the number of different proteins that can be produced by that organism?

No, genes may be alternatively spliced into different versions of the protein.

5) In the experiment looking at the function of the 5' cap and poly-A tail, what two things did the researchers measure and what did each measurement tell them?

They measured the half-life of the mRNA to determine mRNA stability. They measured light output to determine how much protein was being produced. The luciferase protein uses luciferin and ATP to emit light.

6) What happens at translation initiation that explains the common functions of the 5' cap and poly-A tail?

The 5' and 3' ends of the mRNA bend around and bring the proteins bound their together. These proteins aid in translation initiation.

7) What are the three RNA molecules involved in translation, and what does each do?

mRNA contains the information from the gene. tRNA brings the correct amino acids and matches to the mRNA codons. rRNA as part of the ribosome brings the different components together and catalyzes the covalent bond between amino acids.

8) There are 64 codons, what are two reasons that there are less than 64 tRNA's?

Wobble means that less tRNAs are needed than codons, and there is no tRNA for the stop codons.

9) Which ribosome would have a longer polypeptide attached to it, one at the 5' end or the 3' end of the mRNA?

The one at the 3' end has been translating for more time. Translation starts at the 5' end.