

True or False (1/2 point each) – 4 points total for this section

1. Codons on prokaryotic mRNA:
___ are not recognized by proteins.
___ hybridize with the 16S ribosomal RNA.
2. According to the wobble hypothesis:
___ a sole tRNA can recognize multiple codons for a particular amino acid.
___ the 3' nucleotide of the anti-codon can bind to multiple nucleotides.
3. A tRNA "charged" with the incorrect amino acid:
___ must have a mutation in its anti-codon.
___ can still be used in translation.
4. In prokaryotic translation, at least two GTP molecules are required for:
___ translation initiation.
___ translocation during elongation.

Multiple Choice (1 point each); circle the correct answer – 3 points total for this section

5. Which one of the following determines the proper positioning of the AUG codon in the 30S initiation complex?
 - A. Initiation factor 2 (IF-2)
 - B. 50S subunit of ribosome
 - C. N-Formylmethionyl-tRNA
 - D. 16S rRNA
6. Deamination of cytosine in an mRNA, if not repaired, produces which of the following?
 - A. an insertion mutation.
 - B. a deletion mutation.
 - C. a point mutation.
 - D. a thymine
7. Peptide bond formation in prokaryotic organisms requires which of the following?
 - A. four elongation factors.
 - B. nucleophilic attack by the free amide on the "charged" tRNA.
 - C. binding of the aminoacyl-tRNA to the P site prior to bond formation.
 - D. the escort of aminoacyl-tRNAs to the ribosomal A site by a protein with ATPase activity.

BCMB 8020 Exam II
Dr. Schmidt's Lectures (15 points total)
March 2, 2004

Name _____

Short Answer (2 points each) – 8 points total for this section

8. Describe the macromolecular / subunit composition of *E. coli* RNAseP, including the relative mass contributions of these macromolecules, AND the role of RNAseP in tRNA processing. (2 points)

9. List TWO distinct mechanisms for editing of mature mRNAs that can result in altered translation products AND give a detailed biological example for each. Derive your responses from examples that were discussed in lecture and/or the assigned homework. (3 points)

10. Of the three nucleotide positions in a codon, explain why mutations in the 3rd position are least likely to affect protein activity? (3 points)

Bonus Question (1 point)

11. Answer only ONE of the following questions; if you answer both, only the first response will be graded; circle the question being answered.

- A. In the report by Nissen *et al* "The structural basis of ribosome activity in peptide bond synthesis," what were TWO general observations that were determined about ribosomal structure?

- B. From the report by Noller *et al* "Translocation of tRNA during protein synthesis," describe TWO of the observations that have led to the hypothesis of hybrid states during translocation?