

Name: _____

Dr. Reichler's Bio 325-uex Summer 2008 Quiz 6/18

- 1) Why is positive proof often misleading?
- 2) How would not following rule three of Strong Inference affect the outcome of your research?
- 3) Using rules one and two of Strong Inference answer the following question: What is the quickest way to get from Riverside to class?
- 4) In what part of a journal article would you expect to find the most citations?
- 5) What would be different between a results section and the discussion of a journal article?
- 6) You find an older article on a topic that interests you. How could you use information from the article to find if there were more recent publications regarding this topic?
- 7) Would double-stranded RNA be as stable as double-stranded DNA?
- 8) How is the definition that genes code for proteins related to two other gene definitions?
- 9) How could you stop a transposon from moving?
- 10) If a muscle cell is responding to epinephrine (a hormone involved in the fight or flight response), and the response will involve a change in gene expression, where will the three steps in signal transduction occur?
- 11) What evidence indicates that all of the signal transduction chain between DNA damage and inhibition of RNA polymerase I occurs in the nucleolus?
- 12) What are two reasons for the seemingly complex nature of signal transduction?
- 13) What is role of calcium in the two reasons that you gave in #12?
- 14) Nucleotides should be able to be added to either end of RNA, but are only added at the 3' end. Why?

- 15) What is different about the size of prokaryotic and eukaryotic promoters, and how does this affect transcription initiation?
- 16) How is the information in a mature mRNA different from the coding region of the gene?
- 17) Are the number of genes comprising an organisms genome necessarily indicative of the number of different proteins that can be produced by that organism?
- 18) 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?
- 19) What happens at translation initiation that explains the common functions of the 5' cap and poly-A tail?
- 20) What are the three RNA molecules involved in translation, and what does each do?
- 21) There are 64 codons, what are two reasons that there are less than 64 tRNA's?
- 22) Which ribosome would have a longer polypeptide attached to it, one at the 5' end or the 3' end of the mRNA?

Answers:

- 1) Why is positive proof often misleading?
It leads us to ignore data that would disprove our hypothesis.
- 2) How would not following rule three of Strong Inference affect the outcome of your research?
Getting unreliable data would cause the elimination of the wrong hypotheses.
- 3) Using rules one and two of Strong Inference answer the following question: What is the quickest way to get from Riverside to class?
Many answers: Make at least two hypotheses- Take the bus. Driving in a car. Going by horse. Etc.
Devise at least one experiment to eliminate hypotheses- Go to campus using the different methods and time each one.
- 4) In what part of a journal article would you expect to find the most citations?

Either the introduction or discussion.

5) What would be different between a results section and the discussion of a journal article? Results simply list the findings. Discussion connects these findings to other research and interprets the data.

6) You find an older article on a topic that interests you. How could you use information from the article to find if there were more recent publications regarding this topic? Several possibilities: Look for newer publications by these authors. Look for articles by cited authors. Some search engines will show you the articles that have cited that paper.

7) Would double-stranded RNA be as stable as double-stranded DNA? No, the OH on the #2 carbon makes RNA more likely to be broken down by chemical reactions.

8) How is the definition that genes code for proteins related to two other gene definitions? Many answers: Malfunctioning proteins are the cause of many genetic diseases. The traits we inherit are primarily based on the proteins we produce. The switches controlling development are often proteins.

9) How could you stop a transposon from moving? By either changing the inverted repeats or eliminating the function of transposase.

10) If a muscle cell is responding to epinephrine (a hormone involved in the fight or flight response), and the response will involve a change in gene expression, where will the three steps in signal transduction occur? Perception on the plasma membrane, Transduction in the cytoplasm to the Nucleus where the response will occur.

11) What evidence indicates that all of the signal transduction chain between DNA damage and inhibition of RNA polymerase I occurs in the nucleolus? When individual nucleoli were targeted for DNA damage, the response only occurred in the damaged nucleoli.

12) What are two reasons for the seemingly complex nature of signal transduction? Amplification of the signal and signal specificity.

13) What is role of calcium in the two reasons that you gave in #12? Calcium is an easy way to amplify a signal and different spatial or temporal distributions of calcium can give specific responses.

14) Nucleotides should be able to be added to either end of RNA, but are only added at the 3' end. Why? Error repair can only occur at the 3' end. If removing incorrect nucleotides at the 5' end, there are no tri-phosphates to provide energy for making the covalent bond between nucleotides.

15) How are the interactions of RNA polymerase with the promoter different in prokaryotic and eukaryotic promoters, and how does this affect transcription initiation?

Prokaryotic RNA polymerase can bind directly to the promoter in the presence of sigma factor. Eukaryotic RNA polymerase needs several transcription factors to bind the promoter before it can begin transcription.

16) How is the information in a mature mRNA different from the coding region of the gene?
The 5'-cap and the poly-A tail are added, and introns are removed.

17) 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. Alternate splicing and RNA editing can make multiple mRNA's, and therefore multiple proteins, from one gene.

18) 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?
The half-life of the mRNA to look at mRNA stability. Light emission to look at the amount of protein produced from the mRNA.

19) What happens at translation initiation that explains the common functions of the 5' cap and poly-A tail?
The mRNA loops around so the 5'-cap and poly-A tail are close together.

20) What are the three RNA molecules involved in translation, and what does each do?
rRNA- serves as a platform for translation to occur and makes the peptide bond. tRNA- matches with the mRNA and brings the appropriate amino acid. mRNA- contains the codons for stringing the amino acids together.

21) There are 64 codons, what are two reasons that there are less than 64 tRNA's?
There are start and stop codons plus wobble.

22) Which ribosome would have a longer polypeptide attached to it, one at the 5' end or the 3' end of the mRNA?
At the 3' end. Translation starts at the 5' end and moves to the 3' end.