

Biochemistry Quiz Review II

A general note: Short answer questions are just that, short. Writing a paragraph filled with every term you can remember from class won't improve your answer— just answer clearly, succinctly, and in your own words.

1. How many bases are in the double-stranded DNA sequence with one-strand code ATTGTCA?

2. What nucleobase pairs with Guanine? Draw it.

3. If you heat a solution of DNA to their T_m , what fraction of it will be denatured?

4. "RNA is more flexible than proteins." Explain what might be meant by this statement.

5. In the Central Dogma of Molecular Biology, what are the three main molecular components?

6. Explain why DNA can form "hairpins".

7. What is a restriction enzyme? What function does it catalyze?

8. How is recombinant DNA inserted into bacterial cells?

9. If you started with one copy of DNA and began the polymerase chain reaction, how many copies would you have after 5 rounds of amplification?

10. Explain why Adenine and Cytosine cannot efficiently hybridize.

11. Only a small portion of our genomic DNA is translated into protein. What is the rest of the DNA for?

12. Why does a plasmid include an origin of replication (ori)?

13. How does cDNA differ from a gene in the genome?

14. Which would you expect to be larger, the % of the human genome that is translated into protein, or the % of a bacterial genome that is translated into protein. Why?

15. Draw the amino acid Alanine:

16.	1	2	3	4	5
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	Asp-Glu	Gly-Arg	Trp-Tyr	His-Glu	Leu-Val

Which one of the above dipeptides (1 through 5):

- (a) Is most negatively charged at pH 7?
- (b) Contains the largest number of nonpolar R groups?

17. Glycine has two dissociable protons: one with a pKa of 2.3, the other with a pKa of 9.6. Draw the structure of Glycine and indicate where these protons are attached.

18. Under what pH range or ranges would glycine have good buffering power?

19. When proteins are purified by gel electrophoresis, SDS (sodium dodecyl sulfate) is often included with the protein. What is the purpose of this SDS, and what does it enable biochemists to investigate?

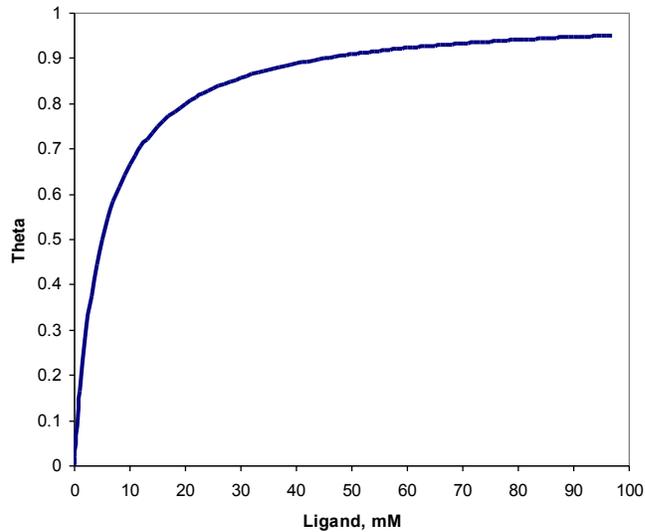
20. In your own words, what is the primary structure of a protein?

21. Describe the general shape that β strands form. What forces hold the strands in this form?
22. Name two amino acid residues you would not expect to commonly be found in an α helix:
23. What type of amino acid residue is typically found in the interior of a water-soluble globular protein? Why?
24. Explain why a denatured protein might not refold *in vitro*.
25. Describe the difference between secondary and tertiary structure in proteins.
26. β -fibroin is a primary constituent of silk. In your own words, describe the structure of fibroin on the molecular level.
27. Why does NMR generate multiple, similar structures for a given protein?
28. Chaperones assist in what process?

29. What is a “motif”, as applied to protein structure?

30. Describe what, in general, is happening during the binding event of an induced fit mechanism.

31. Estimate the affinity of this protein-ligand interaction:



32. For a given binding reaction, if θ is equal to 0.25, and the K_d for the reaction is 1×10^{-4} M, what is the concentration of ligand? Show your work.

33. Describe the difference between a concerted and sequential cooperative mechanism.

34. Name the following amino acids with full name and 1 letter code:

