Guided Reading
"The Structures of Life" NIH publication

Put your name and ID number on the bubble sheet, bubbling in your ID number carefully.

Answer the questions as best you can. Most of the answers come from the booklet.

Start reading with page iv.

1] What determines the properties of molecules?
[A] the outer electrons [B] the 3D shape [C] chemical composition [D] All of these

2] What kinds of scientists work on structural biology? (Mark ALL that apply)
[A] molecular biologists [B] X-ray crystallographers [C] NMR spectroscopists [D] biochemists

Chapter 1

3] Silk fibers are made of
[A] spiders [B] carbohydrates [C] protein fibers [D] nucleic acids

4]Antibodies are made of
[A] muscle [B] protein [C] carbohydrate [D] lipid

5] Proteins are made of chains of _____.
{A] nucleotides [B] amino acids [C] simple sugars [D] lipids

6] What type of molecule helps proteins fold?
[A] assistant molecules [B] friendly molecules [C] chaperone molecules [D] placement molecules

7] DNA Polymerase III is shaped like
[A] a line [B] a donut [C] the letter Y [D] a glob

8] Collagen is shaped like
[A] a line [B] a donut [C] the letter Y [D] a glob

9] Antibodies are shaped like
[A] a line [B] a donut [C] the letter Y [D] a glob

Small Errors in Proteins can cause disease

10] How many errors in the gene for hemoglobin cause sickle cell disease?
[A] 1 [B] 2 [C] 3 [D] 4 [E] 5

11] Cystic fibrosis is caused by a misfolded protein. The protein is a channel protein that normally allows what ion through the membrane of cells?
[A] H^+ [B] OH^- [C] Na^+ [D] Cl^-

12] The corkscrew shaped secondary structure of proteins is called
[A] Alpha helix [B] Beta pleated sheet [C] Gamma blue [D] Delta globular

13] The flattened strip shaped secondary structure of proteins is called
[A] Alpha helix [B] Beta pleated sheet [C] Gamma blue [D] Delta globular

14] Which of the following diseases are thought to be the result of misfolded proteins? (Mark all that apply)
[A] Cystic fibrosis [B] Alzheimer's [C] mad cow [D] hemophilia [E] malaria

15] Each of us has _____ of different proteins in our cells.
[A] 100s [B] 1000s [C] 10,000s [D] 100,000s [E] 1,000,000s

16] Nerve toxins can be found in the venom of (Mark all that apply)
[A] crazed science teachers [B] puffer fish [C] cobras [D] scorpions [E] sea snails

17] Some jellyfish produce a protein that leaves a _____ light.
[A] red [B] blue [C] green [D] orange [E] yellow

18] The outer surface of your skin is made of
[A] cellulose [B] keratin [C] morphine [D] chitin [E] collagen

19] Looking at the picture on the bottom of page 10, that protein has a great deal of
[A] alpha helix [B] beta pleated sheet [C] gamma globulin [D] delta blue

20] Looking at the picture on the bottom of page 11, that protein has a great deal of
[A] alpha helix [B] beta pleated sheet [C] gamma globulin [D] delta blue

The Genetic Code

21] How many different DNA Nucleotides are there?
[A] 1 [B] 2 [C] 3 [D] 4 [E] 5

22] How many different RNA Nucleotides are there?
[A] 1 [B] 2 [C] 3 [D] 4 [E] 5

23] Transcription involves reading the DNA and writing?
[A] a novel [B] a short story [C] a section of protein [D] a complimentary sequence of RNA

24] How many DNA bases correspond to 1 RNA base in transcription?
[A] 1 [B] 2 [C] 3 [D] 4 [E] 5

25] How many RNA bases correspond to 1 amino acid in translation?
[A] 1 [B] 2 [C] 3 [D] 4 [E] 5

Using the genetic code table of pages 12 & 13, along with the information associated with the table

26] What would be the RNA sequence that would be transcribed from the following sequence of DNA?
TACAGAGGAATACGCATC
[A] AUGUCUCCUUAUGCGUAG
[B] ATGTCTCCTATGCGTAG
[C] UACAGGAAUACGCAUC

27] What would be the amino acid sequence that would be translated from the RNA in question 26?
[A] methionine-proline-serine-alanine
[B] alanine-proline-serine
[C] methionine-serine-proline-tyrosine-alanine

28] How many possible triplets are there for lysine?
[A] 1 [B] 2 [C] 3 [D]4 [E] 6

29] How many possible triplets are there for serine?
[A] 1 [B] 2 [C] 3 [D]4 [E] 6

30] How many possible stop codons are there?
[A] 1 [B] 2 [C] 3 [D]4 [E] 6

31] How many possible codons are there for phenylalnine?
[A] 1 [B] 2 [C] 3 [D]4 [E] 6

32] How many possible codons are there for tryptophan?
[A] 1 [B] 2 [C] 3 [D]4 [E] 6

Turn to page 20-21

33] A protein is approximately ____ the size of a water molecule.
[A] 10X [B] 100X [C] 1000X [D] 10,000X [E] 100,000X

34] A cell is approximately _____ the size of a water molecule.
[A] 10X [B] 100X [C] 5000X [D] 50,000X [E] 100,000X

35] Xrays have wavelengths _____ than infrared light.
[A] the same as [B] shorter than [C] longer than

36] Radiowaves are _____ than visible light.
[A] longer [B] shorter [C] the same as

Turn to page 23

37] Ribosomes make
[A] DNA [B] RNA [C] carbohydrates [D] proteins [E] fats

Turn to page 33-35

38] Which of these can effect a proteins folding (Mark all that apply)?
[A] acidity [B] temperature [C] chemical composition

39] Myoglobin stores _____ in muscle tissue.
[A] water [B] carbon monoxide [C] carbon dioxide [D] oxygen [E] iron

40] Brazzein, a protein, is _____ times sweeter than sugar.
[A] 100 [B] 200 [C] 2000 [D] 5000 [E] 50,000

Turn to page 52

41] Myosin filaments slide across _____ filaments in muscle movement
[A] actin [B] Brazein [C] hemoglobin [D] myoglobin [E] tuberculosis

42] Looking at the picture on page 54, the purple section of the protein is mostly
[A] alpha helix [B] beta pleated sheet [C] gamma globulin [D] delta blue

If you have finished the questions related to the booklet you are free to read the rest of the booklet (the part about drug design) and to go over whatever other sections in which you have an interest.