CHEM 109 Cracking Your Genetic Code Homework

It is due at or before you meet with me for your final. Make sure all pages are stapled together (0.1 point deduction if not) and that your name is on all pages.

1. Watch a Nova video called “Cracking Your Genetic Code”. View it at the following web site: http://www.pbs.org/wgbh/nova/body/cracking-your-genetic-code.html. Print out the following 4 pages below and answer the questions as you watch the video. Make sure you staple the pages together.
“Cracking Your Genetic Code” Lab Homework Assignment

1. A person’s entire genetic code can fit on a flash drive.  True or false

2. How many letters are in a person’s genome? _________________________________

3. What advice were ancient Greeks given, and how does that relate to the name on the flash drive?
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

4. Francis Collins was interviewed for this program. What is his job?
   ________________________________________________________________

5. What symptoms did Andrew Schmitz display? __________________________________

6. When Andrew’s DNA was sent to a company for sequencing, what was done to his DNA to make it easier to sequence?
   ________________________________________________________________

7. How long did it take and how much did it cost to complete the 1st human genome sequence (not Andrew’s)?
   How long? ______________ How many $ ______________

8. What happens if DNA is copied incorrectly? ______________________________________

9. Does Dr. Jacob think it is possible that Andrew might have a genetic problem for which no treatment exists?  Y or N (Circle one)

10. Some companies provide partial genome sequencing. What is the name of one of the best known of these companies?
    ________________________________________________________________

11. What odds were given for Jay Adelson someday developing Parkinson’s?________

12. Francis Collins had DNA analyses done by three different companies. What disease did the analysis suggest he was at risk for __________________________, and how did he alter his life style to improve his odds of not getting this disease? __________________________

13. James Watson (of Watson & Crick fame) did not want to know about one of his gene sequences. Which gene was this, __________________________
14. To what disease has a variant of this gene been linked? ________________________________

15. There is a subset of disease related genes that are very likely to make you sick, even if you only have one of them. These are __________________________ disease genes.

16. Who is Megan Sullivan? ________________________________________________________

17. What three characteristics were listed as being caused by Megan’s disease? ________________


19. Why did Katie Moser decide to get tested for the disease? ________________________________

20. What is an actionable gene? _________________________________________________________

21. Give two examples of actionable genes. __________ & ________________________________

22. Back to Andrew Schmitz for a moment: How long did it take to sequence his genome ________

23. How expensive was the Andrew’s DNA sequencing? _________________________________

24. Another young man, Nicholas Volker, had a genetic health problem. What gene _______________ was responsible for Nick’s health problems?

25. What treatment appears to have saved Nick? ____________________________________________

26. From what disease was Michael McCarrick suffering? _________________________________

27. What drug is/was Michael taking? _________________________________________________

28. What leads to lung infections in CF patients? __________________________________________

29. While Paul does appear to be showing real improvement in his health as a result of taking Kalydeco, what figure is given as a possible annual cost for Kalydeco? __________________________
30. At this price, what would it cost Paul to take this drug for 20 years? _________________________
(Show calc.)

31. What type of cancer did Tom Garpestad develop? ________________________________

32. When it is discovered that a melanoma patient’s cancer has spread, how long do they have to live?
____________________________________________________________________________________

33. What term is used to describe the process of cancer cells spreading from one location to other sites in the body?
____________________________________________________________________________________

34. What gene was described in the program as being the melanoma gene ________________

35. In one word, what can cancer cells do to overcome the effects of the drug? ________________

36. How many months of quality life are patients getting from the drug treatment? _________

37. At what cell stage in embryo development is a single cell removed from the embryo to determine if it contains a genetic disease? Circle one:  1     2     4     8     16     32

38. How many diseases are Mark Hughes and his team testing for? _________________________

39. Some people have concerns that genetic testing for reproductive purposes will be misused. What science fiction movie was cited in this regard? ________________________________

40. Briefly, how did the Beery twins’ parents know their children had a health problem? __________
____________________________________________________________________________________

41. What happened to Alexis around age 5 that suggested the original diagnosis might be wrong? ______
____________________________________________________________________________________

42. What was Retta Beery’s response to Alexis’ worsening condition? ________________________
____________________________________________________________________________________

43. How did Alexis respond to the new treatment? ________________________________
____________________________________________________________________________________

44. What did Joe Beery (the father) do in response to Alexis’ continuing problems? _____________
45. What was discovered about the twins from the answer to #41? __________________________

46. What does Joe indicate saved Alexis’ and Noah’s lives? ________________________________

Back to Andrew
47. What did geneticist Elizabeth Worthy find in Andrew’s genome? ______________________

48. Did this finding lead to a cure for Andrew?  Y or N

49. What does Dr. Collins give as an important reason to know your genome? ______________

Not for credit issues to consider on your own:
What would you do if you were in Katie Moser’s place?
What would you do if you were in Catherine Elton’s place? (Re. tamoxifen/raloxifene?)
If you had a loss-of-function genetic disease, would that influence your choice of a mate?
If you had a loss-of-function genetic disease, would that influence your interest in having children?
Would you consider using PGD if you and your mate were heterozygous for the same loss-of-function disease?
If you had a dominant genetic disease (like Huntington’s), would that influence your interest in having children?
Has learning about these people changed your level of interest in genetics?
Would you like to have your genome sequenced?
If your answer to the above question was yes, how much would you consider to be a reasonable amount to pay for the sequencing?