

Dr. Reichler's Bio 309D Take-Home #2 Due 4/5/11 at 8:00am in class Print your name here: KEY

1. You are in charge of developing a new chemotherapy drug. I do not want you to tell me about a drug that you looked up. There are many chemotherapy drugs. I want you to come up with an idea for a new drug. A drug that does not exist. This should be a drug to treat cancer, not for prevention. You will be describing a drug that does not yet exist, but it should be realistic and your description should clearly describe how it will work. Backing up your assertions with reliable citations will help convince us that you have come up with a realistic and reasonable answer. Answer the following questions: How will you treat cancer without killing the patients? What will your drug do to treat cancer? How will it eliminate the cancer cells? What are the potential side-effects? (15 pts)

The answer needs detail how the drug will kill cancer cells while not doing undue harm to the patient. Possibilities would be inhibiting telomerase, anti-angiogenesis drugs, adding negative cell cycle regulators like p53, etc.

One example of a good answer: This drug will inhibit the action of telomerase. Since telomeres are shortened during DNA replication, for a cell to divide many times, it needs to express the telomerase protein to add telomeres. This drug will inhibit the telomerase protein thereby limiting how many times the cancer cells can divide. Most adult cells do not express telomerase, so the drug should not kill healthy cells. Some cells, notably gametes, do express telomerase. So side effects may include problems with fertility and inhibition of cell division in skin, stomach lining, etc.

2. Would you vaccinate your daughter against the HPV virus? Why or why not? What if your insurance did not cover it, and you had to pay the \$360 out of pocket? Support your answer with facts. (10 pts) *Answer needs to include clear rationale for the decision. For 'yes' this could include the benefit of protection from cervical cancer with the low risk of complications from the vaccination. For 'no' this could include the low risk of getting cervical cancer compared to the risk or expense of the vaccination.*

One example of a good answer: Yes. Even though cervical cancer is a rare type of cancer, the risks of serious complication are extremely low. About 1,500 serious reactions have been reported from over 33 million HPV vaccines given (<http://www.cdc.gov/vaccinesafety/vaccines/hpv/gardasil.html>). If I could afford the vaccination, I would pay for it. But since cervical cancer is rare, if paying for the vaccine was a serious financial burden, I would forgo the vaccination.

3. HIV is a serious problem, especially in sub-Saharan Africa. What would be the most effective method to prevent new HIV infections in sub-Saharan Africa? There may be many possible schemes to limit HIV transmission, but I want you to pick the best. In your analysis include both the probability of success as well as the cost. (5 pts)

Answers will include a thorough analysis of the chances of success as well as the cost of the preventative measures. Answers may include: Developing a vaccine, although much money has already been spent with little success. Sex education, but they need to explain how this will have more success than it has had, and how they will overcome cultural reluctance. Education of women, which is inexpensive and can significantly reduce age of first sexual activity as well as increase women's security. Increased access to safe-sex, which has had limited success like sex-education.

4. Track what you eat for a day, and compare what you ate to the USDA food pyramid. How close did you get to the "ideal" combination of foods for your age, gender, and activity level? Estimate the number of calories that you consumed. Would eating closer to the recommended food pyramid increase or decrease your caloric intake? Be certain to cite your sources. (10 pts)

Answer will include a list of foods eaten, and how those foods fit the food pyramid, as well as whether changing their diet to more closely conform to the food pyramid will increase or decrease their caloric intake.