

**Dr. Reichler's Bio 301L Take-Home #3 Due 4/28/11 in class Print your name here: KEY**

This take-home will be 40 points of your 100 point exam 3. I expect that this test will consist only of your work. Do not discuss this test with anyone else until after the in-class exam. If you have any questions, ask Stuart or Sonya. You may use any outside written material that you wish, but you may not receive/give help to or from anyone else. If you use written material beyond your class notes to answer a question, be certain to cite the source. Any specific information that is not common knowledge should be cited.

Answer each question as concisely as possible. Fully answer the questions, but extra information that does not directly pertain to your answer will not help, and additional incorrect information will cause points to be deducted. The answers must be printed; hand-written papers will **not** be accepted.

1. Nutrition is related to many aspects of life. Connect **three** specific nutrients to sensing and responding to the environment. What are the nutrients, and what role does each nutrient play in sensing and/or responding to the environment?

A) Answer this question for humans, and include foods where you would find each of the nutrients that you use. (9 pts)

*Many possible answers. 2 points for the nutrient and its role in perception, signaling/integration and/or responding to the environment. 1 point for the food where this nutrient can be found. Each nutrient needs to be clearly and directly connected to sensing and/or responding. Examples: Calcium is needed to make bones for muscles to pull against and found in cruciferous vegetables. Sodium is needed for the depolarization of neurons and found in table salt. Amino acids/protein are needed to form the actin and myosin for muscle contraction and found in legumes.*

B) Answer this question for plants. (6 pts)

*Many possible answers. 1 point for the nutrient and 1 point for its role in perception, signaling/integration and/or responding to the environment. Each nutrient needs to be clearly and directly connected to sensing and/or responding. Examples: Nitrogen is needed to make amino acids to make the receptor proteins. Potassium is needed for stomata opening and closing. Phosphorous is needed to make DNA that codes for the proteins involved in producing hormones like systemin.*

2. In some species males are significantly smaller than females. Why? (10 pts)

*Many possible answers. Answers need to include the species and a reasonable, likely cited, rationale for why males are smaller/females are larger. Examples: Spiders- males need to 'bridge' using their silk to move and find the females. So smaller males have been shown to be more mobile.*

3. Genetically modifying people involves the addition, deletion, or alteration of genes in people. If someone was to offer you the chance to modify one of your genes: What gene would you modify, and would you add a new gene, delete a gene you have, or alter a gene? What benefits would you expect from this change? What risks would you consider before making a final decision? (15 pts)

*Answer needs to include: The gene, with citation, and how it is being changed (5 pts). The benefit to be derived from this change (5 pts). The risk of wither this specific change or of genetic modifications (5 pts). Examples: DNA polymerase. I would alter the DNA polymerase gene to make fewer errors thereby reducing mutations and the risk of cancer. The risks would include reduced genetic diversity in humans due to fewer mutations, but this could also increase the risk of cancer if the newly inserted version, inserted via a virus, disrupted a gene whose protein controls cell division. Amylase- I would delete the salivary amylase gene thereby reducing the availability of simple sugars to my digestive system and allowing me to eat more food and absorb fewer calories. The risk would be the lack of calories in a situation where food was scarce.*

Please sign here as a promise that the work included in this exam is entirely your own:

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