**Biology 36 Quiz #2 Spring 2011**

Answer in the exam book provided. Good luck!

**1. Clinical studies** (34 points)

**A.** (8 points each, total 16) For the two clinical studies described below, (1) state what type of study it is, and (2) in a sentence or two, describe one or more advantages and disadvantages of this kind of clinical study.

(i) To test the possibility that taking aspirin reduces heart attacks, a large group of people volunteered to take one aspirin a day for a long period of time. This group was followed up over many years and the incidence of heart attacks in the group was compared to the incidence of heart attacks in a similar-sized group who didnt take aspirin each day.

(ii) To see whether drinking alcohol during pregnancy leads to reduced birth weight in babies, the mothers of low birth-weight babies in a certain hospital were asked about their alcohol use during their pregnancy, and this was compared to the alcohol use reported by a group of mothers who gave birth to normal-weight babies in the same hospital.

**B.** (18 points) Minocycline is one standard treatment for arthritis, but its effectiveness is variable in different people with arthritis, so pharmaceutical companies are trying to develop better drugs. A new drug called maxprofit went through phase I and II trials successfully and is ready for testing in an experimental (interventional) study. The study design was as follows: Physicians who treat arthritis patients were asked to divide their patients taking minocycline randomly into two groups using a randomization method of their choice. They will give one group maxprofit, and continue the other group on minocycline. Patients would be required to give permission to participate. They were given unlabelled pill vials so the patients were blind to the drug they were taking. After a set period of time, the physicians rated the severity of each patients arthritis symptoms.

Identify two major problems with this experimental design, explain in a paragraph why each is problematic, and say what should be done instead.

**2. Molecular basis of disease** (34 points)

Identify a molecular defect or change in a protein associated with either (A) Alzheimers disease or (B) Huntingtons disease. (If you gave a presentation on one of these diseases, you must choose the other disease for this question.) In a paragraph, describe what causes the molecular change in the protein.

**3. Motor control circuitry** (32 points)

Motor control involves two circuits that connect the motor cortex with deep brain structures.

* Draw a diagram of the direct pathway, labelling each structure and indicating whether each synaptic connection in the circuit is excitatory (+) or inhibitory (-). If you use abbreviations for the structures in your diagram, be sure to define them in words somewhere in your answer..
* Separately draw the indirect pathway, again indicating excitatory and inhibitory connections.
* Explain the overall effect of each pathway on motor cortex excitability in terms of the sequence of synaptic connections in the pathway.