

## Zoology 470 - Quiz #1 – 2009 – Key (answers in bold)

This quiz has **2 pages**, with **8 questions** and is worth a total of **8 points**. It is designed to test basic knowledge about molecular techniques used in developmental biology.

Use the accompanying answer sheet to enter your answers for the following multiple choice questions. There is **one** right answer for each question. Please make sure you enter your student ID number on the answer sheet.

1. Which of the following techniques provide information about the relative abundance of **RNA** in a tissue sample?

- a. Northern blotting** b. Immunoblotting c. Immunostaining d. a & c e. b & c

2. You are studying the expression of the *Oct4* protein in a mouse embryo. Which of the following techniques could result in a **decrease** in expression of *Oct4* **protein**?

- a. RNA mediated interference (RNAi) against the *Oct4* RNA  
b. Production of an *Oct4* "knockout" mouse by homologous recombination  
c. Production of an otherwise normal mouse containing a wild-type *Oct4* transgene  
**d. a & b**  
e. All of the above

3. You prepare a tissue sample from a mouse embryo and place it under a microscope. Which technique would you use to identify in which cells of an early mouse embryo *Oct4* **protein** is normally expressed?

- a. Indirect immunostaining**  
b. Northern blotting  
c. In situ hybridization  
d. Southern blotting  
e. none of the above

4. You are in Olivier Pourquie's lab, and discover that somites at a particular stage of development express 57 genes at higher levels than somites at a slightly later stage. Which technique did you use to discover this?

- a. Southern blotting  
b. DNA sequencing  
c. Northern blotting  
**d. DNA microarrays**  
e. none of the above

5. Studying **cDNA** is useful because

- a. It reflects the kinds and abundance of mRNAs present in a tissue sample  
b. It contains the regulatory DNA that affects expression of a gene  
c. It lacks introns, which complicate studying genes  
d. a & b are reasons cDNA is useful  
**e. a & c are reasons cDNA is useful**

6. "Forward genetics" involves which of the following?
- a. Screening for interesting phenotypes in the offspring of parents in which mutations have been induced
  - b. It differs from "reverse genetics", because the molecular identity of the gene is not known initially
  - c. It involves making "knockouts"
  - d. a & b**
  - e. All of the above statements are incorrect
7. The polymerase chain reaction (PCR) is useful because
- a. It can amplify DNA from extremely small amounts of starting material
  - b. It can be used to amplify specific DNA sequences
  - c. It is used to make RNA from a DNA template
  - d. a, b & c
  - e. a & b**
8. Morpholino antisense oligonucleotides are useful because
- a. They usually result in reduction in the level of DNA containing a particular gene
  - b. They usually result in reduction of the level of mRNA transcribed from a particular gene
  - c. They usually result in reduction in the level of protein encoded by a particular gene**
  - d. a, b, & c
  - e. b & c