

Sample questions from Topics 1

1. You want to examine the expression levels of a gene. Which of the following techniques could you use?

- a) restriction enzyme mapping
- b) PCR of genomic DNA
- c) Southern blot analysis
- d) Northern blot analysis
- e) More than one of the above

2. Which of the following molecular techniques/reactions directly involves DNA ligase?

- a) PCR
- b) dideoxy nucleotide sequencing
- c) Southern blotting
- d) DNA cloning
- e) More than one of the above



3. After cutting DNA, which of the following enzymes is used to join the ends of two DNA fragments?

- a) restriction endonucleases
- b) RNA polymerase
- c) DNA gyrase
- d) DNA ligase
- e) Helicase

4. Which of the following is a DNA palindrome?

- a) 5'-AATGCCCCGTAA-3'
3'-TTACGGGGCATT-5'
- b) 5'-AATGCCGGCATT-3'
3'-TTACGGCCGTAA-5'
- c) 5'-AATGCCAATGCC-3'
3'-TTACGGTTACGG-5'
- d) 5'-CCUGAAUUACGG-3'
3'-GGACUUA AUGCC-5'
- e) None of the above

5. Which of the following enzyme(s) is/are required in a Sanger's DNA sequencing reaction?

- a) RNA polymerase
- b) DNA polymerase
- c) Restriction endonuclease
- d) DNA ligase
- e) More than one of the above



Longer answer questions

1. The following is an mRNA sequence encoding a very short polypeptide.

5'- GUAGAUGUUAGAUC CAUAGAU AUGAGAAGUAA CAAGUGUCUAGUGAUAAUAAAAA-3'

Based on this sequence





a. How many amino acids does this sequence encode? Hint, on the sequence identify the codons, beginning with the initiation codon, which encode the peptide, by putting a line between adjacent codons.

b. Write out a 7 nucleotide primer (in 5' to 3' format) for the first strand cDNA (excluding the polyA tail)

c. What is the name of the first Amino Acid in this polypeptide?

2. A hypothesis put forth by Dr Krell is that the level of myosin is higher on a per cell basis in a murine cardiac cell line compared to in a murine muscle cell line. Assuming you are growing both cell lines in culture, a fully functional molecular biology laboratory and you have anti myosin antibodies, describe how you would test that hypothesis.

3. Below are five descriptions of material covered in class. To the right is an empty cell. Enter the appropriate term in the cell next to the descriptions

1. The process whereby mRNA is made using a ssDNA template	
2. A process that uses cytoplasmic ribosomes	
3. The full generic name of enzymes which recognize palindromic sequences in dsDNA and cleave the DNA at that location	
4. The process involved in duplicating the DNA in a cell prior to cell division	
5. The process whereby a 5 methyl guanosine is attached to the 5' end of a primary transcript in the nucleus	