

VTMB Genomics Midterm
March 8, 2001

- 1). Compare and contrast the difference between an orthog and a paralog. (6 pts)

- 2). List the seven steps (in order) that need to be taken to perform a phylogenetic analysis. (10 pts)

- 3). Compare and contrast the similarities and differences between Type I and Type II restriction endonucleases. (6 pts)

- 4). Compare and contrast the essential features of BAC, YAC, and Cosmid vectors. (6 pts)

- 5). How many sequence runs are needed to achieve a 10 fold coverage of human chromosome 1 which is 225 MB long. (6 pts)

- 6). You are planning to screen a mouse genomic library to obtain the gene for alkaline phosphatase. You have in hand 1 kb of the gene sequence for the human homolog which you estimate is 75% identical to the mouse version. Please define the hybridization conditions that you will use for this screen. (10 pts)

- 7). Please define the activity of each enzyme and where it is used in molecular biology. (12 pts)
 - a) RNase H

 - b) Bovine DNase I

 - c) MMLV polymerase

 - d) E. coli Ligase

- 8) List all the ways that DNA is metabolized. (6 pts)

- 9). Compare and contrast the differences between euchromatin and heterochromatin. (6 pts)
- 10). Distinguish between a local alignment and a global alignment and then explain why BLAST uses a local alignment to identify similar sequences. (6 pts)
- 11). What is the difference between sequence homology and sequence identity? (6 pts)
- 12). BLAST uses a substitution matrix to define sequence similarity. How are substitution matrices derived? What is the difference between a BLOSUM62 matrix and a BLOSUM45 matrix? (8 pts)
- 13). BLAST uses values for S, P and E to describe the similarity between two sequences. Define S, P and E. (6 pts)
- 14). Distinguish between "blastp" and "tblastp". (6 pts)