Module 6: Alternative Splicing

Answer Sheet

Q1. Given that exons are shown by the black boxes, and introns are shown by thin lines with arrowheads in the FlyBase Genes track, what does this tell us about the first intron of tra-RB compared to that of tra-RA?

Q2. Given what you know about the initiation of translation, which of the 3 possible reading frames is used for both the tra-RA and tra-RB products?

Q3. Give the coordinate for the last base of the first exon for tra-RA.

Q4. Give the coordinate for the last base of the first exon for tra-RB.

Q5. What is the consensus sequence for the 5’ splice site (donor site)?

Q6. What are the coordinates for the 5’ splice site in tra-RA?

Q7. What are the coordinates for the 5’ splice site in tra-RB?

Q8. What is the phase at this splice site?

Q9. What are the coordinates for the first base of the second exon in tra-RB?

Q10. What is the consensus sequence for the 3’ splice site?

Q11. What are the coordinates for the 3’ splice site in intron 1 of tra-RB?

Q12. What phase do we anticipate?

Q13. Given this, what is the reading frame for tra-RB exon2?

Q14. Does this make sense, given the location of stop codons?

Q15. What are the coordinates for the first base of the second exon in tra-RA?

Q16. What is the consensus sequence for the 3’ splice site?

Q17. What are the coordinates for that sequence in intron 1 of tra-RA?

Q18. Given the phase at the donor site, what phase are we looking for here?

Q19. Given this, what is the reading frame for tra-RA exon 2?

Q20. Does this make sense, given the location of stop codons?

Q21. Look back at Module 5, **Q17**. Using the coordinates you’ve written in your answer to that question, calculate the number of amino acids in the protein translated from tra-RA. Do this by calculating the size of each exon, added the sizes of all exons together, and dividing by 3 (the number of bases in a codon). _____

Q22. Write down the coordinates for exon 1.

Q23. Looking at exon 2 of tra-RB, is the entire second exon translated or is there a stop codon within the exon? _____

Q24. Write down the coordinates for the translated portion of exon 2.

Q25. How many amino acids does the protein translated from the tra-RB isoform have?

Q26. Is it likely that the protein translated from tra-RB could play the same functional role played by the protein translated from tra-RA?

Use what you learned in Module 5 to construct a gene model for tra-RB. Locate the start codon, splice sites, and the stop codon. Construct the gene model below.

Q27. Coordinate for start of translation: _____

Q28. Coordinate for last base of exon 1: _____

Q29. Coordinate for first base of exon 2: _____

Q30. Coordinate for last base of exon 2: _____

Q31. Coordinate for first base of exon 3: _____

Q32. Stop codon coordinates: _____