

Chapter 4 Review questions

1. How is it possible that our 25,000 genes are able to produce the hundreds of thousands of proteins made by the body?
2. In humans, missing a whole chromosome is lethal, except for the X and Y chromosomes. Why is it possible to have extra or missing sex chromosomes and not suffer the same terrible consequences of having abnormal numbers of autosomes ?
3. a. The following shows a very short DNA sequence. Write, underneath the sequence, the amino acids that would be coded for by this sequence, assuming triplets start with TAC

TACAAAACCTTACAGCAGAACTAATT

- b. Rewrite the sequence showing a triplet repeat expansion of the codon for valine

1. Ans:

Alternative splicing – an RNA transcript from a gene may be spliced and rejoined in different combinations which will then be translated into different proteins. Far removed from the original ‘one gene – one protein’ concept originally thought to be true

2. Ans:

Extra X chromosomes can be inactivated in the same way the second X is in female cells. Since normal female cells function with essentially only one active X, having a missing second sex chromosome does not produce terrible consequences either. The Y chromosome is not essential to life since females function well without it. It is also a very small chromosome with very few functional genes, so having extras is also without dire consequences.

3. Ans:

- a. Start (methionine) phenylalanine leucine asparagine valine valine phenylalanine aspartic acid Stop
- b. TACA AAAACTTACAGCAGCAGCAGAACTAATT (any number of CAG>2 is good)