**Review Worksheet ANSWERS DNA, Alleles and Genes**

1: Where in a human tissue cell can DNA be found?

(1 mark)

*Most DNA is in the nucleus (0.5), and some in the mitochondria (0.5).*

2: How many chromosome pairs do most humans have?

(1 mark)

*23 pairs*

3: What are the four bases involved in the genetic code? How do they pair up?

(3 marks)

*Adenine (A) (0.5) and Thymine (T) (0.5) pair (0.5)*

*Cytosine (C) (0.5) and Guanine (0.5) (G) pair (0.5)*

4: RNA does not contain Adenine. What does it use instead?

(1 mark)

*Uracil (U)*

5: What are genes?

(5 marks)

*Genes are long sequences of DNA that code for production of a protein (1). Each set of three bases (triplet) (1) codes for an amino acid (1). These amino acids are assembled in sequence (1) to form proteins (1).*

6: What does the mRNA do?

(4 marks)

*mRNA (messenger RNA) takes a complementary (0.5) copy (0.5) of a section of the DNA strand (0.5), then moves out of the nucleus (0.5) to the ribosomes (0.5) where it is used as a template (0.5) to assemble amino acids (0.5) to make proteins.(0.5)*

7: What does the tRNA do?

(2 marks)

*tRNA (transfer RNA) carries amino acids (0.5) to the ribosomes (0.5), so the ribosomes can assemble them into proteins (0.5) using the mRNA template (0.5).:*

8: What functions can the proteins produced from genes perform in the body?

(3 marks)

*Proteins produced can form structural material for cells (1), control rate of chemical reactions (0.5) as enzymes (0.5), and control aspects of membrane transport (0.5) as protein channels and/or receptors (0.5).*

9: What is an allele?

(1 mark)

*An allele is a variant of a gene.*

10: How many alleles does a human being inherit for each gene, and who are they inherited from?

(2 marks)

*A human being inherits two alleles (0.5) (possible variants) for each gene (0.5). One is inherited from the person’s mother (0.5), and the other from the person’s father (0.5).*

11: Can a person have two of the same allele for a given gene? Explain your answer.\*

(2 marks)

*Yes (0.5). Sometimes a person will inherit two of the same allele (0.5), and sometimes two different alleles (0.5) for a given gene. It depends what alleles their parents have (0.5).*

12: Approximately how many genes are in the human genome?

(1 mark)

*Around 30 000 genes.*

13: Is each trait coded for by a single gene? Explain your answer.

(3 marks)

*No (1). Some traits are coded for by a single gene (0.5) – for example dimples (0.5). Most traits are coded for by a complex combination of genes (0.5) – for example hair colour (0.5).*

14: What is a karyotype?

(1 mark)

*A karyotype is a picture of the full set of chromosomes in a cell.*

15: List and describe 5 modes of disease transmission.

(10 marks)

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| **Mode of Transmission** | **Definition** |
| *Contact (1)* | *The disease is caught by touching the affected person (0.5), or touching something they have touched. (0.5)* |
| *Transfer of body fluids (1)* | *The affected person’s body fluids (0.5) come into contact with the blood or mucous membranes of another person. (0.5)* |
| *Droplet/airborne/aerosol infection (1)* | *Pathogens in droplets of mucous (0.5) become airborne during sneezing or coughing (0.5) and are breathed in by people nearby. (0.5)* |
| *Ingestion (1)* | *Pathogens enter the body by being ingested (0.5) in food or drink (0.5)* |
| *Vector Transmission (1)* | *Pathogens are transmitted using another organism (0.5) as a carrier (0.5).* |