1. BrainProt™ serves as an integrated and streamlined knowledge repository rooted in omics research, focusing on the human brain and its related disorders.

   Clink on this link and then go to the `Brain Disease Marker Curator (BDMC)` and then on the Disease Table. When considering the combined score, what is the gene name for the highest-ranking marker associated with Ataxia–telangiectasia?

   (a) RAD50
   (b) CHEK1
   (c) ATM
   (d) BRCA1

   Answer: (c)

2. Sagarika's project focuses on understanding the role of a pivotal protein A in the pathobiology of lung cancer in Humans. The FASTA sequence for this protein is given below. Find out the name of the protein. (Hint: BLAST the FASTA sequence to find out the name, here is the link for BLAST tool)

   `im4.png`

   (a) Pyruvate carboxylase
   (b) Lactate dehydrogenase A chain
   (c) Human epidermal growth factor receptor 2
   (d) Cellular tumor antigen p53

   Answer: (b)

3. Betty has normal vision, but her mother is color blind. Bill is color blind. If Bill and Betty marry and have a child together, what is the probability that the child will be color blind?

   (a) 1

(b) $\frac{1}{4}$
(c) $\frac{1}{2}$
(d) $\frac{2}{3}$

Answer: (c)

4. Sex-related disorders are inherited in families via one of the X or Y chromosomes. The chromosomes X and Y are sex chromosomes. When a defective gene from one parent causes disease, even when the matching gene from the other parent is normal, this is called dominant inheritance. The aberrant gene takes precedence.

   (a) It would appear that an X-linked recessive gene would

      i. Equally express in males and females
      ii. Generation-skipping
      iii. Only express in homozygous recessive condition in female
      iv. Lethal

      Answer: (ii), (iii)

   (b) In a family of four, apart from the impaired son, who has a normal mother, a normal father, a colorblind son, and a normal son, who do you believe possesses the defective X gene?

      i. The mother
      ii. The father
      iii. The normally developing son
      iv. The affected son alone

      Answer: (i)

   (c) Which of the following is not true if colorblindness is a dominant trait?

      i. It would be expressed in heterozygous females.
      ii. It would be expressed in males.
      iii. It would skip a generation.
      iv. It would never skip generations.

      Answer: (iii)

   (d) What is the probability that a colorblind father's son will also be colorblind?

      i. 0

ii. 0.25

iii. 0.5

iv. 1

Answer: (i)

5. A man who has color blindness and type O blood has children with a woman who has normal color vision and type AB blood. The woman's father had color blindness. Color blindness is determined by an X-linked gene, and blood type is determined by an autosomal gene.

   (a) What are the genotypes of the man and the woman?

   i. Man - $X^cYI^AI^B$, Woman - $X^cXI^0I^0$

   ii. Man - $X^cYI^0I^0$, Woman - $X^cXI^AI^B$

   iii. Man - $X^cYI^AI^0$, Woman - $X^cX^CI^AI^B$

   iv. Man - XYI^0I^0 , Woman - $X^cXI^AI^B$

   Answer: (ii)

   (b) What proportion of their children will have color blindness and type B blood?

   i. 0

   ii. 0.25

   iii. 0.5

   iv. 1

   Answer: (ii)

   (c) What proportion of their children will have color blindness and type A blood?

   i. 0

   ii. 0.25

   iii. 0.5

   iv. 1

   Answer: (ii)

   (d) What proportion of their children will be color blind and have type AB blood?

   i. 0

   ii. 0.25

iii. 0.5

iv. 1

Answer: (i)

6. Let's assume that allele **B** encodes blue color petals in a plant and allele **b** encodes white color petals in the plant. If this plant is found to have a genotype **Bb** and is also found to have both blue and white color petals, then what kind of relationship is exhibited by the alleles of this gene?

   (a) Complete dominance

   (b) Incomplete dominance

   (c) Co-dominance

   (d) Semi-dominance

   Answer: (c)

7. The base that is not found in RNA is:

   (a) Adenine

   (b) Thymine

   (c) Cytosine

   (d) Guanine

   Answer: (b)

8. What constitutes the 5' and 3' ends of a DNA?

   (a) Phosphate and Base

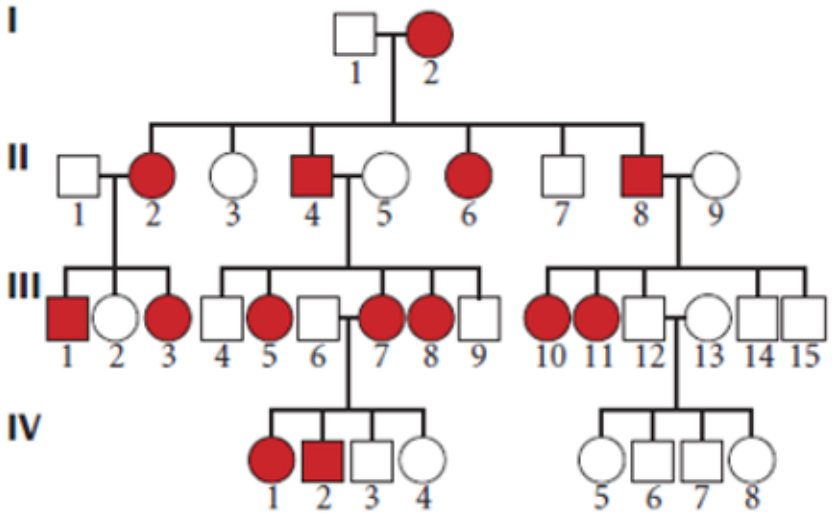
   (b) Phosphate and -OH group

   (c) -OH group and base

   (d) Base and sugar

   Answer: (b)

9. Guess the mode of inheritance.



(a) X-linked dominant

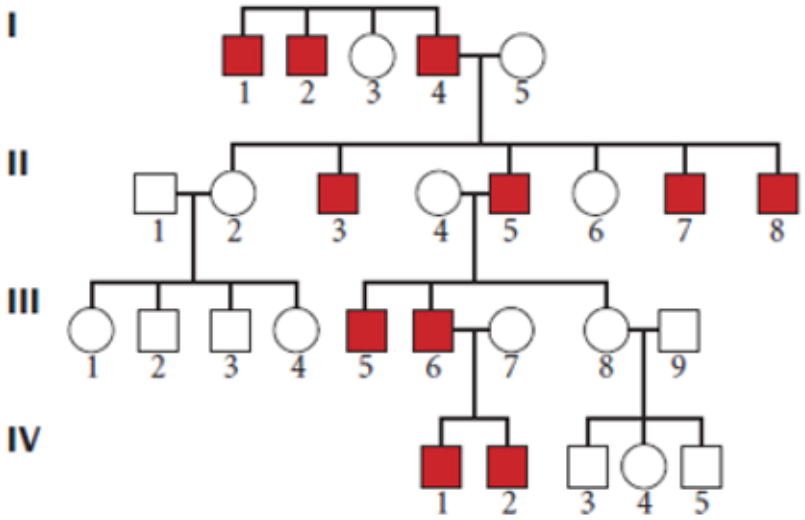
(b) Autosomal recessive

(c) X-linked recessive

(d) Y-linked

Answer: (a)

10. Guess the mode of inheritance.



(a) X-linked dominant

(b) Autosomal recessive

(c) X-linked recessive

(d) Y-linked

Answer: (d)