

Identifying Reasoning

1. Choose the best reasoning to complete the argument below.

Observation Two light tan mice had a baby mouse pup with dark brown fur.

Question How did light parents produce a pup with dark fur?

Claim In at least one of the parents' gametes (reproductive cells), mutation of the MC1R gene generated a new allele that caused the mouse pup to have dark fur.

- Evidence**
- Genetic testing showed that the two light-colored mice are definitely the parents of the dark-colored pup.
 - DNA sequencing revealed that the mouse pup has an allele of the MC1R gene that causes more black pigment to be made in the fur.
 - Neither parent has a copy of this dark MC1R allele.

Which of the following statements provides the **best reasoning** to justify why the evidence supports the claim?

- a. Mutation is a natural process that generates genetic variation.
- b. DNA is passed from parents to offspring so that each offspring gets half of their genetic information from their father and half from their mother.
- c. The dark MC1R allele is dominant to the light MC1R allele.
- d. Since offspring inherit DNA from their parents, if neither parent carried the dark MC1R allele, mutation in a parent's sex cell must have generated the allele.
- e. Mutation happens when errors are made in copying the DNA, sometimes as a result of environmental causes.

2. Complete the argument: Match the evidence to the relevant reasoning.

Claim: A disease in rats is caused by having an allele of the C gene called C².

EVIDENCE	(connect the dots)	REASONING
No healthy rats have the C ² allele.	<input type="radio"/>	<input type="radio"/> If a single copy of the C ² allele causes the disease, then diseased rats will always have at least one copy of the C ² allele. A
Every rat with the disease has at least one copy of the C ² allele.	<input type="radio"/>	<input type="radio"/> If a single copy of the C ² allele causes the disease, then putting the C ² allele into rats with normal C alleles will give them the disease. B
When a C ² allele is put into rat embryos whose parents had only normal alleles of the C gene, the embryos have the disease when they grow up.	<input type="radio"/>	<input type="radio"/> If a single copy of the C ² allele causes the disease, then healthy rats will never have the C ² allele. C

3. a. Use the information below to fill in the table.

Observation Some dogs have curly hair, and others have straight hair.

Question Does the K gene influence hair texture in dogs?

Claim Having at least one K^C allele causes curly hair in dogs.

(Check the appropriate box)

EVIDENCE	Supports claim	Does not support claim	
		Not related to claim	Opposes claim
All dogs have two alleles of the K gene.			
All dogs with a K ^C allele have curly hair.			
No dogs with straight hair have a K ^C allele.			
Some dogs have wavy hair.			

b. For one piece of evidence that supports the claim, **provide the reasoning** that connects the evidence to the claim.