

Creature Feature
 Simulating Protein Synthesis



BACKGROUND

In this investigation, you will simulate the mechanism of protein synthesis and thereby determine the traits inherited by your Creature. The Creature is made up of eight genes – A, B, C, D, E, F, G, H – each of which is responsible for a certain trait. We are assuming you are the parents of The Creature and are heterozygous for all the traits. Each partner will flip a coin to determine the traits.

DIRECTIONS

1. Determine the gender of your offspring. Which partner determines this?
2. Each partner flips for one of the provided DNA sequences of Gene A. Heads passes on the dominant allele. Tails passes on the recessive allele.
Record each parents' DNA strand on your answer sheet along with the complementary strand.
3. Using the **original DNA** sequence of the gene, model the process of **transcription** to create the appropriate mRNA sequence.
Record each parents' sequence of mRNA.
4. Using your mRNA sequence, determine and model the tRNA sequence (part of **translation**).
Record each parents' tRNA sequence.
5. Using the genetic code from the textbook, identify the codons of the mRNA & determine the corresponding amino acid sequence (part of **translation**).
Record each parents' Amino Acid Sequence
6. Using Figure 1, match the Amino Acid sequence to its appropriate allele.
Record each parents' Allele on answer sheet.
7. **Record the genotype of the creature for gene A.**
8. Using figure 1, determine and **Record the phenotype and the type of inheritance for this trait.**
9. **REPEAT STEPS 2 THROUGH 8 WITH OTHER GENE DNA SEQUENCES.**
10. **Create** the 8th trait. Use the same number of bases to transcribe and translate. Record the DNA, complementary strand, the mRNA, the tRNA, and the amino acid sequence.
11. **Draw a colored, labeled diagram of** your creature using the inherited traits that it was determined it to have.

Gene A			Gene B		
ACCGGAAGA	or	ACCGGATAT	TGCCACCAT	or	TGTCATGTG
Allele A		Allele a	Allele B		Allele b
Gene C			Gene D		
AGACGT	or	AGATCA	GGTAGAAAACCC	or	GGCTCGTTGCCG
Allele C		Allele c	Allele D		Allele d
Gene E			Gene F		
GTCGAG	or	TTCGAA	GGGCGCCGT	or	GGCCGTACA
Allele E		Allele e	Allele F1		Allele F2
Gene G			Gene H -youcreate		
GCTTCCTCT	or	GCTGCGTTG		or	
Allele G		Allele g	Allele		Allele