

Explore: Modeling Transcription/Translation

PROCESS AND PROCEDURES

1. Part of the room will be partitioned off as “the nucleus”. The DNA with the gene to be decoded will be in the nucleus.
2. The person selected to be the **RNA polymerase** will take the loose magnetic “nucleotides” found in the nucleus near the DNA and use those to create a polymer of mRNA on the magnetic board using the DNA as a template.
3. The person designated as the **mRNA** will then bring the mRNA sequence (on the magnetic board) out of the nucleus to the two people designated as **the ribosome**.
4. A number of students will have been designated by the teacher to play **tRNA molecules**. They will have anti-codon labels on their shirts and be retrieving amino acids (mini-white boards) and bringing them to the ribosome. The tRNA molecules must be careful to only handle the specific amino acid they are designed for.
5. One of the two students playing **the ribosome** will then look for the start sequence on the mRNA to begin translation of the mRNA into a protein. If there is no start sequence, then there will be no protein.
6. This first ribosomal student will then take the amino acid from the tRNA and pass it to the second ribosomal student.
7. The first student looks for the next anti-codon (found on the tRNAs) that is complementary to the next codon (3 letter code) in the mRNA.
8. That tRNA then brings over their amino acid to the ribosome. The second ribosomal RNA student then chains the new amino acid to the previous amino acid (white boards back to back) using the carabineers.
9. The previous tRNA molecule leaves at this point to go get another amino acid, and the first ribosomal RNA student looks for the next complementary tRNA anti-codon to match the mRNA sequence.
10. This process repeats until a stop codon is reached at which time the protein is finished.

ANALYSIS

Write the following questions in your notebook and answer them using complete sentences.

1. What two jobs does the person playing the RNA polymerase have?
2. Where in the cell do we find the RNA polymerase? What type of molecule is the polymerase (for example: carbohydrate, lipid)?

ANALYSIS (cont.)

Write the following questions in your notebook and answer them using complete sentences.

3. Name the three types of RNA involved in making proteins and describe what each of their jobs is.
4. What are the three polymers involved in protein synthesis? What monomer is each of these made of?
5. What is the relationship between the DNA and the mRNA? What is the relationship between the mRNA and the protein?