



Central Dogma Card Sorting Activity

INTRODUCTION

Hemophilia is a rare genetic disorder in which the blood does not clot properly because it lacks sufficient blood-clotting proteins. The disease is caused by mutations in a gene on the X chromosome. Because males typically have only one X chromosome, to inherit the disease, they only need to inherit one copy of the mutated gene, whereas females with two copies of the X chromosome must inherit two copies of the mutated gene. Symptoms of the disease vary but generally include excessive internal and external bleeding. Currently, there is no long-term cure, and many patients receive infusions of blood-clotting proteins. Because the disease is caused by mutations in the DNA, scientists think that they could someday treat it by intervening in the steps that occur from DNA to protein production. This flow of information represents the way most genes are expressed in eukaryotic cells and is also referred to as the central dogma of molecular biology. How would knowledge of the central dogma help find a treatment for hemophilia?

Working in small groups or alone, you will place cards with drawings of cellular molecules in the order in which the steps occur in eukaryotic gene expression, labeling all names and molecules as instructed. Then, answer the questions that your instructor assigns.

QUESTIONS

1. A genotype is the complete genetic makeup of an individual, whereas a phenotype is all observable characteristics of the individual. Because genes direct the production of proteins and proteins are responsible for an individual's observable characteristics, genotypes control phenotypes.

The final card in the series shows a mature protein. Proteins can play several different cellular functions, as shown in the figure below. Using prior knowledge, describe a specific role each type of protein performs for the cell and provide an example of an actual protein (e.g., lactase). Write your answer next to each picture.



