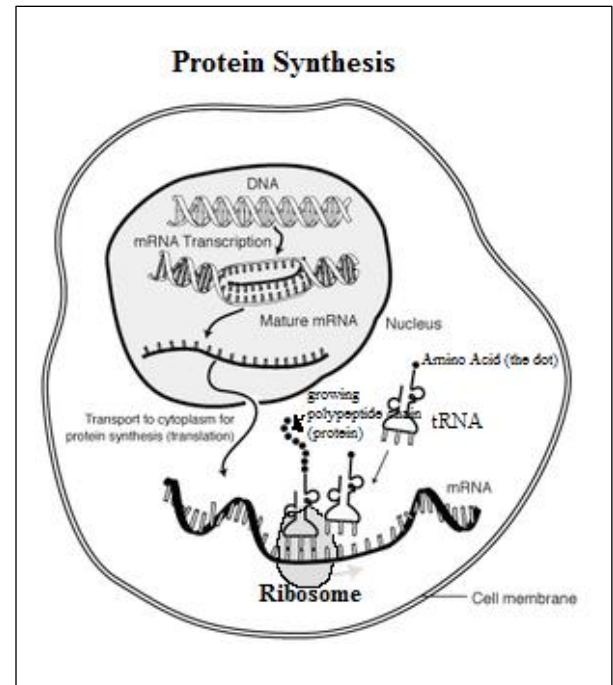


Lab: Modeling Protein Synthesis – Wildcat A

Introduction: Today our classroom is made up of different eukaryotic cells found within a new species discovered in League City. It was named *Clearcreekus wildcatorum*. This cell, like ALL cells, is always busy synthesizing various proteins. You will be working with a partner to simulate the process that builds these proteins for your cell. This process is called **protein synthesis**. Protein synthesis involves two steps: transcription and translation.

1. **Transcription:** A small portion of **DNA** called a **gene** unzips to expose the nitrogen bases. The DNA strand is used as a template to make a **messenger RNA (mRNA)**. mRNA was created with the enzyme RNA polymerase. The pre-mRNA is then edited within the **nucleus**. The introns are removed and the exons are joined together to create a mature mRNA. mRNA leaves the nucleus through a nuclear pore and enters the cytoplasm.
2. **Translation:** In the cytoplasm, a ribosome attaches to the mRNA. Every 3 bases on the mRNA are a **codon** which codes for a specific amino acid. Another RNA molecule known as **transfer RNA (tRNA)** brings an **amino acid** to the mRNA. The tRNA has three bases, known as an anti-codon, that form a temporary bond with a codon on the mRNA. A specific amino acid is attached to a tRNA with a specific anti-codon. As the tRNA anti-codon attaches to the mRNA codon, amino acids are linked together to build a **polypeptide chain**. The chain of amino acids will continue to be made until a stop signal is received. This polypeptide chain is released and folds itself up. A **protein** is now formed.



Data

| Gene # 1 | | T | A | C | C | A | A | G | T | G | A | C | G | A | T | T |
|--------------------------------|--|-------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mature messenger RNA (mRNA) | | _____ | | | | | | | | | | | | | | |
| Transfer RNA (tRNA) anti-codon | | | | | | | | | | | | | | | | |
| Amino Acid Sequence | | | | | | | | | | | | | | | | |

Fill in this missing label, DNA or RNA?

Process that makes mRNA: _____

Process that creates amino acid sequence: _____

Analysis

1. Use the tables below to determine the traits of your wildcat.
2. All amino acids have 3 letter abbreviations. USUALLY this is the first three letters of the amino acid

| | |
|----------------------------|---------------------------------|
| Amino Acid Sequence | Met-Gly-Lys-Stop |
| Trait | Long fur on ears, body and tail |

| | |
|----------------------------|----------------------|
| Amino Acid Sequence | Met-Val-His-Cys-Stop |
| Trait | Long nose/snout |

| | |
|----------------------------|-----------------------------|
| Amino Acid Sequence | Met-Tyr-His-Stop |
| Trait | Long tail with dark stripes |

| | |
|----------------------------|----------------------|
| Amino Acid Sequence | Met-Gly-Lys-Cys-Stop |
| Trait | Long whiskers |

| | |
|----------------------------|--------------------------------|
| Amino Acid Sequence | Met-Met-His-Glu-Stop |
| Trait | Dark stripes and spots on body |

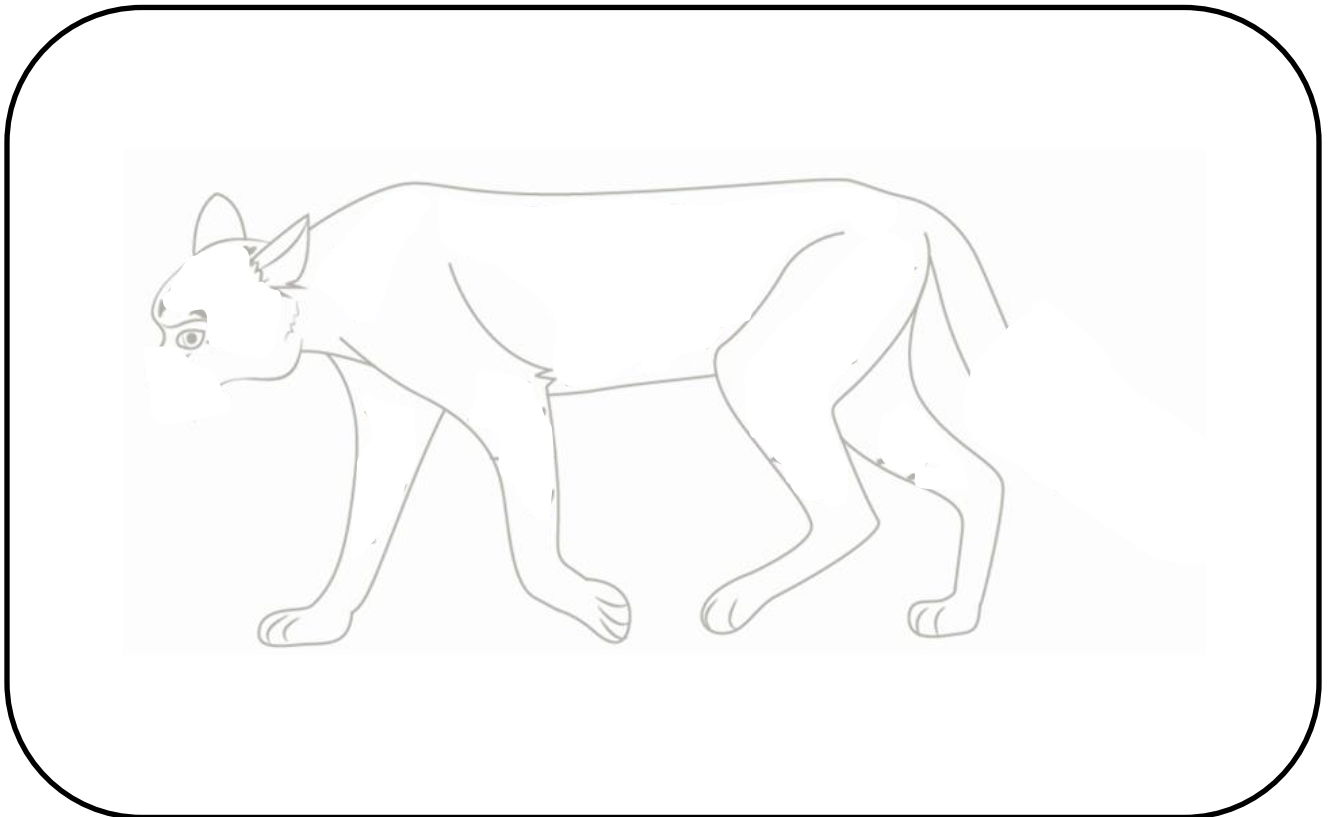
| | |
|----------------------------|----------------------|
| Amino Acid Sequence | Met-Val-Glu-Try-Stop |
| Trait | Thick sharp claws |

Identify the traits of your specific *Clearcreekus wildcatorum*.

Record the traits in the space provided.

| Gene | 1 | 2 | 3 | 4 |
|--------------|----------|----------|----------|----------|
| Trait | | | | |

Draw your *Clearcreekus wildcatorum*. Draw over the background image and add your traits. If you do not get one of the traits you should draw the opposite of that trait.



I had Wildcat A, B, C (circle one)

Name your Wildcat! _____