# **Gene expression (Transcription) and gene regulation**

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## Purpose:

* In this activity, you will be asked to think about how gene transcription is turned on, dive into some of the details of mRNA processing, and reflect on your learning of this process.
* You will be asked to query AI for the interconnectedness of specific terms about genes (DNA) and the mRNA they encode.
* You will also be asked to evaluate the response generated by AI using what you have learned from lectures and reading assignments.

Complete the following before starting this activity.

* Review these Chapter on “Gene Expression: Transcription” and “Regulation of Gene Expression” to help you to complete the assignment.
* Sign up for ChatGPT to gain access to AI.

**References:** [*Genetics, Agriculture, and Biotechnology*](https://iastate.pressbooks.pub/genagbiotech/)***,*** Chapters 5, 9

## Part 1:

1. In your own words, what is a gene? (1-2 sentences)
2. Reflect on what you do not understand or what content you have not mastered in Chapters 5 and 9 (2-3 sentences).
3. Identify and describe a strategy you can use to deepen and improve your current understanding in ways that will help you master the topic of gene expression (2-3 sentences)

Review the two columns of terms below.  Select **three terms from each column** for a total of six terms.

|  |  |
| --- | --- |
| **Column A** | **Column B** |
| TATA box | Mature mRNA |
| CAAT box | pre-mRNA |
| GC box | When the gene is expressed |
| Intron | How much mRNA is produced |
| Exon | Where the gene is expressed |
| 3’ UTR | mRNA transport |
| 5’ UTR | mRNA stability |
| Cap | Translation |
| poly(A) tail | Splicing |

1. List the six terms you selected in your response.
   1. What are the connections between the terms you have selected? Use the OER and lecture notes to create your response. Your response should be about 150 +/- 10 words.

## Part 2:

1. Use the provided prompt from your instructor to obtain a response from ChatGPT.
   1. The prompt should limit ChatGPT’s response to 150 +/- 10 words.
2. Evaluate every sentence from ChatGPT’s response.
   1. What terms and or statements provided by ChatGPT are unclear to you (1-2 sentences).
   2. Compare your own response and ChatGPT response. Identify 2 similarities or differences between your response and ChatGPT.
      1. Similarities (1-2 sentences)
      2. Differences (1-2 sentences)
3. Evaluate how this activity of comparing your response to that of ChatGPT has helped your learning process (1-2 sentences).