**20.2 Gene Expression & Protein Synthesis**

Protein:

* A long chain of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Every protein has to be coded for in DNA
* The function of a protein is dependent on its shape
  1. Uses: muscle, enzymes, hormones, cell membrane, etc

2 main stages: Transcription & Translation

* *Diagram:*

RNA – ribonucleic acid

*Comparing DNA to RNA*

|  |  |  |
| --- | --- | --- |
|  | **DNA** | **RNA** |
| **Sugar type** |  |  |
| **Bases** |  |  |
| **Structure** |  |  |
| **Location** |  |  |

Types of RNA

***mRNA***: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ – takes code from nucleus to cytoplasm; single stranded

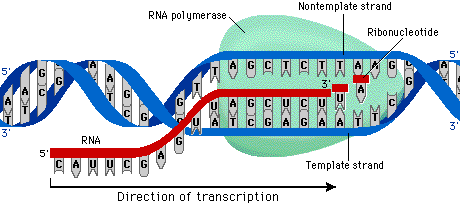
***tRNA***: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – carries specific amino acids to the ribosome (20 different tRNA molecules, each specific to an a.a.)

**mRNA codon**: a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of nitrogen bases (nucleotides)

* + - This is how DNA is “read”

**Transcription**

1. Initiation – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ binds to DNA at a specific site near the beginning of a gene (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – sequence of A & T)
2. Elongation – RNA polymerase builds single-stranded \_\_\_\_\_\_\_\_\_ in a \_\_\_\_\_\_\_\_\_\_\_ direction
   * Transcribed DNA strand = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Termination – synthesis of mRNA continues until a termination sequences is reached then mRNA disconnects
   * mRNA moves into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



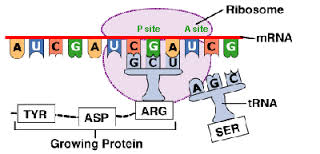
**Translation**

1. Initiation:
   * a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ binds to mRNA - 2 subunits clamp mRNA between it
   * Ribosome moves in a \_\_\_\_\_\_\_\_\_\_\_\_ direction until it finds a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Elongation:

* \_\_\_\_\_\_\_\_\_\_ with complementary to start codon attaches to mRNA
* Next in line enters the next site
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bond forms between two a.a’s
* Ribosome shifts over one codon

1. Termination:

* when a \_\_\_\_\_\_\_\_\_\_codon is reached the ribosome - mRNA complex breaks apart, releasing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[](http://www.google.ca/url?sa=i&source=images&cd=&cad=rja&docid=Oab6UfZq3kTq2M&tbnid=re7X4IsjjTd9GM:&ved=0CAgQjRwwAA&url=http://biology.about.com/library/bltranslation.htm&ei=Dl6eUueCKs6ajALSqoHQBg&psig=AFQjCNETkj007s_D-Lr3j8Rxi132vJ2zEA&ust=1386196878754321)