



## Protein Synthesis - Transcription & Translation


### Transcription


RNA, Ribonucleic Acid is very similar to DNA. RNA normally exists as a single strand (and not the double stranded double helix of DNA). It contains the same bases, adenine, guanine and cytosine. However, there is no thymine found in RNA, instead there is a similar compound called uracil.


Transcription is the process by which RNA is made from DNA. It occurs in the nucleus. Label the box with the x in it near the nucleus with the word TRANSCRIPTION and proceed to color the bases according to the key below

Thymine = orange 

Guanine = purple 

Adenine = dark green 

Cytosine = yellow 

Uracil = brown 

Color the strand of DNA dark blue (D) and the strand of RNA light blue (R). Color the nuclear membrane (E) gray.

### Translation

Translation occurs in the cytoplasm, specifically on the ribosomes. The mRNA made in the nucleus travels out to the ribosome to carry the "message" of the DNA. Here at the ribosome, that message will be translated into an amino acid sequence. Color the ribosome light green (Y) and note how the RNA strand threads through the ribosome like a tape measure and the amino acids are assembled. The RNA strand in the translation area should also be colored light blue, as it was colored in the nucleus.

Label the box with the X in the translation area with the word TRANSLATION.

Important to the process of translation is another type of RNA called Transfer RNA (F) which function to carry the amino acids to the site of protein synthesis on the ribosome. Color the tRNA red.

A tRNA has two important areas. The anticodon, which matches the codon on the RNA strand. Remember that codons are sets of three bases that code for a single amino acid. Make sure you color the bases of the anticodon the same color as the bases on your DNA and RNA strand - they are the same molecules!

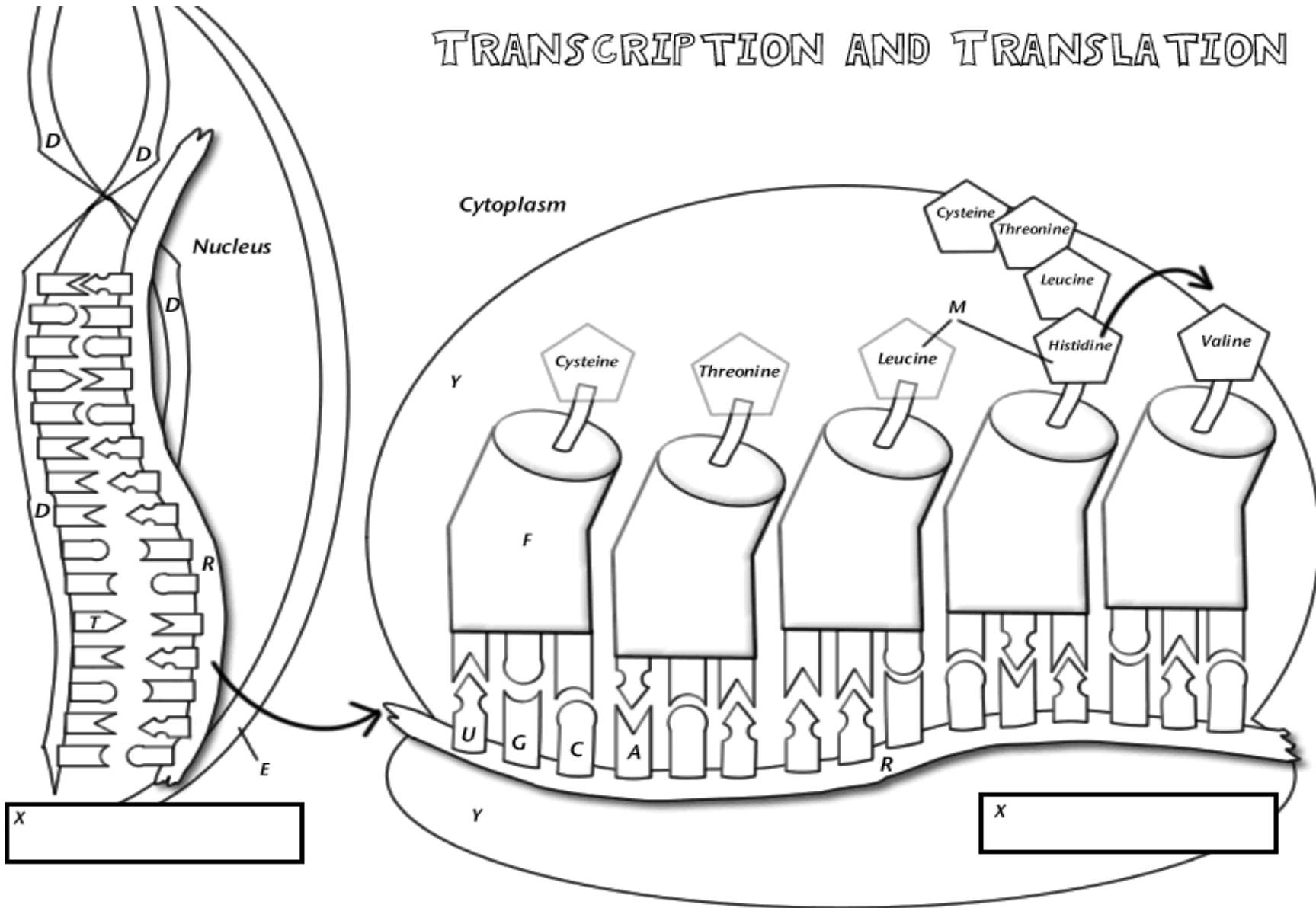
At the top of the tRNA is the amino acids. There are twenty amino acids that can combine together to form proteins of all kinds, these are the proteins that are used in life processes. When you digest your food for instance, you are using enzymes that were originally proteins that were assembled from amino acids. Each tRNA has a different amino acid which link together like box cars on a train. Color all the amino acids (M) pink.

### Questions:

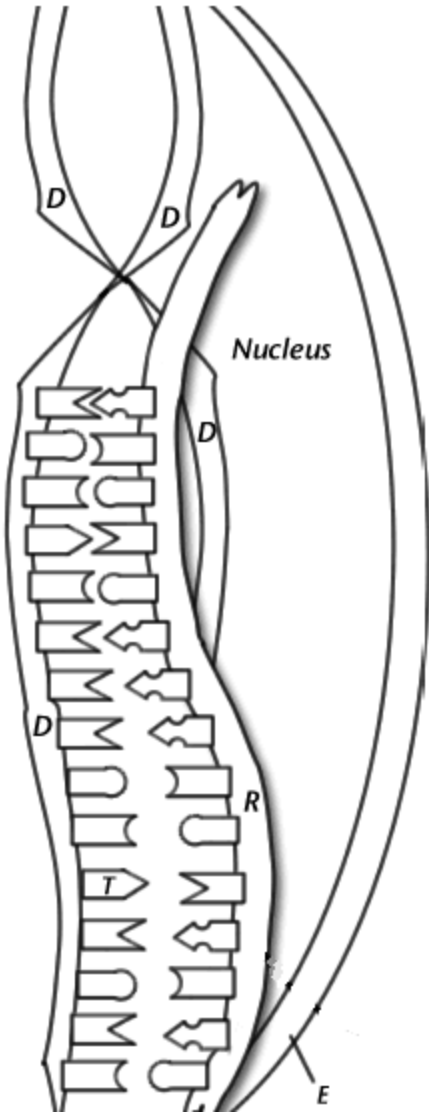
1. How many different kinds of bases can be found on DNA \_\_\_\_\_
2. What base is found on RNA but not on DNA? \_\_\_\_\_
3. How many bases are in a codon? \_\_\_\_\_ In an anticodon? \_\_\_\_\_
4. How many amino acids are attached to a single transfer RNA? \_\_\_\_\_
5. Transcription occurs in the \_\_\_\_\_; translation occurs in the \_\_\_\_\_.
6. The process of making RNA from DNA is called \_\_\_\_\_ and it occurs in the \_\_\_\_\_.
7. The process of assembling a protein from RNA is called \_\_\_\_\_ and it occurs in the \_\_\_\_\_.

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## TRANSCRIPTION AND TRANSLATION



# TRANSCRIPTION



# TRANSLATION

