

**SNC4U – Eukaryotic Gene Regulation**

Name: \_\_\_\_\_

Students at MIT are working on some genetic experiments. They have hypothesized that a certain segment of genes codes for a protein that is connected to Alzheimer's. Before they are able to test their hypothesis, they need to determine whether the segment of DNA they are looking at codes for this specific protein. With knowledge of gene regulation in Eukaryotes, they realize that there are a number of different ways that cells can regulate the formation of this protein and if they are able to control the production of this protein through external measures (like eating specific foods), maybe they can delay the onset of Alzheimer's. They have determined that the protein has the amino acids: Start-Ser-Ala-Ser-Ser-His-Ala-Phe-Arg-Thr-Stop

The scientists have narrowed down the potential segment of DNA that they think code for this particular protein to the following:

5'-CTATGTATAAACGTGGCATGCTATCGTACAATAGTCGATCGCAGAGTGTGCGTAAACCTCCTGCACT-3'

UUU	Phe	UCU	Ser	UAU	Tyr	UGU	Cys
UUC		UCC		UAC		UGC	
UUA	Leu	UCA	Pro	UAA	Stop	UGA	Stop
UUG		UCG		UAG		UGG	Trp
CUU		CCU		CAU		His	CGU
CUC	CCC	CAC	Gln	CGC			
CUA	CCA	CAA	CGA	CGG			
CUG	CCG	CAG					
AUU	Ile	ACU	Thr	AAU	Asn	AGU	Ser
AUA		ACC		AAC		AGC	
AUC	ACA	AAA	Lys	AGA	Arg		
AUG	Met/Start	ACG		AAG		AGG	
GUU	Val	GCU	Ala	GAU	Asp	GGU	Gly
GUA		GCC		GAC		GGC	
GUC		GCA		GAA	GGA		
GUG		GCG		GAG	Glu	GGG	

[http://mcmanslab.ucsf.edu/sites/mcmanslab.ucsf.edu/files/put\\_your\\_BMS265\\_images\\_here/tm\\_codons.jpg](http://mcmanslab.ucsf.edu/sites/mcmanslab.ucsf.edu/files/put_your_BMS265_images_here/tm_codons.jpg)

/15 1. Go through the transcription and translation process and identify where in the processes the DNA may be regulated. (Remember, at this point in time, they are not sure where the regulation occurs for this particular protein, so there may be more than one form of regulation used on this segment of DNA.)

/5 2. How might the scientists "turn off" this gene to help delay the onset of Alzheimer's? (Think about how genes can be regulated)