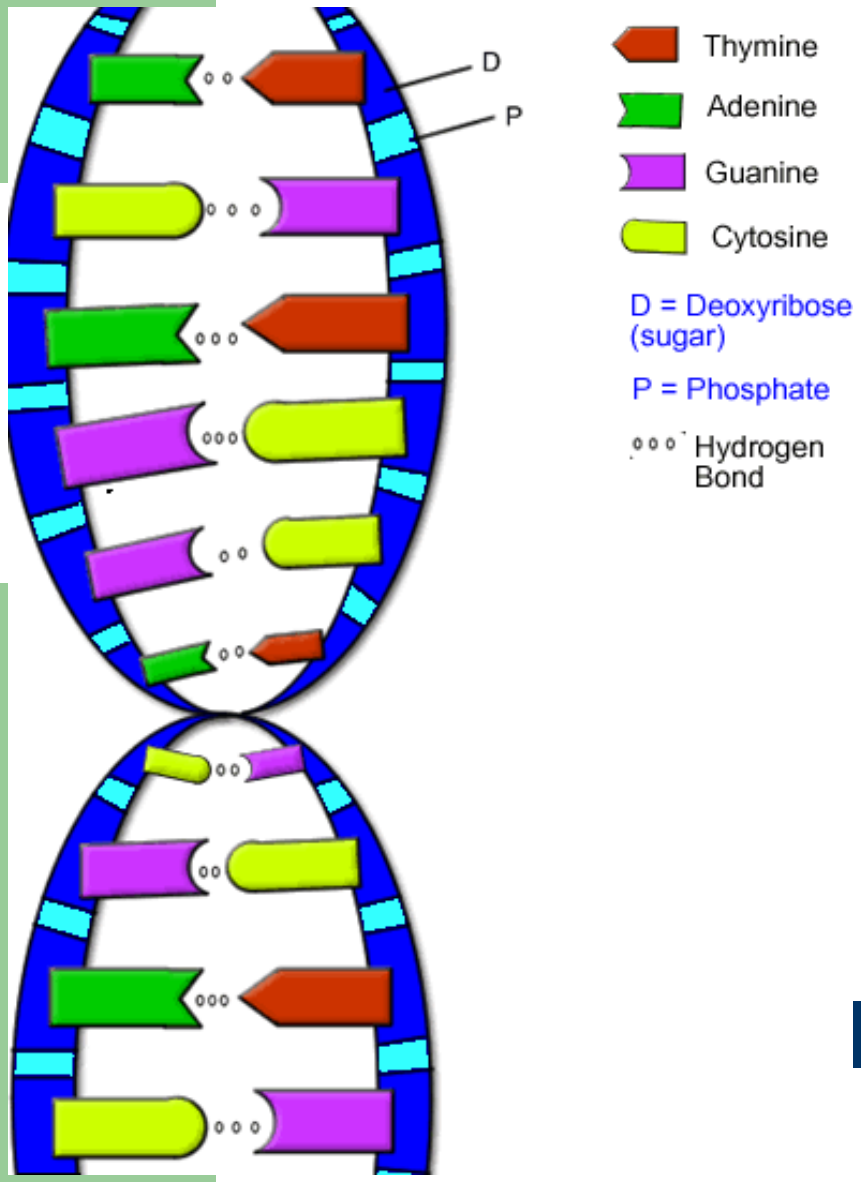
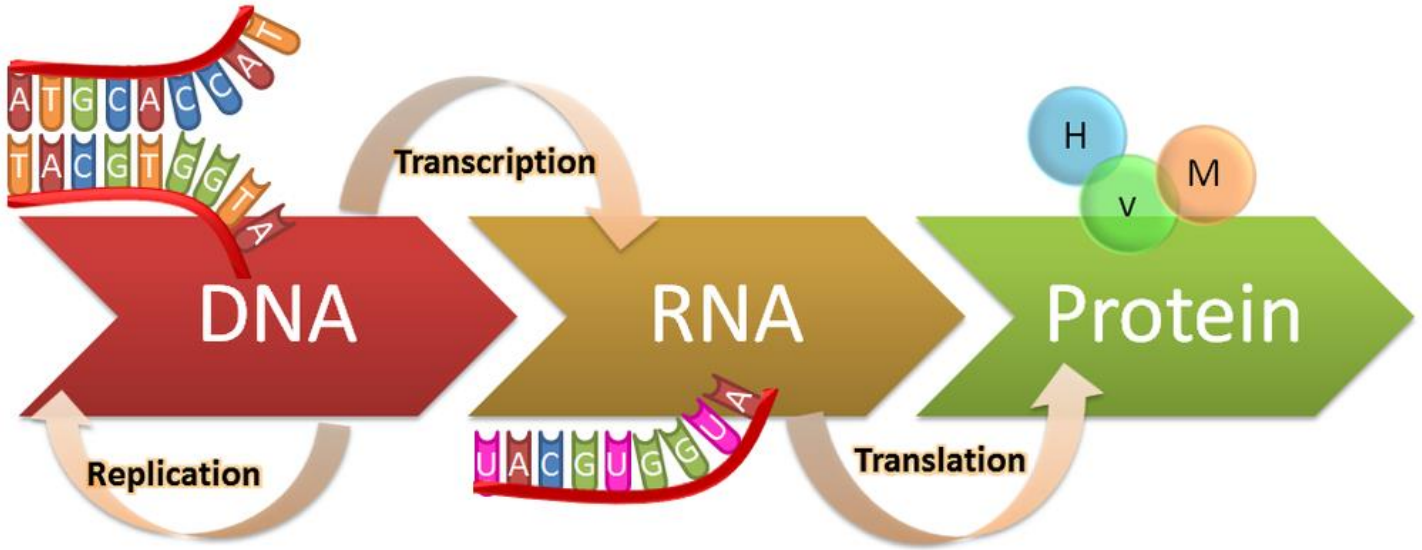
Translation



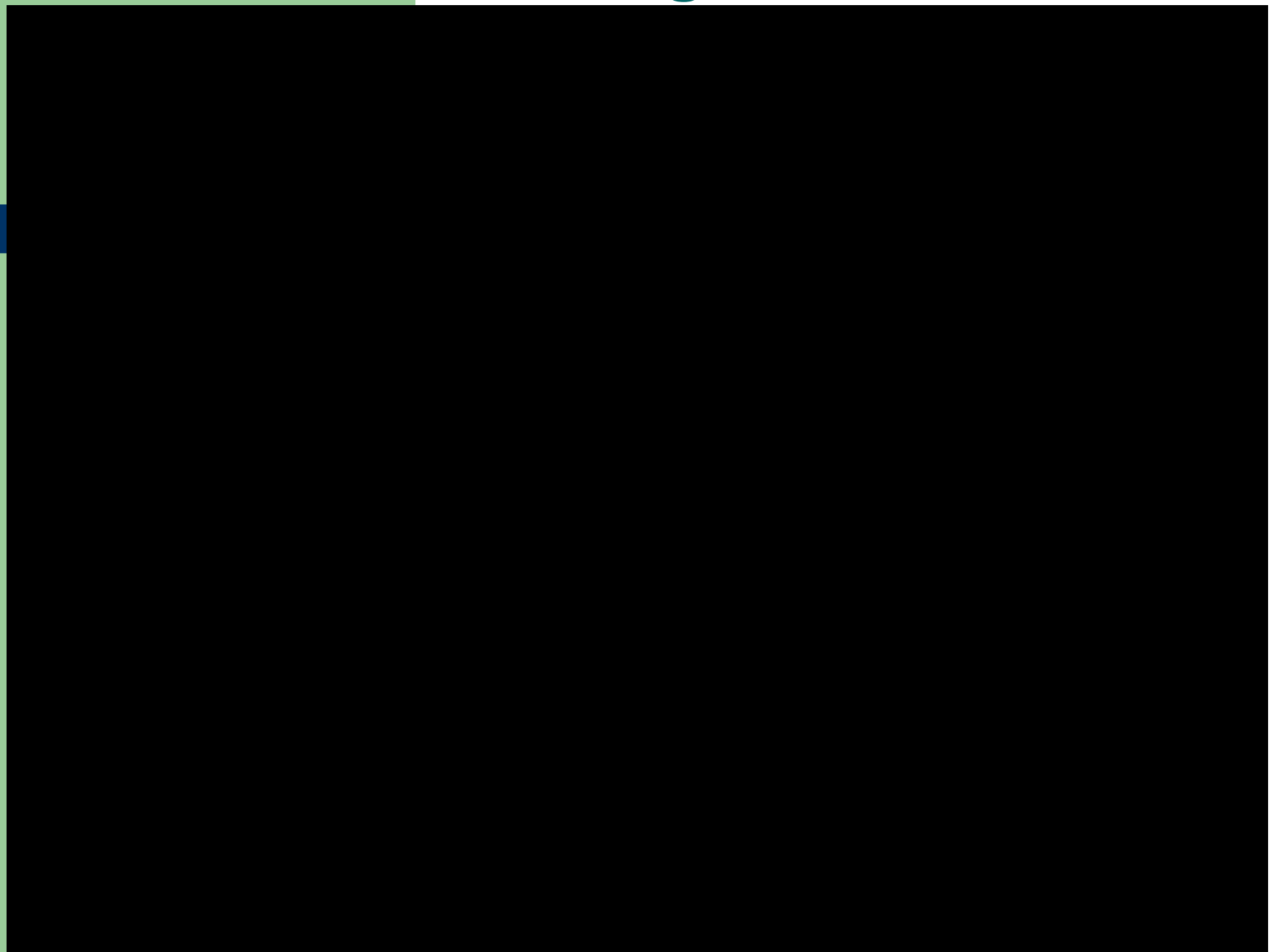
mRNA to proteins …

The Big Picture …

- The “Central Dogma” of molecular biology explains what we’re studying:



The Big Picture …

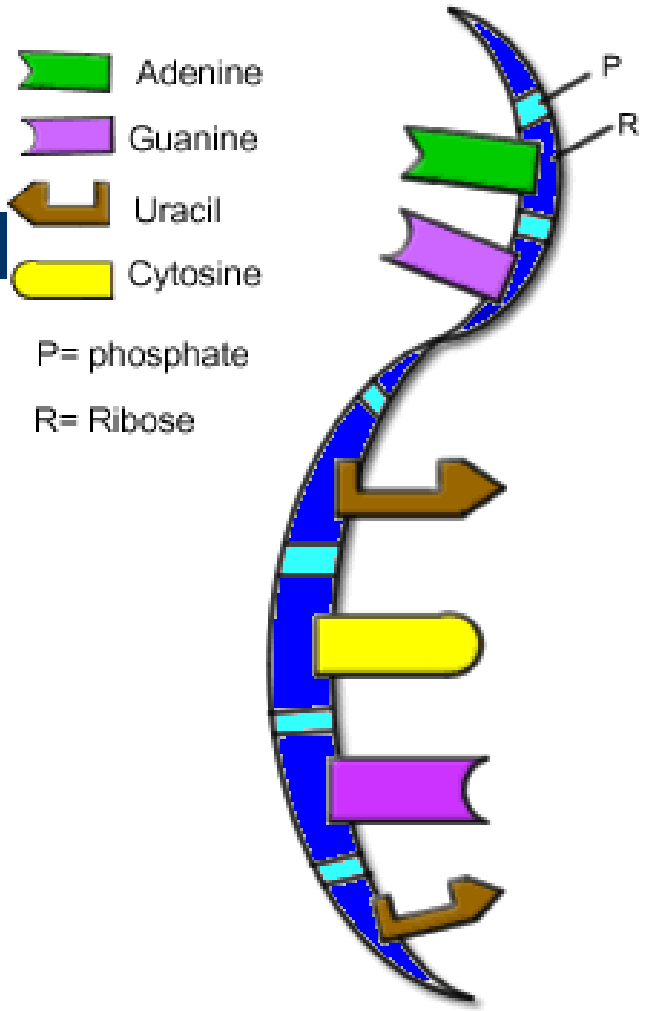


Objectives

- Students will know and be able to explain the process of DNA translation (starting with a strand of mRNA and ending with a protein)
- Students will understand how the steps of DNA translation unfold
- Students will be able to explain the roles of mRNA and tRNA in DNA translation
- Students will be able to describe what codons and anticodons are and will be able to use a table to determine which codons code for which amino acids

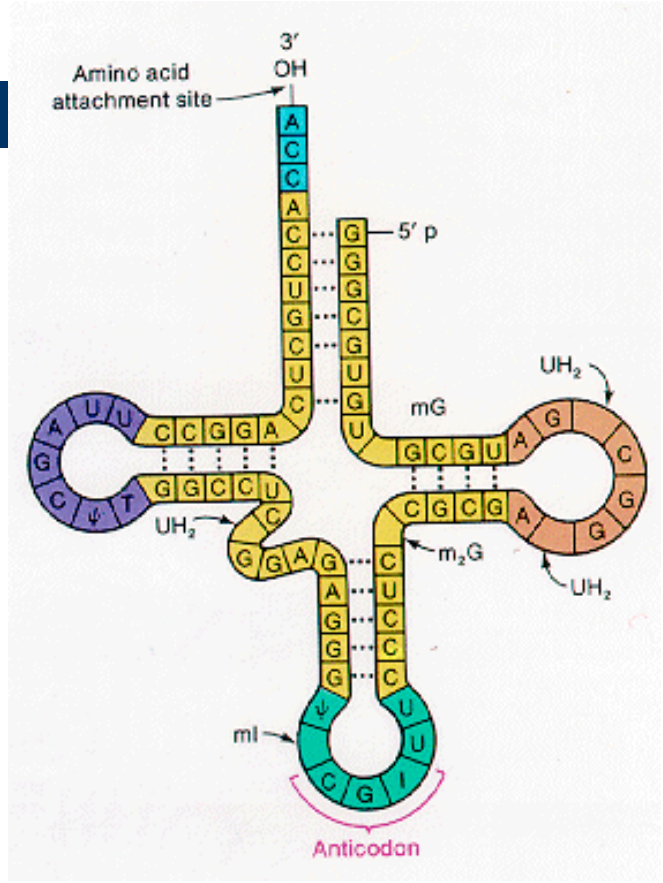
mRNA

- RNA nucleotides (sugar + base) all hooked together
- **Complementary** to transcribed DNA strand



tRNA – transfer RNA

- Nucleotides hooked together just like mRNA
- Arranged in a loopy, curved shape
- Closed end has three bases that bind to mRNA
- Three mRNA bases called “codon”
- Three tRNA bases called “anticodon”
- Open end is attached to an amino acid (building block of proteins) – each codon goes with a specific amino acid

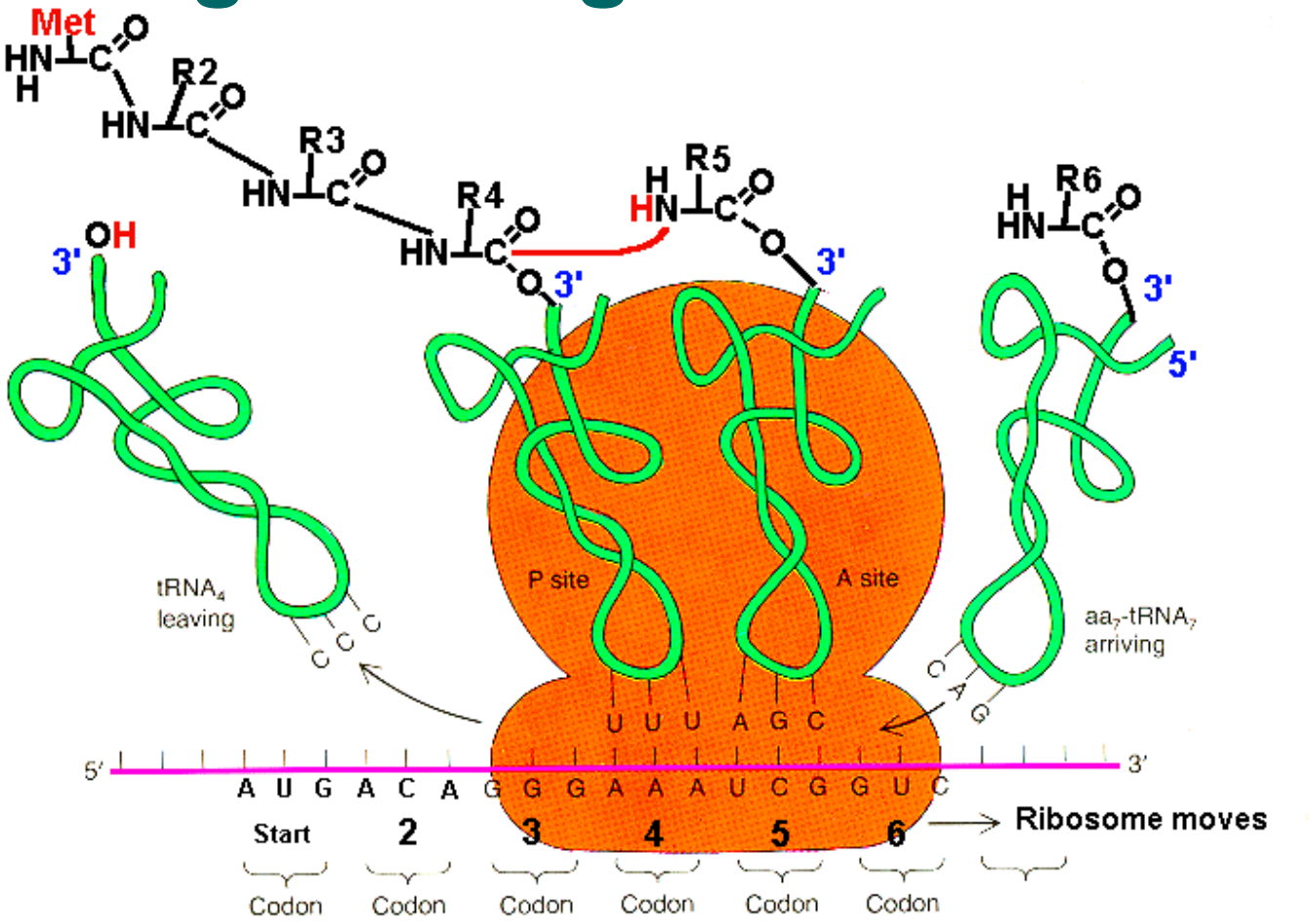


Codons

- Three base sequences – many codons stand for one amino acid
- AUG – Methionine (start)
- UAA, UAG, UGA – stop
- 20 Different amino acids

1st letter	Second Letter: U		Second Letter: C		Second Letter: A		Second Letter: G		3rd letter
U	UUU	Phe	UCU	Ser	UAU	Tyr	UGU	Cys	U
	UUC		UCC		UAC		UGC		C
	UUA	Leu	UCA		UAA	Stop	UGA	Stop	A
	UUG		UCG		UAG	Stop	UGG	Trp	G
C	CUU	Leu	CCU	Pro	CAU	His	CGU	Arg	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	Gln	CGA		A
	CUG		CCG		CAG		CGG		G
A	AUU	Ile	ACU	Thr	AAU	Asn	AGU	Ser	U
	AUC		ACC		AAC		AGC		C
	AUA		ACA		AAA	Lys	AGA	Arg	A
	AUG	Met	ACG		AAG		AGG		G
G	GUU	Val	GCU	Ala	GAU	Asp	GGU	Gly	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glu	GGA		A
	GUG		GCG		GAG		GGG		G

Putting it all together …



Modified from Griffiths et al., AN INTRODUCTION TO GENETIC ANALYSIS, 6th Ed., W.H. Freeman & Co., 1996.

Visualize …

- http://vcell.ndsu.edu/animations/translation/movie-flash.htm

“Central Dogma”