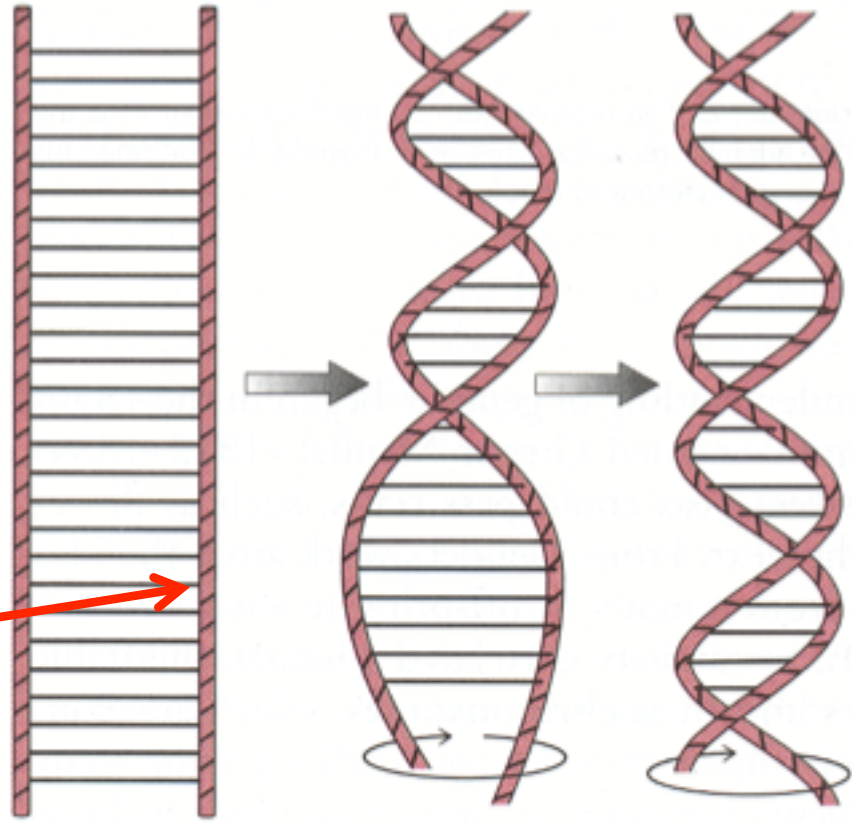
# DNA

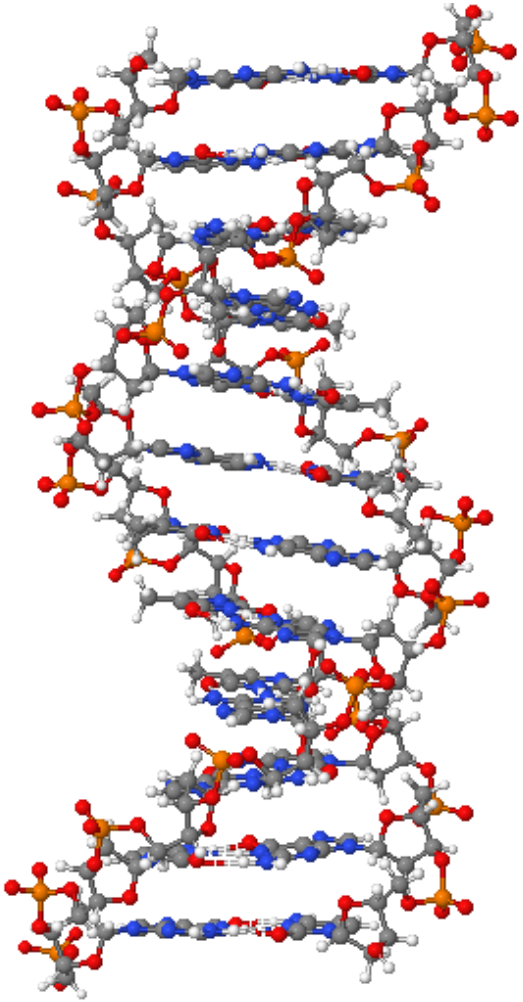
# Active Sites: DNA (Ch. 12.1-3)

DNA encodes protein formation —so, attack the DNA to prevent protein formation

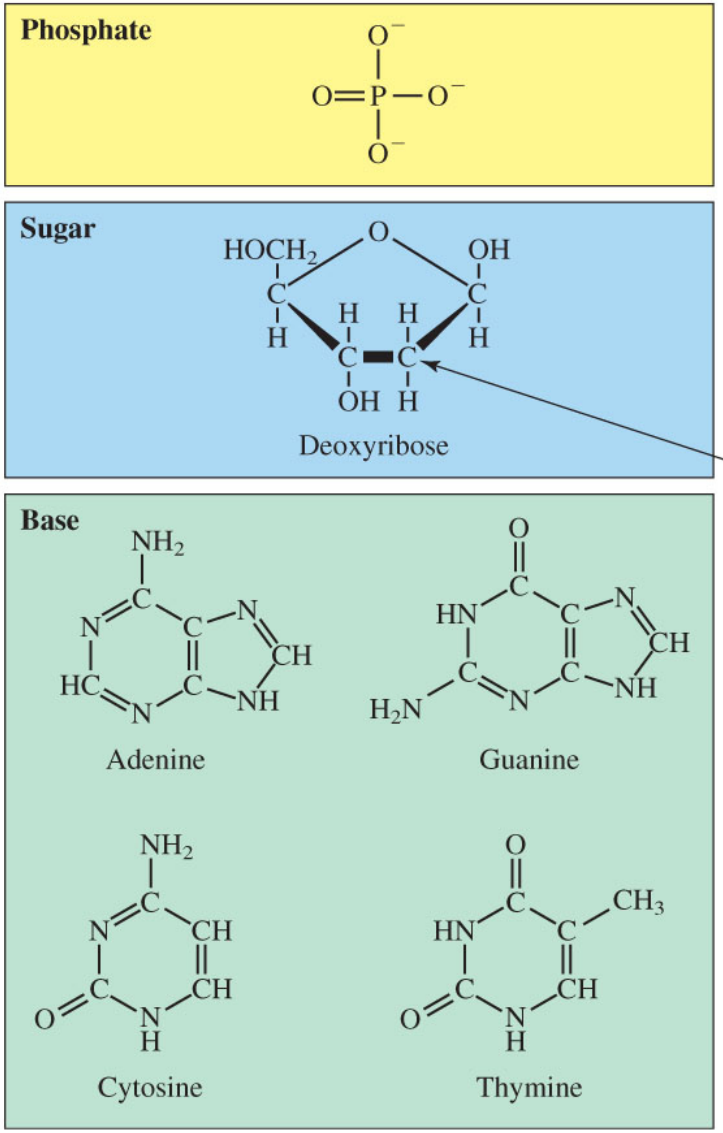



chains of nucleotides connected via phosphates

H-bonding interactions between nucleotide bases

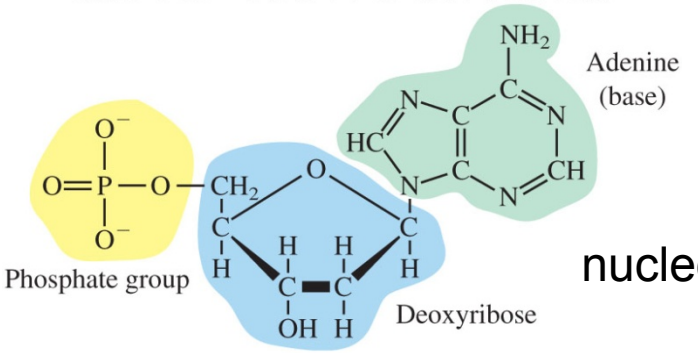


# Primary Structure of DNA

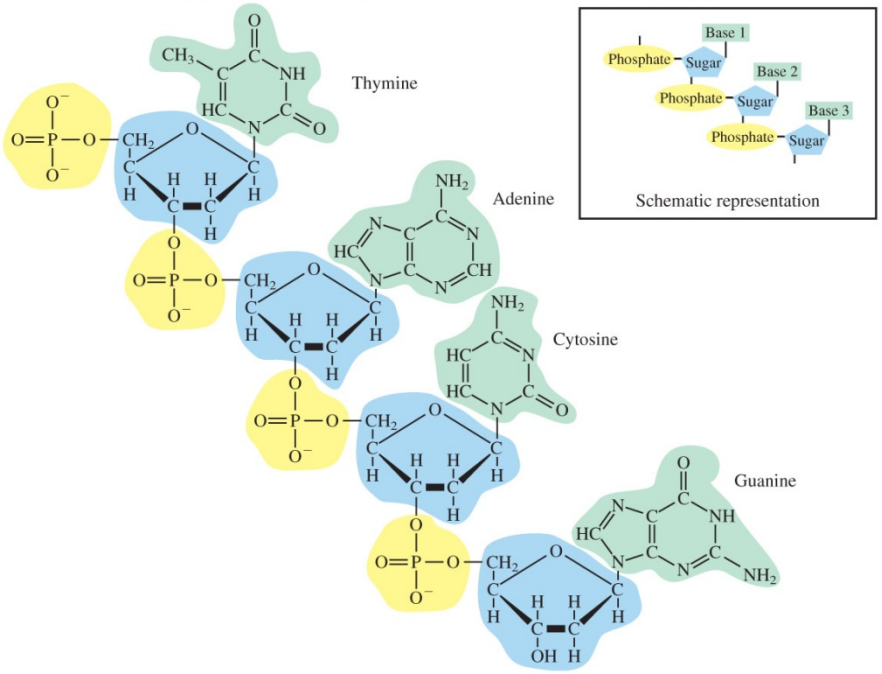



At this carbon, an —OH group has been replaced with an H atom, making it "deoxy" ribose as opposed to ribose.



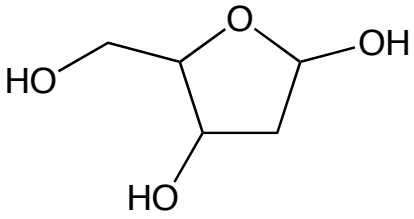



nucleotide

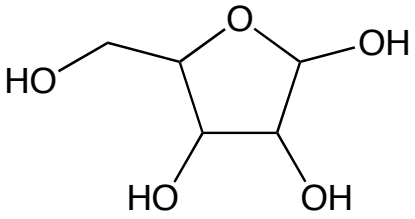


# Nucleic Acids: Polymers of Nucleotides

## Sugars

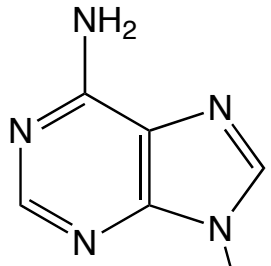



DNA sugar

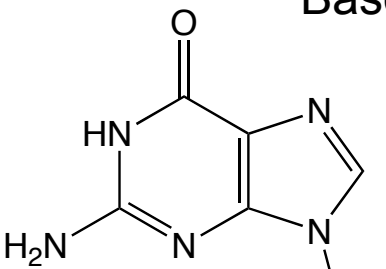



RNA sugar

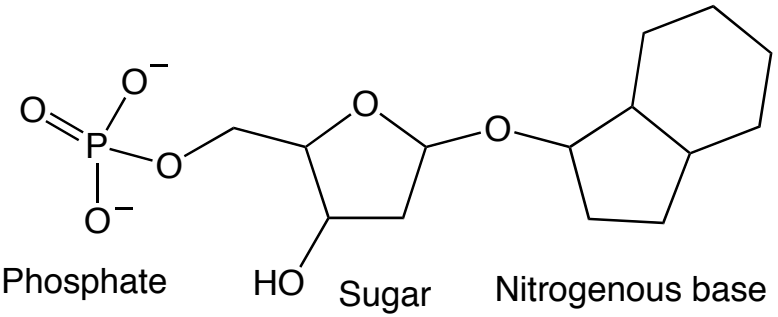
## Bases



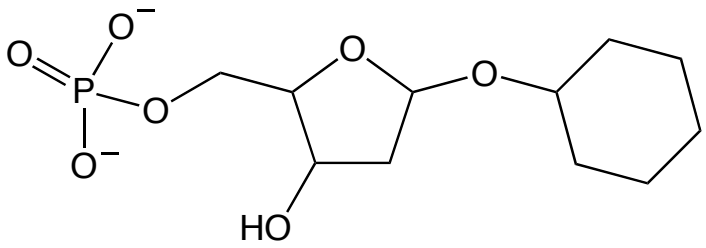

Adenine (A) Sugar

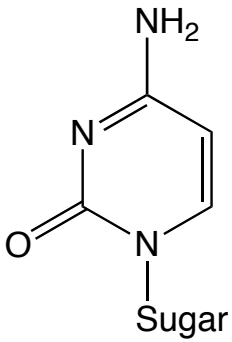



Guanine (G) Sugar

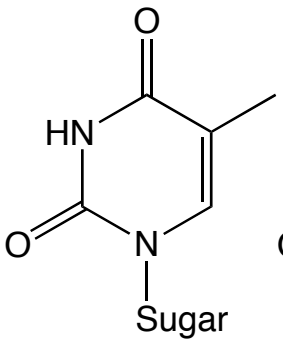



Phosphate Sugar Nitrogenous base



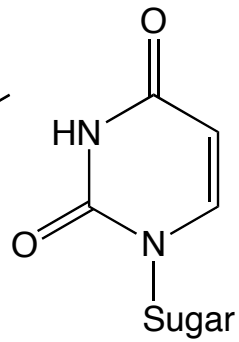




Cytosine (C)




Thymine (T)

DNA



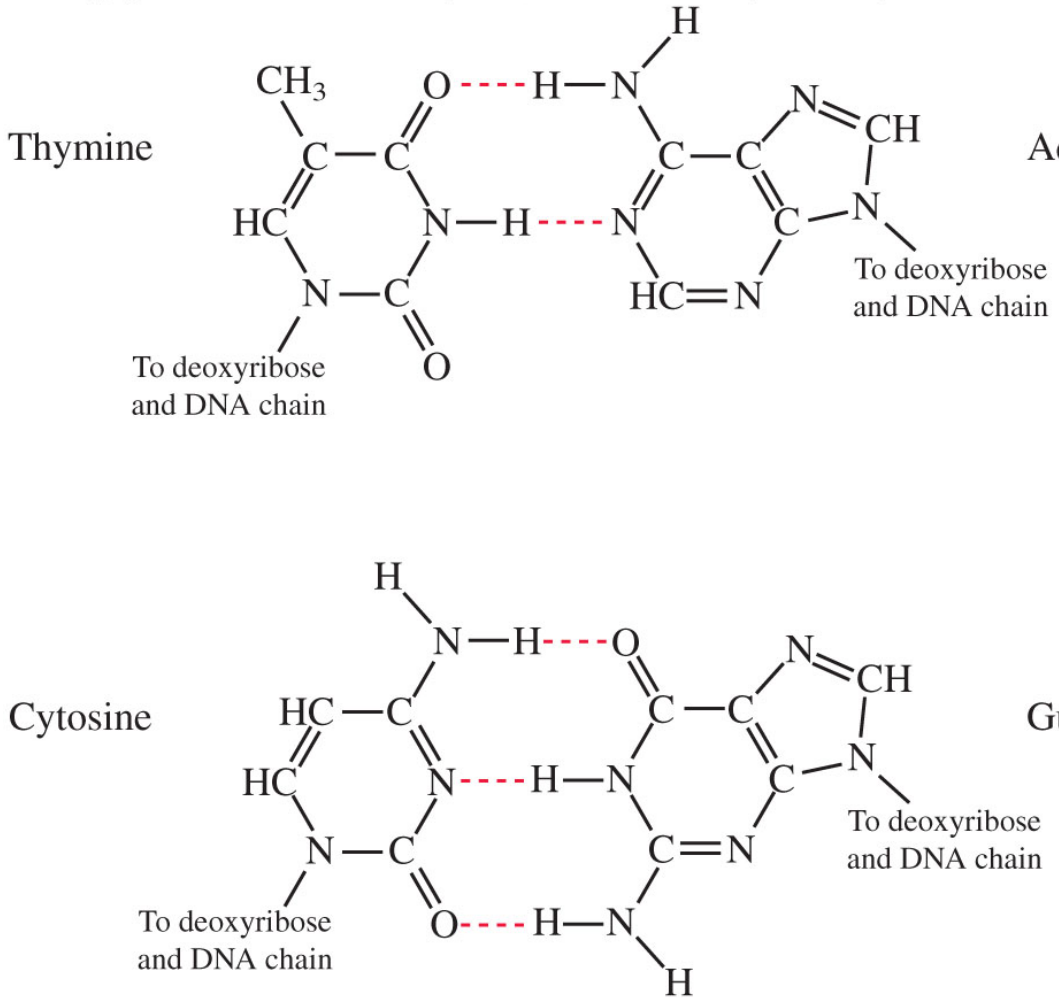

Uracil (U)

RNA

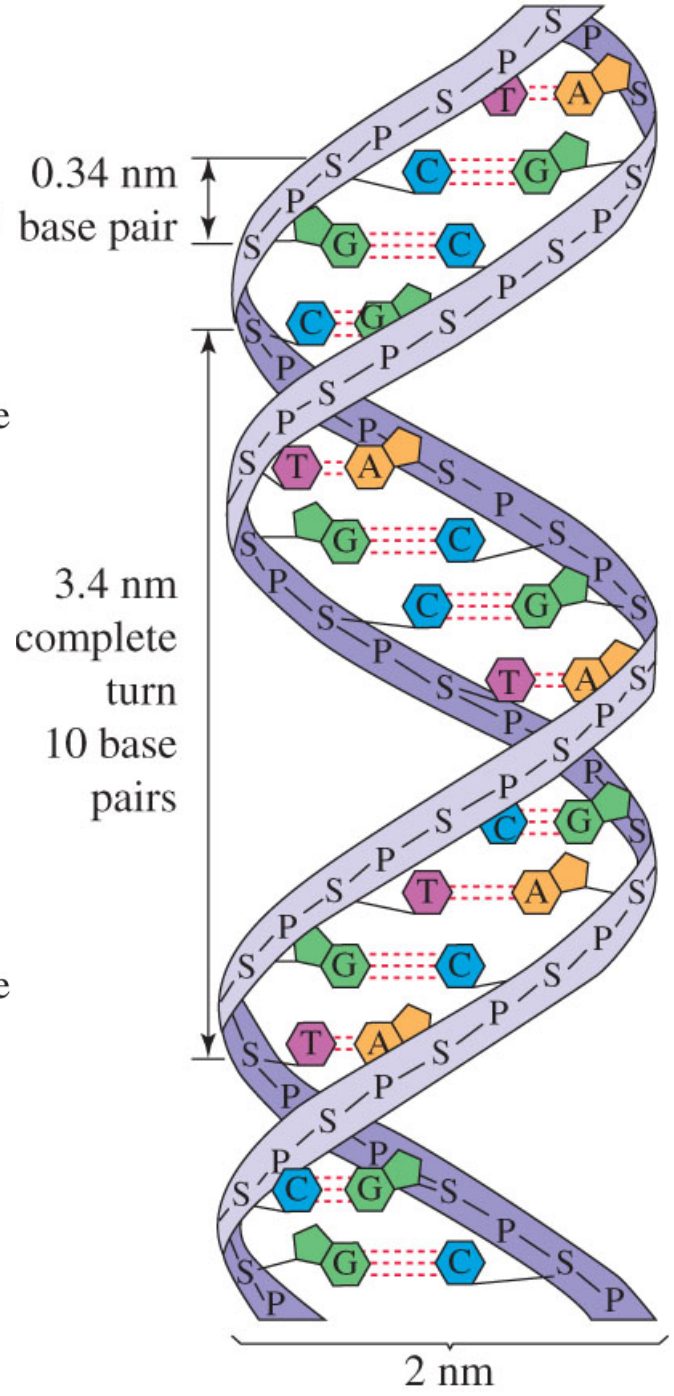
Nucleotide = sugar + base + phosphate

# Base Pairing via H-Bonding





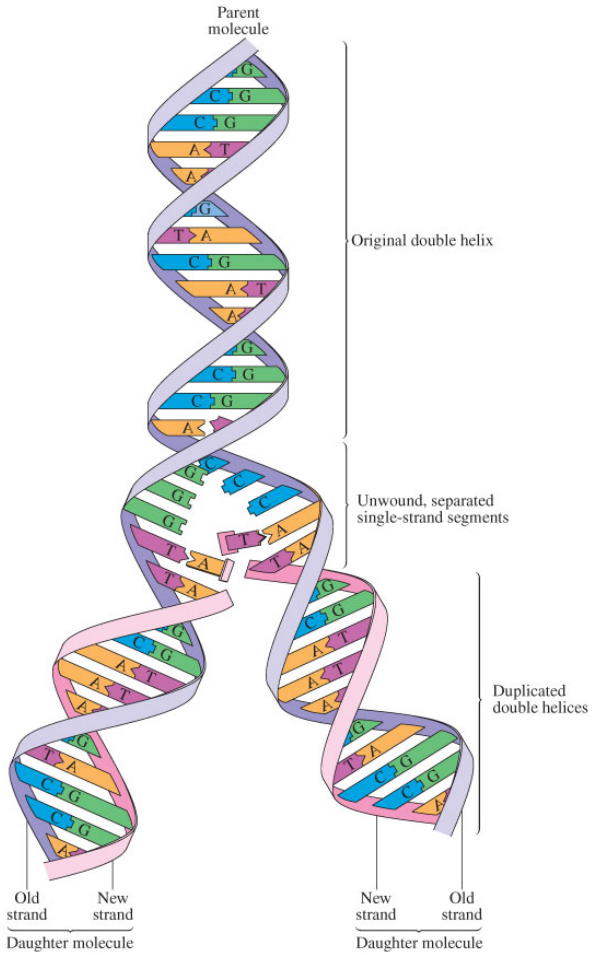


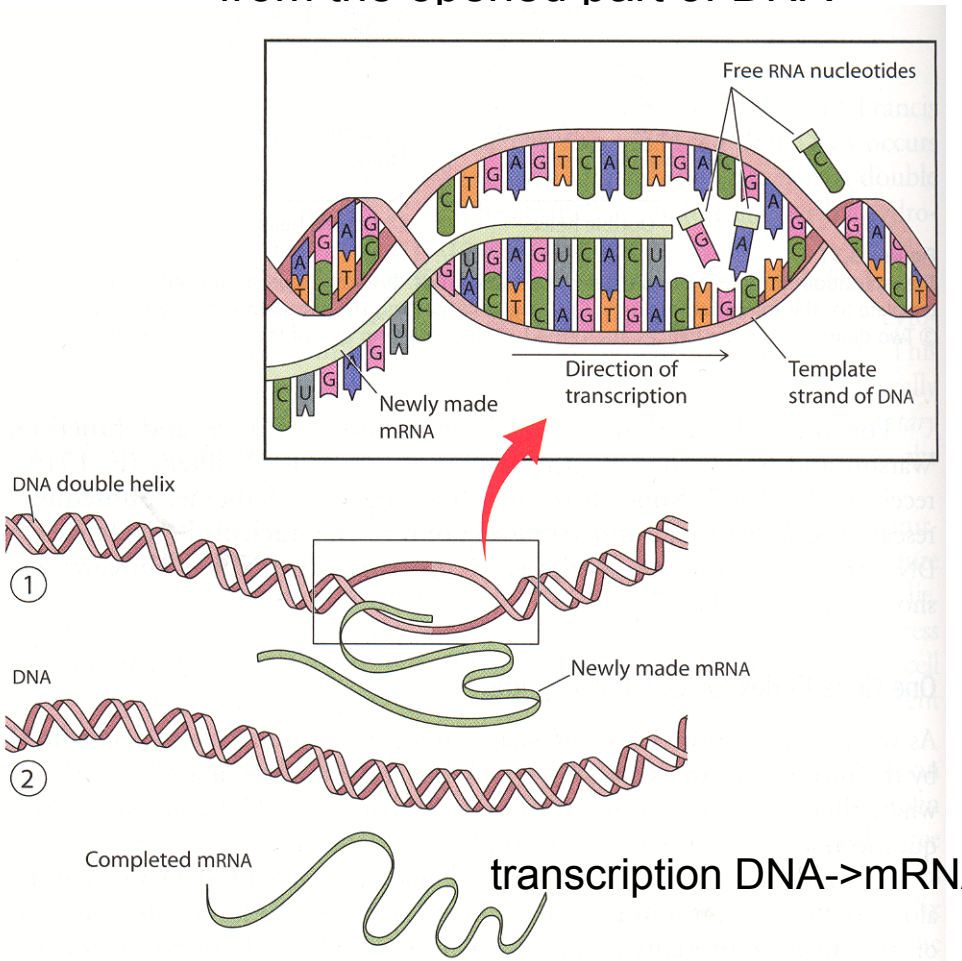
# DNA / RNA Activities

## Replication






## Transcription: DNA unzips, messenger RNA (mRNA) is formed from the opened part of DNA

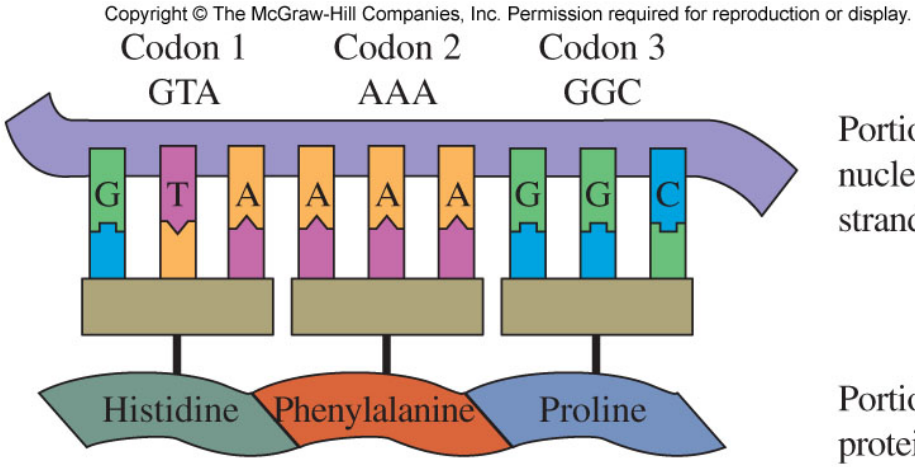



transcription DNA->mRNA

"Conceptual Chemistry" 2nd Ed. John Suchocki 2004 Pearson Education, Inc. p. 426

# Encoding Protein Formation and Making the Protein

Simple picture:




mRNA

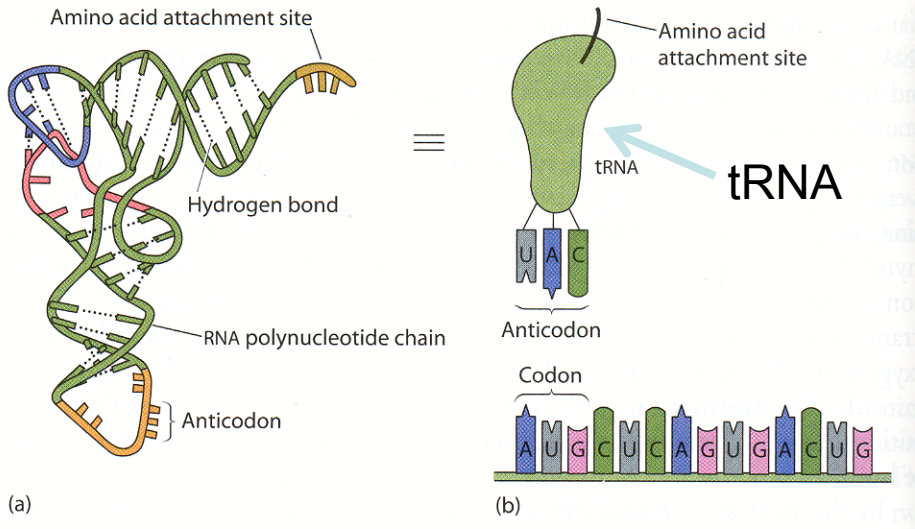
amino acid residues (peptides)

4 “letters” (C, G, A, T) can make 64 different 3-letter words

61 of the 64 “words” are used to encode amino acids; the other 3 start and stop the chain

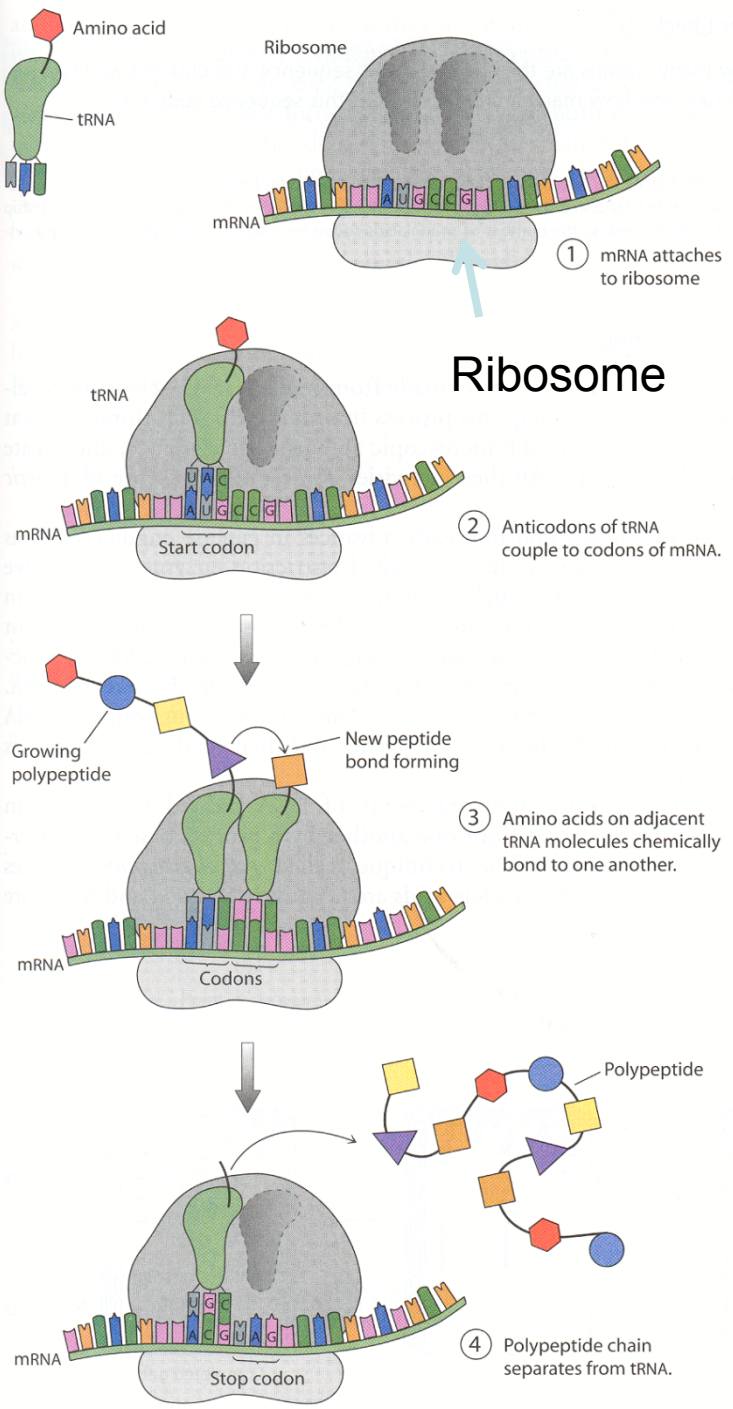
# Encoding (and Making) Proteins

Slightly more realistic picture:

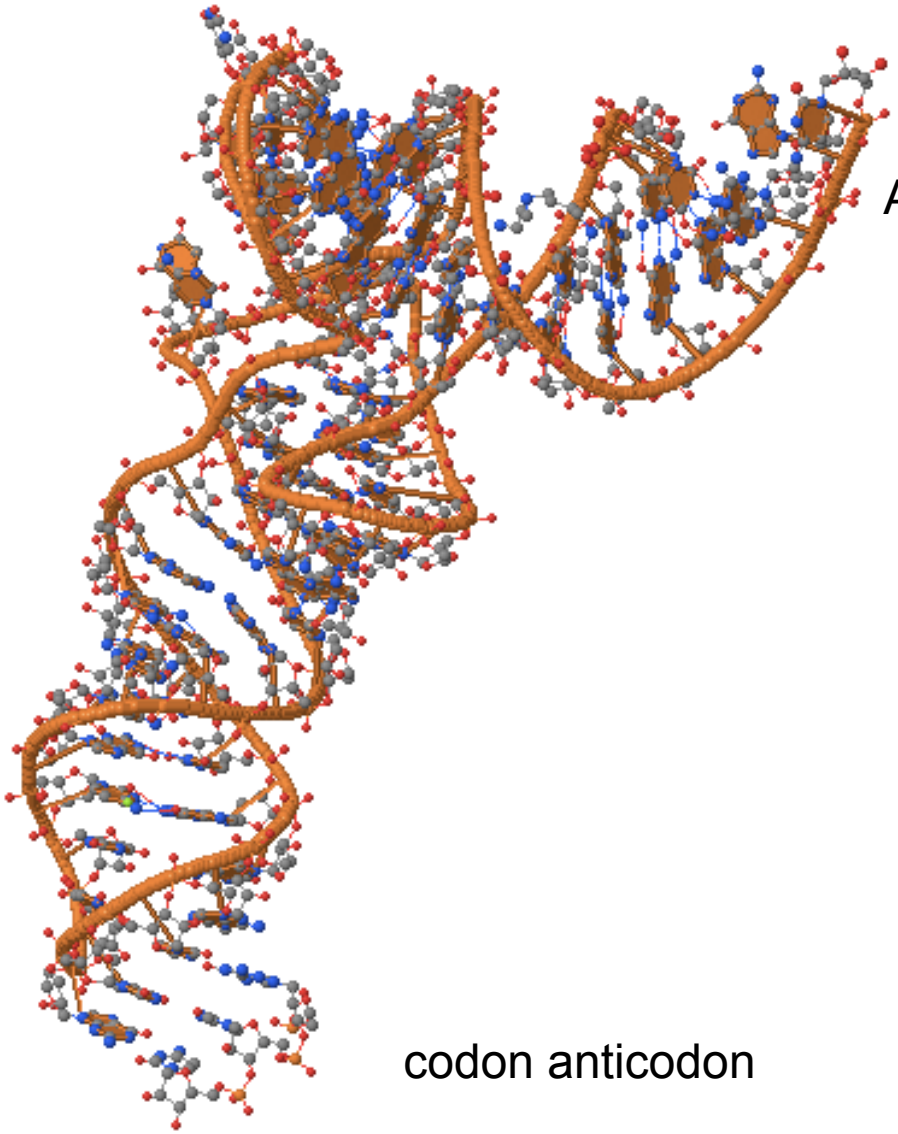



1. Transfer RNA is formed—it can bind to both the codon from mRNA as well as the appropriate amino acid
2. mRNA, tRNA and amino acid meet in the Ribosome, peptide forms by condensation rxn
3. When stop codon arrives, the peptide falls off to go do its thing…

"Conceptual Chemistry" 2nd Ed. John Suchocki 2004 Pearson Education, Inc. p. 428-429



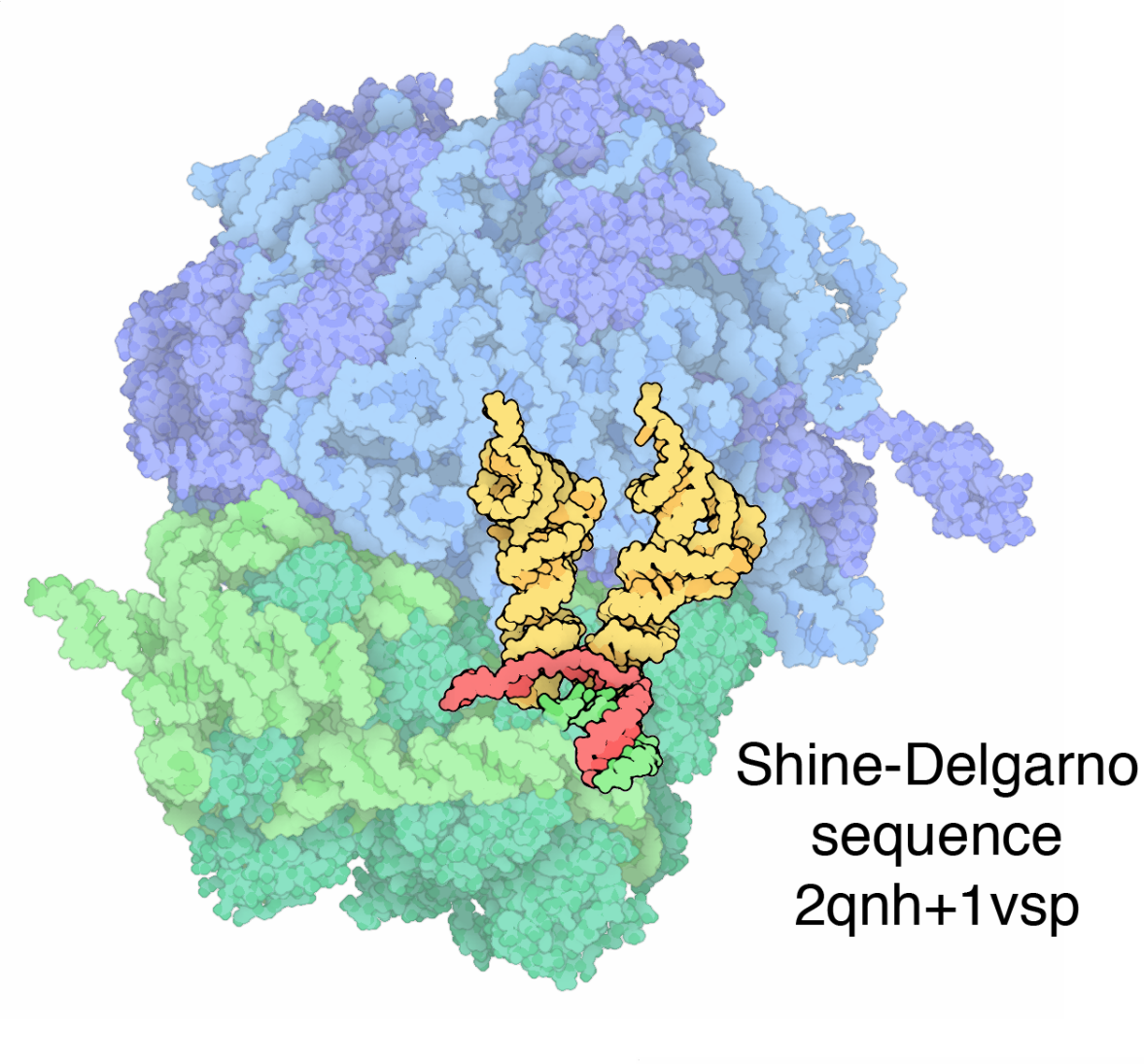
# tRNA



Amino acid binding site

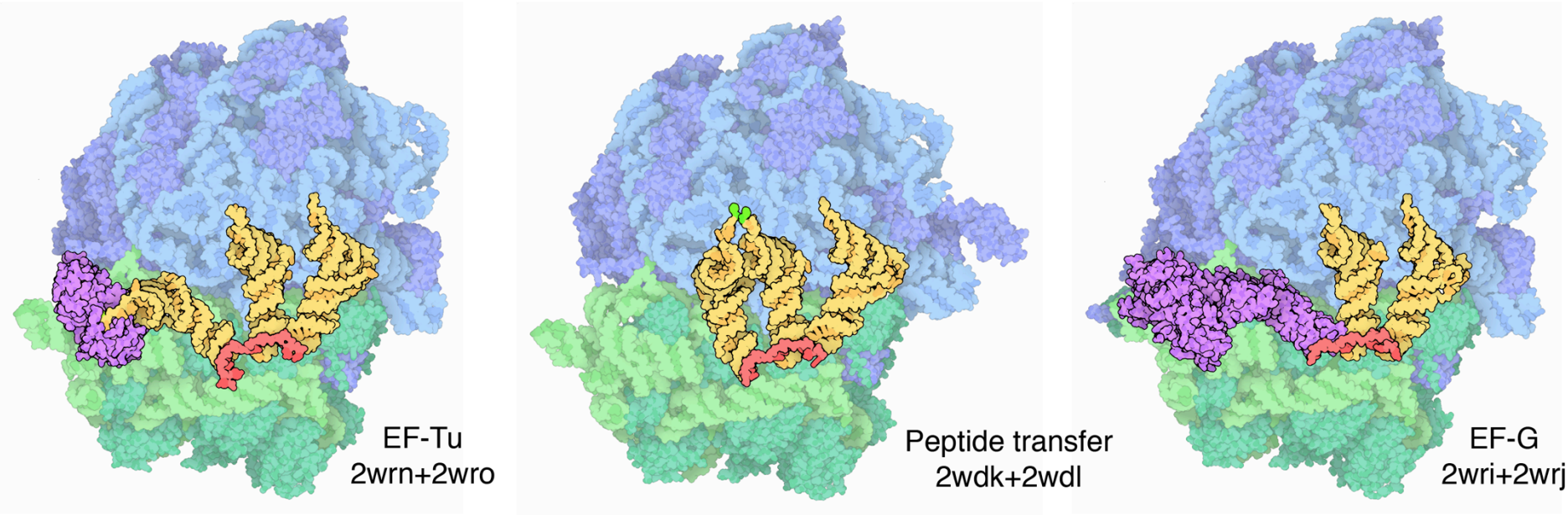
codon anticodon

# Ribosome initiation



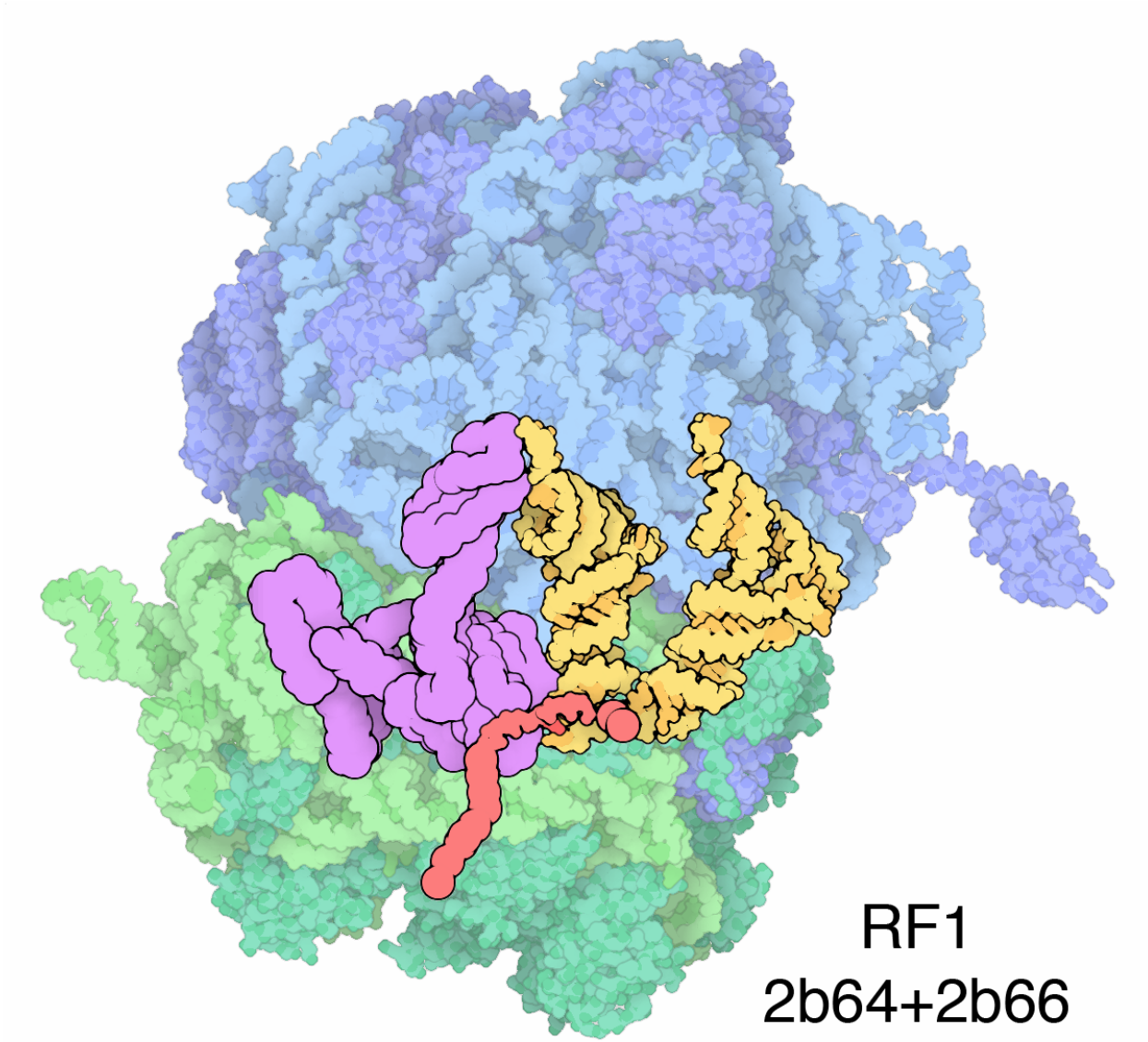

RCSB Molecule of the Month, 70S, **doi:** 10.2210/rcsb_pdb/mom_2010_1

# Ribosome elongation




RCSB Molecule of the Month, 70S, **doi:** 10.2210/rcsb_pdb/mom_2010_1

# Ribosome termination

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