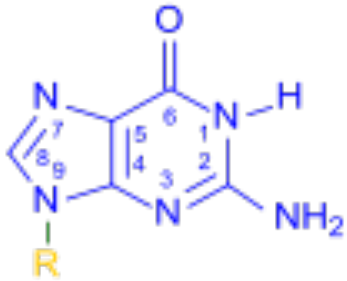
Important molecules in molecular biology

Steven Salzberg

There are 4 nucleotides in DNA

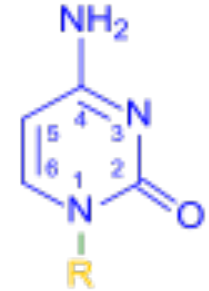
Purines

Adenine

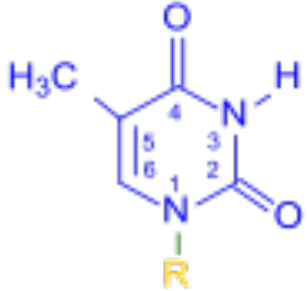


Guanine

Pyrimidines



Cytosine



Thymine

image credit: http://en.wikipedia.org/wiki/Nucleotide#mediaviewer/File:Nucleotides_1.svg

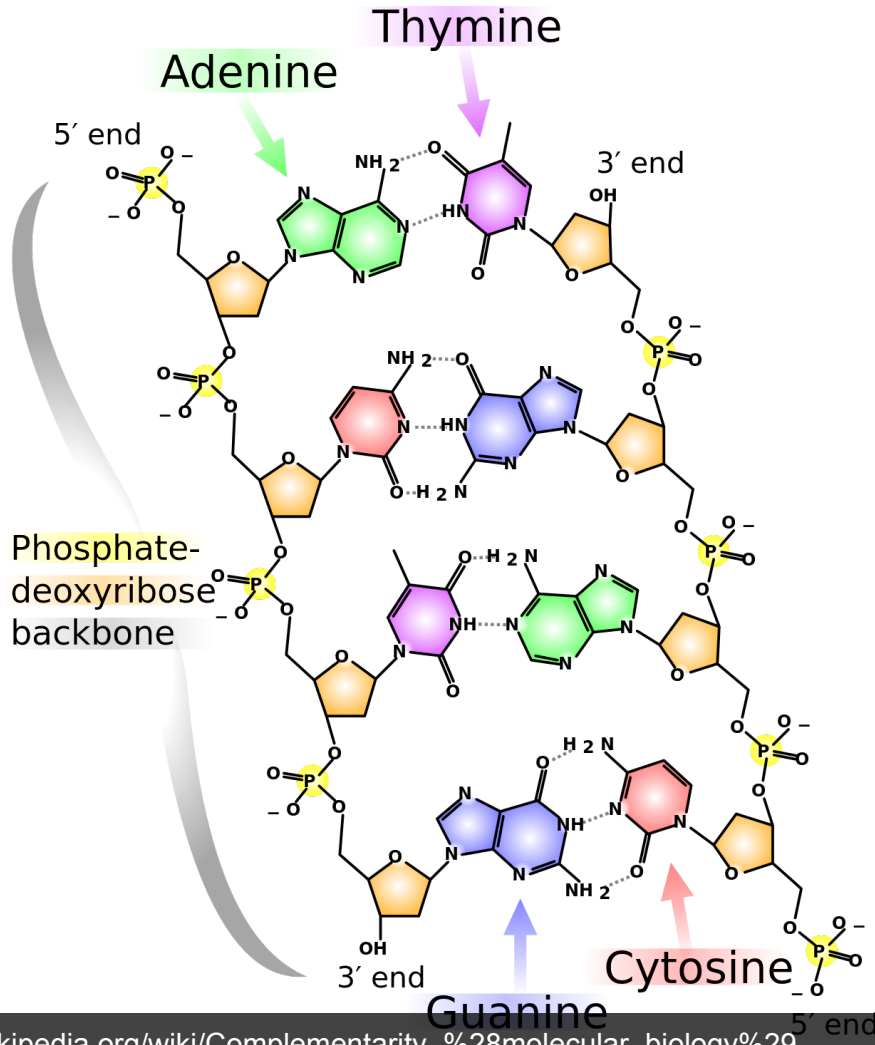


image credit: http://en.wikipedia.org/wiki/Complementarity_%28molecular_biology%29

- Dexoyribonucleic acid (DNA)
  - A double-stranded nucleic acid
  - Paired molecules
  - Sugar backbone between them

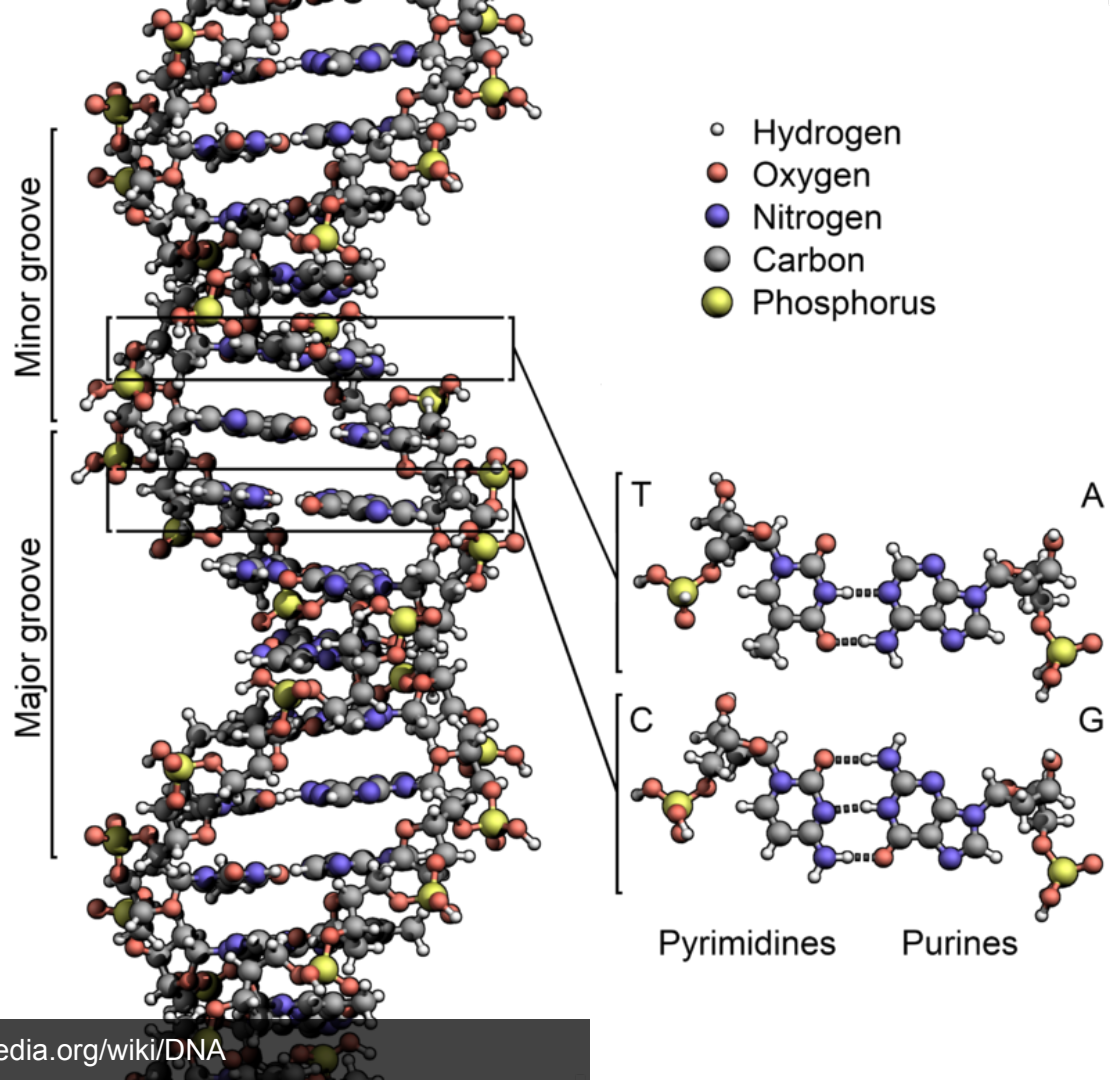


image credit: http://en.wikipedia.org/wiki/DNA

How we write DNA sequence

5’ - ACACCGGTT - 3’

3’ - TGTGGCCAA - 5’

5’ - ACACCGGTT - 3’

3’ - TGTGGCCAA - 5’

Positive strand

We write 5’ to 3’: “ACACCGGTT”

5’ - ACACCGGTT - 3’

3’ - TGTGGCCAA - 5’

Reverse compliment: “AACCGGTGT”

Ribonucleic acid (RNA)

Single stranded nucleic acid

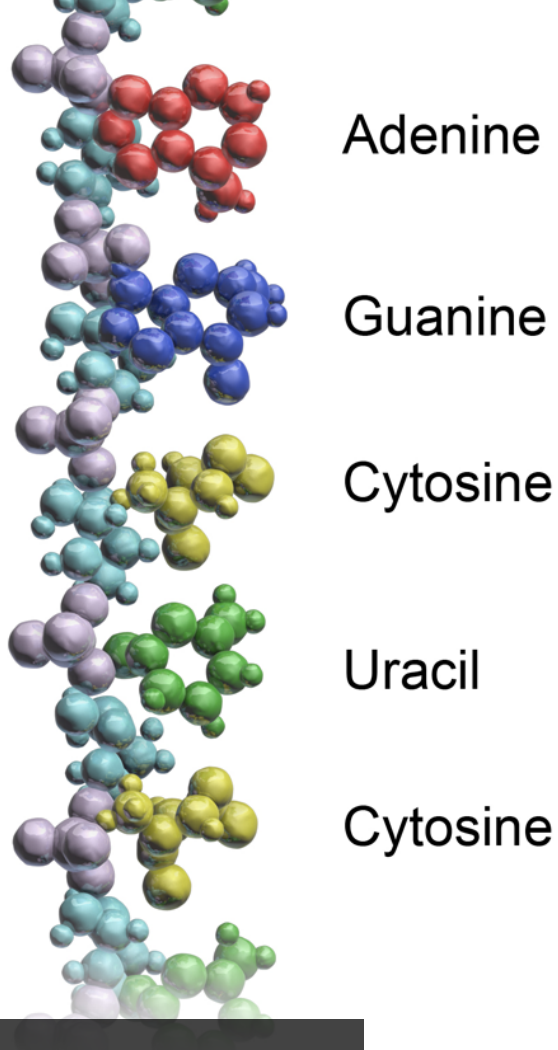
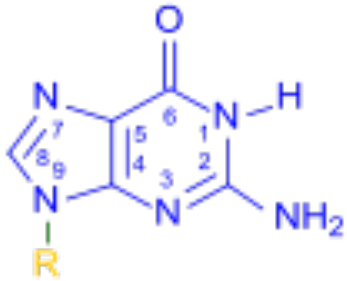


image credit: http://en.wikipedia.org/wiki/RNA

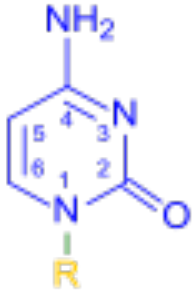
Purines

Adenine

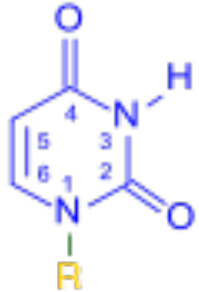


Guanine

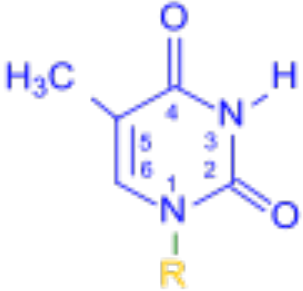
Pyrimidines



Cytosine



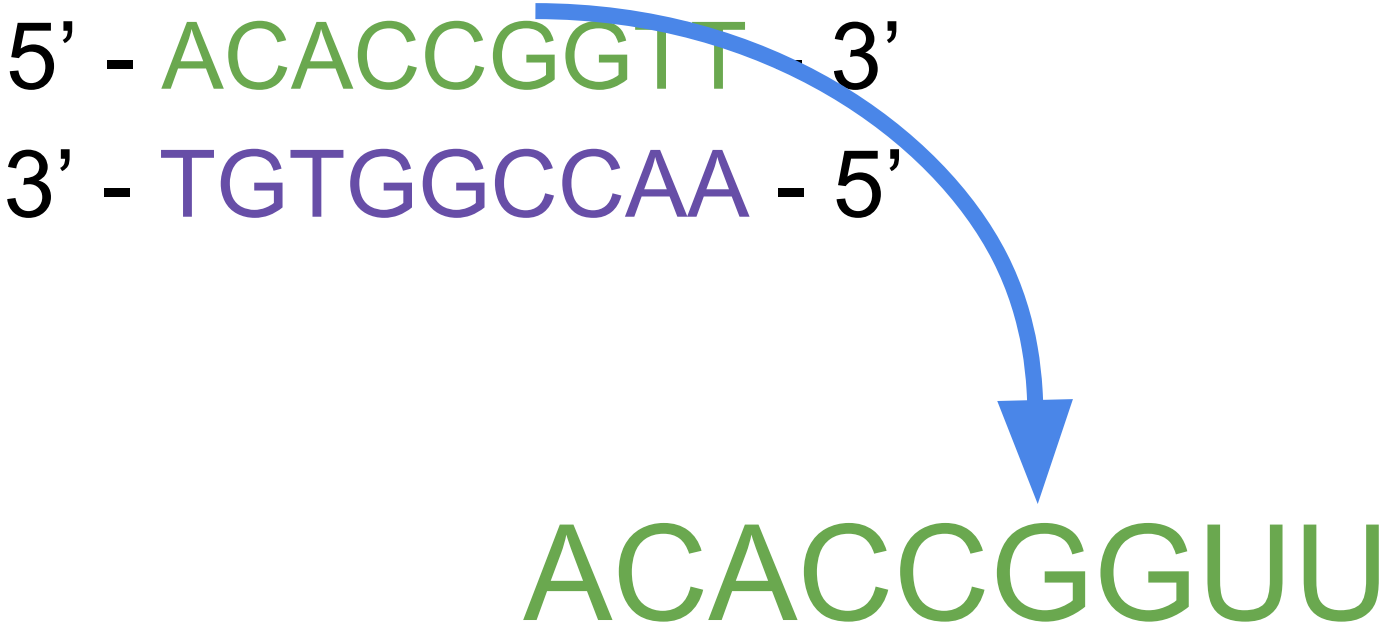
Uracil



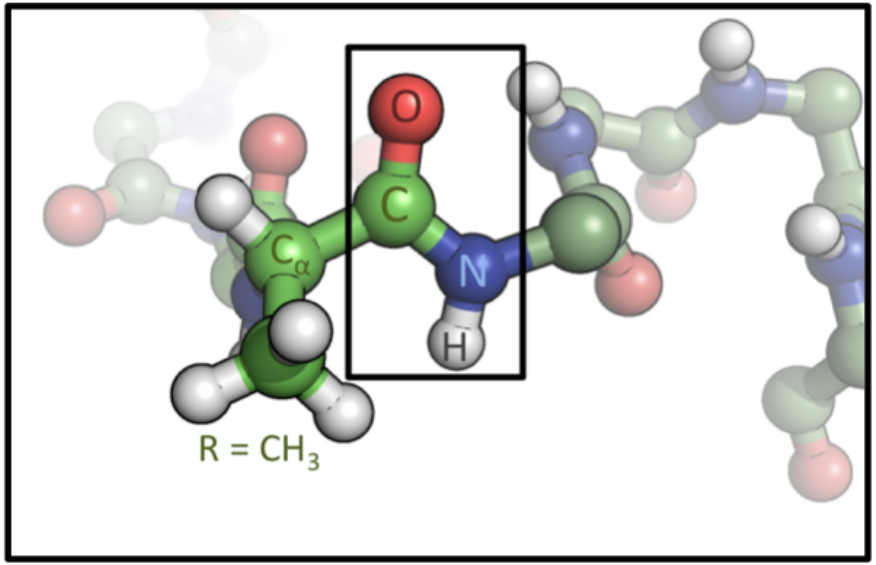
Thymine

image credit: http://en.wikipedia.org/wiki/Nucleotide#mediaviewer/File:Nucleotides_1.svg

How we write an RNA sequence


5’ - ACACCGGTT - 3’
3’ - TGTGGCCAA - 5’
ACACCGGUU

- Protein
  - Chains of amino acids
  - Carry out most of the functions of the cell



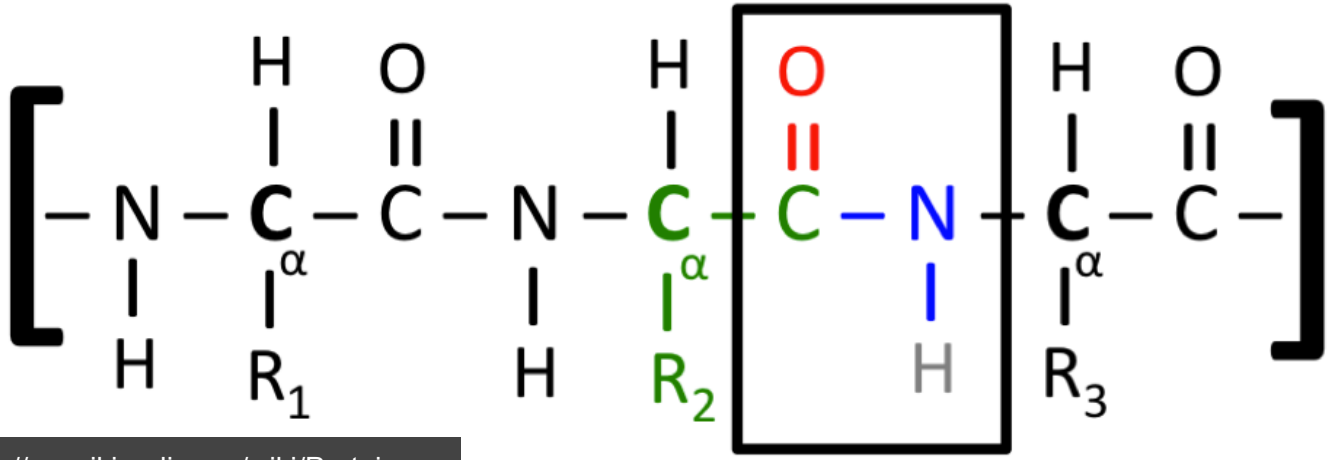
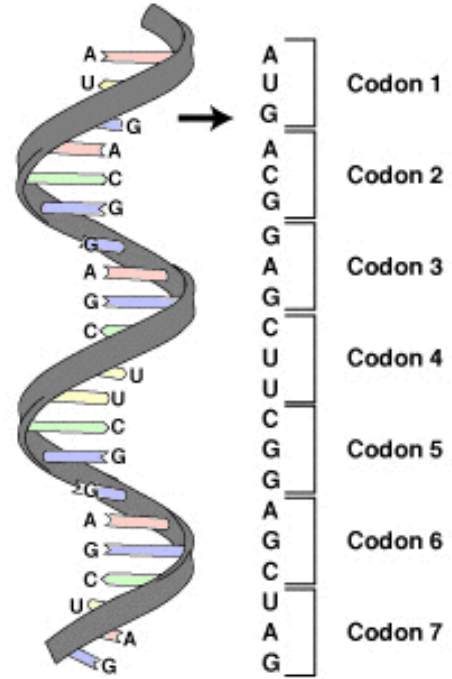


image credit: http://en.wikipedia.org/wiki/Protein



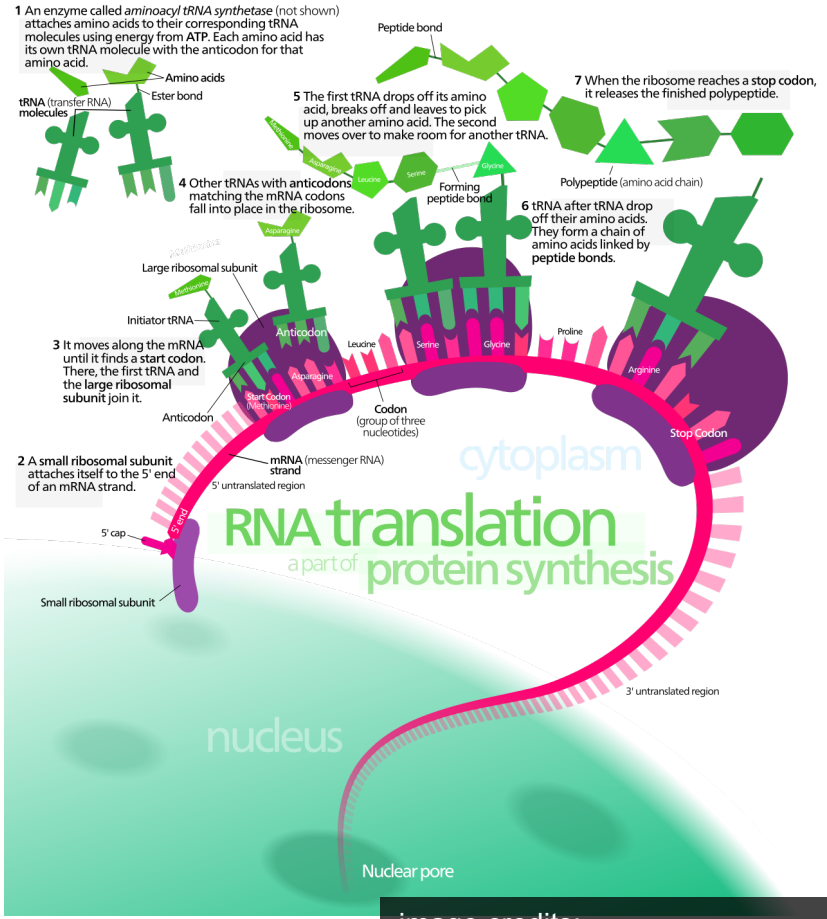
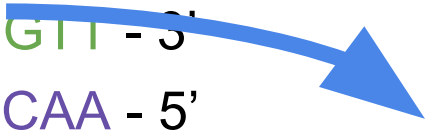


image credits:
http://en.wikipedia.org/wiki/Protein
http://en.wikipedia.org/wiki/Genetic_code

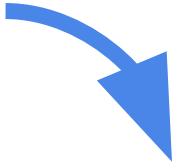
How we write protein sequences

5’ - ACACCGGTT - 3’

3’ - TGTGGCCAA - 5’



ACACCGGUU



TPV