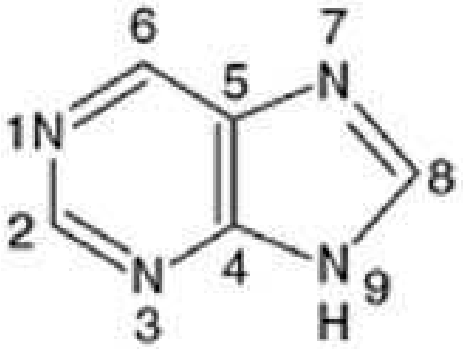
Structure of purine and pyrimidine nucleotides

Vladimíra Kvasnicová

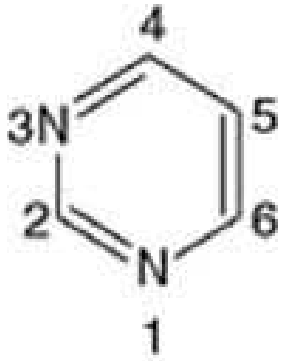
- **nucleotide** = ester of phosphoric acid and a nucleoside
- **nucleoside** = N-containing base + monosaccharide
- **β-N-glycosidic bond** between base and saccharide
- nucleotide bases: aromatic heterocycles
  - *purines:* pyrimidine + imidazole ring
  - *pyrimidines:* pyrimidine ring



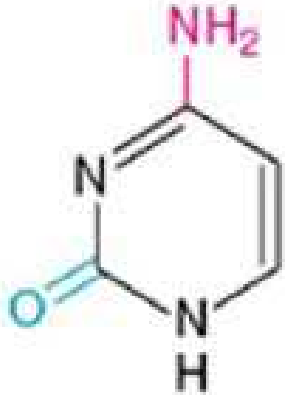
Purine

Adenine

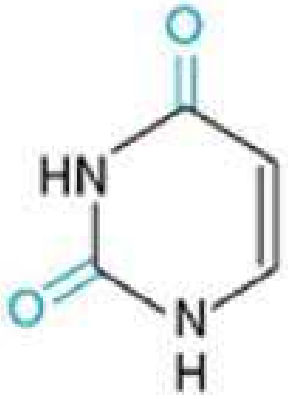
Guanine



Pyrimidine



Cytosine



Uracil

Thymine

http://pratclif.com/biologie-moleculaire/dna/bases.htm

Classification of nucleotides

- **purine nucleotides:** **contain adenine, guanine,**
  (and hypoxanhine and xanthine = metabolic intermediates)

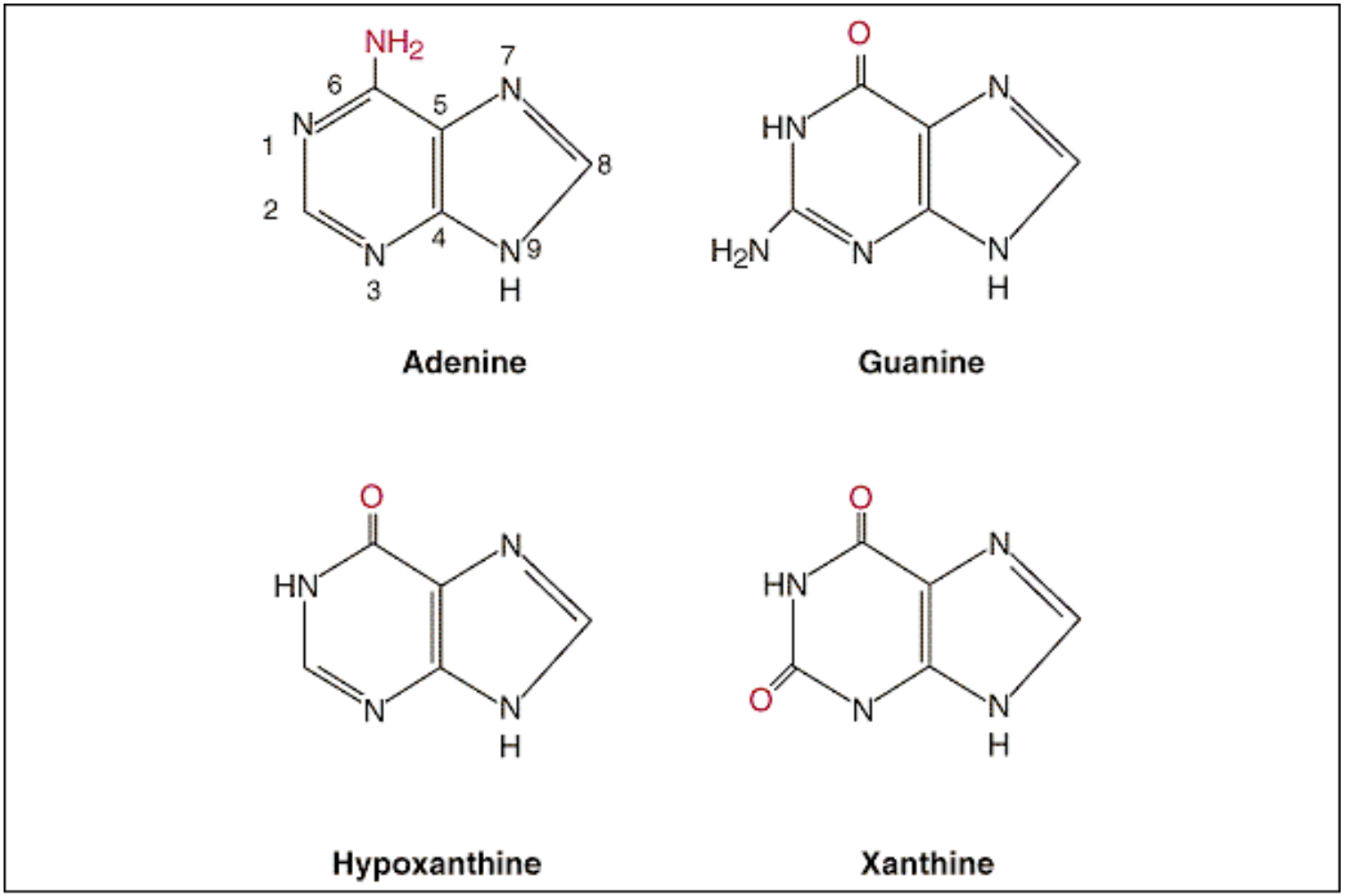
- **pyrimidine nucleotides:** **contain cytosine, uracil or thymine**

- **ribonucleotides** **(saccharide: ribose)**

- **deoxyribonucleotides** **(saccharide: deoxyribose)**

  - **formed by reduction of ribonucleosides**

PURINE BASES



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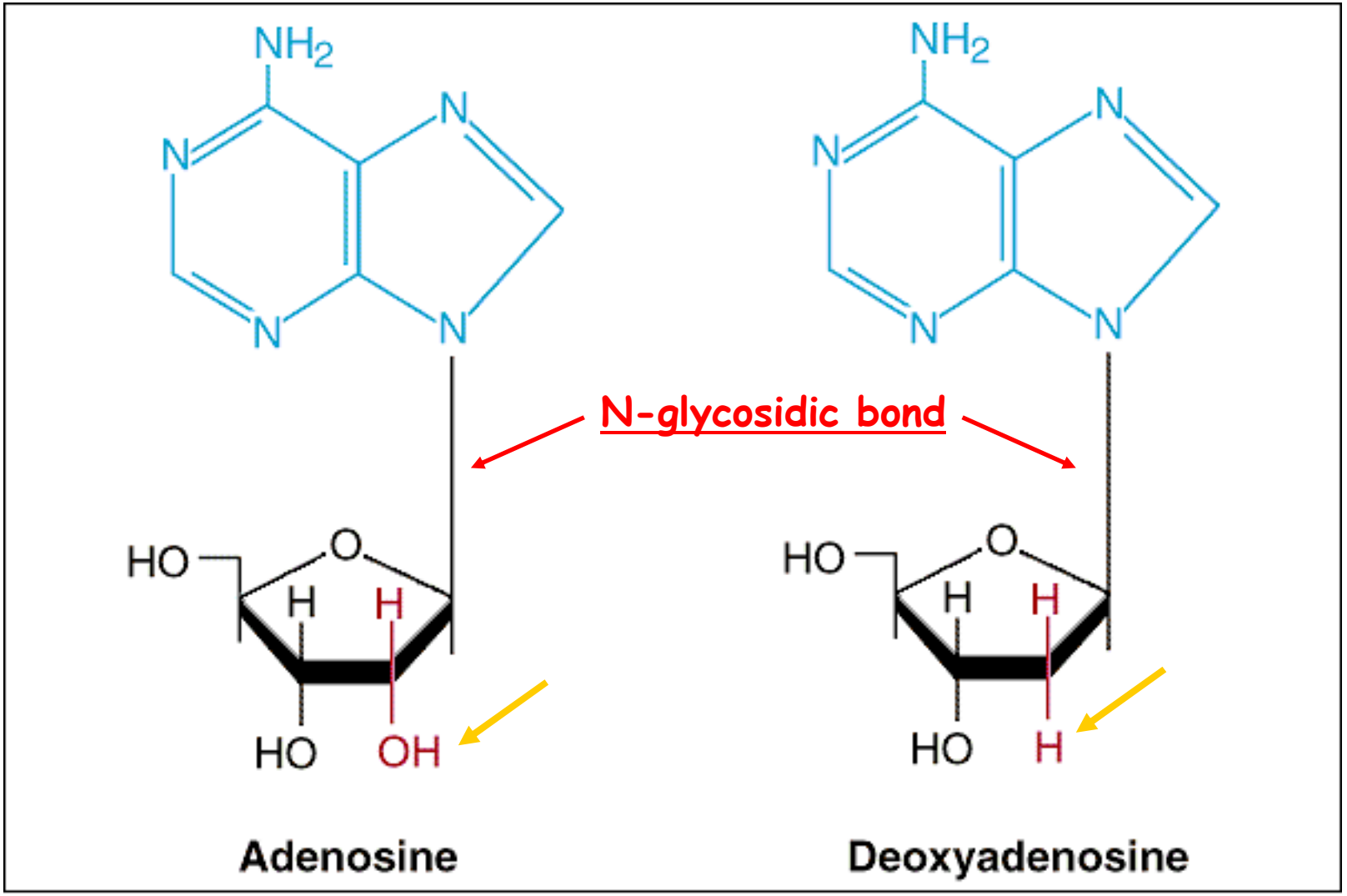
ribonucleoside **deoxyribonucleoside**



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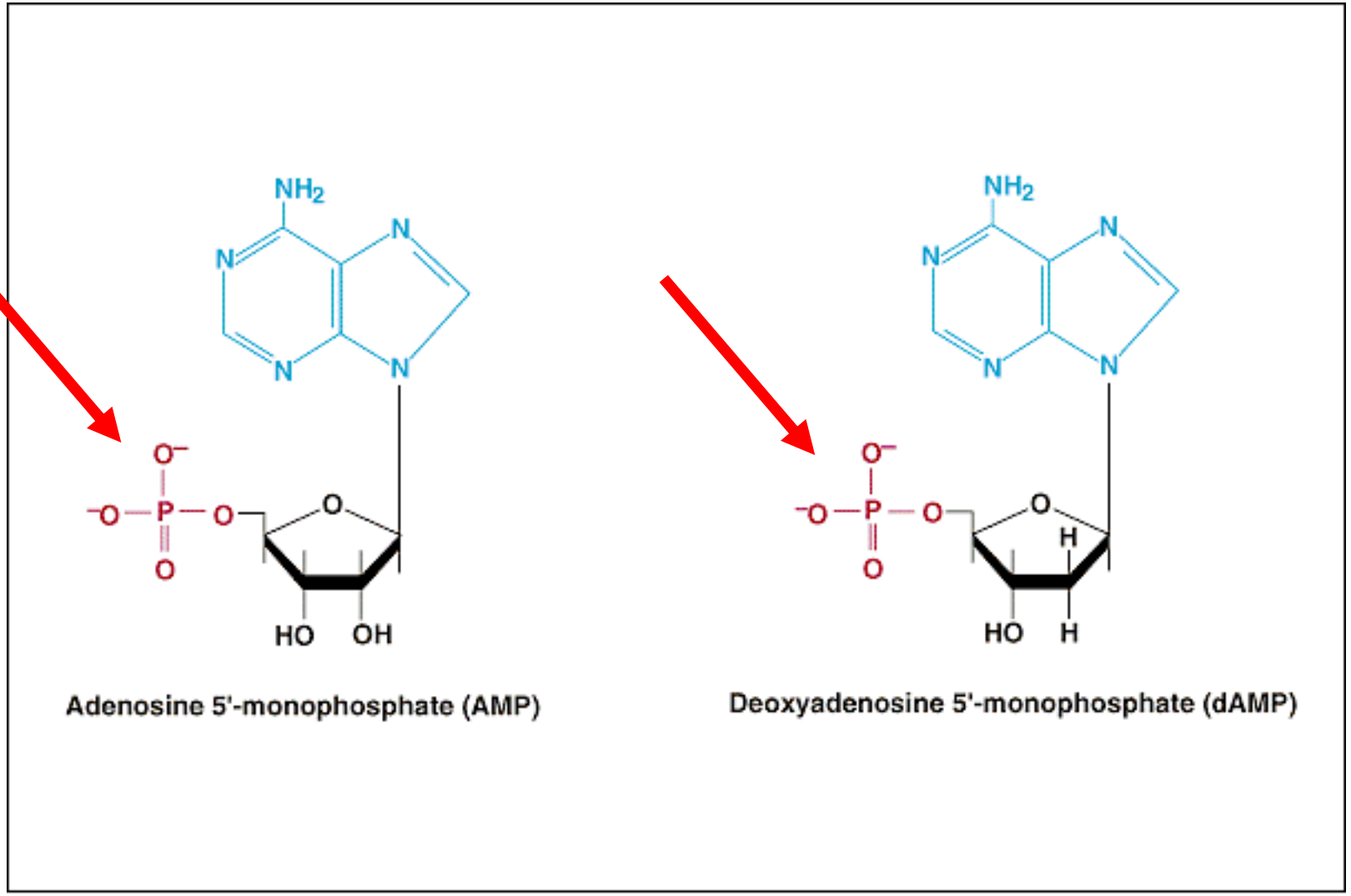
ribonucleotide deoxyribonucleotide



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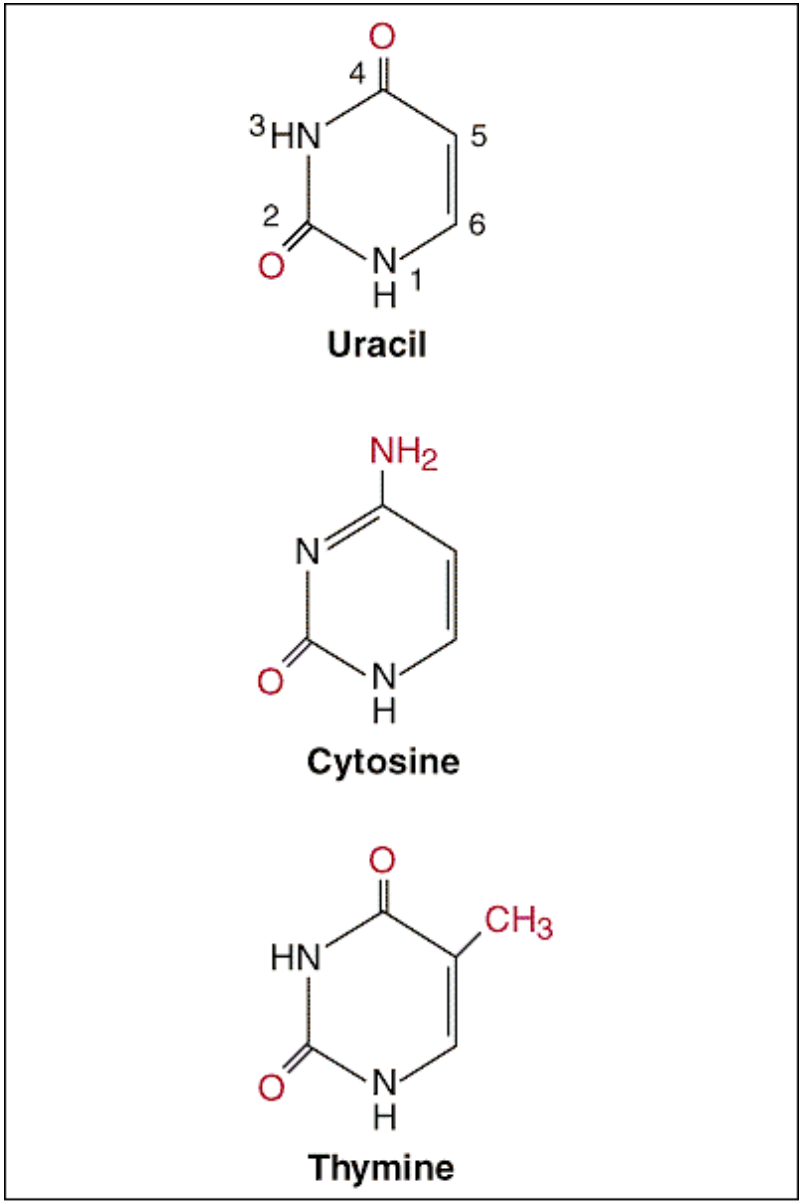
PYRIMIDINE BASES



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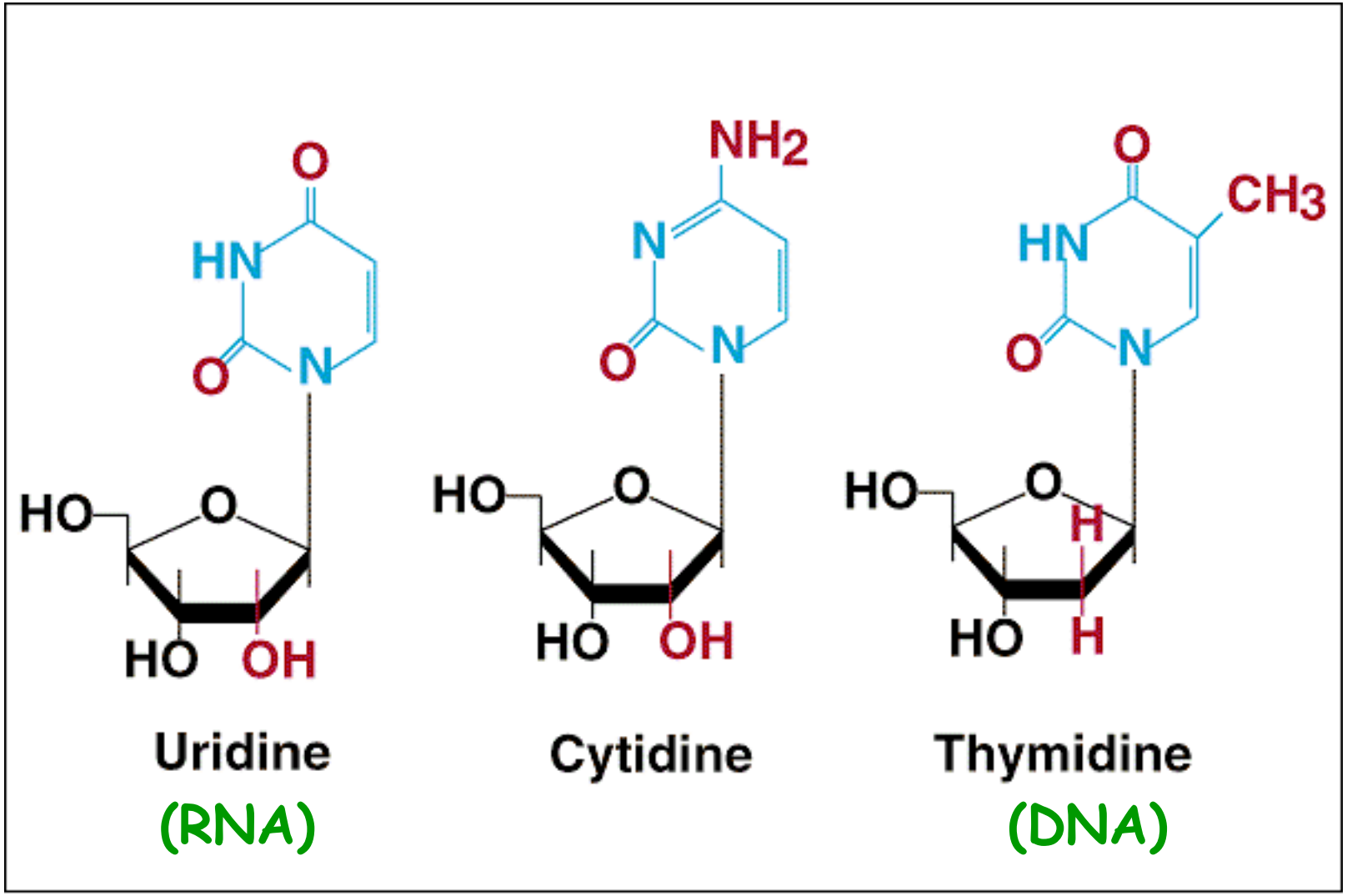
ribonucleosides deoxyribonucleoside



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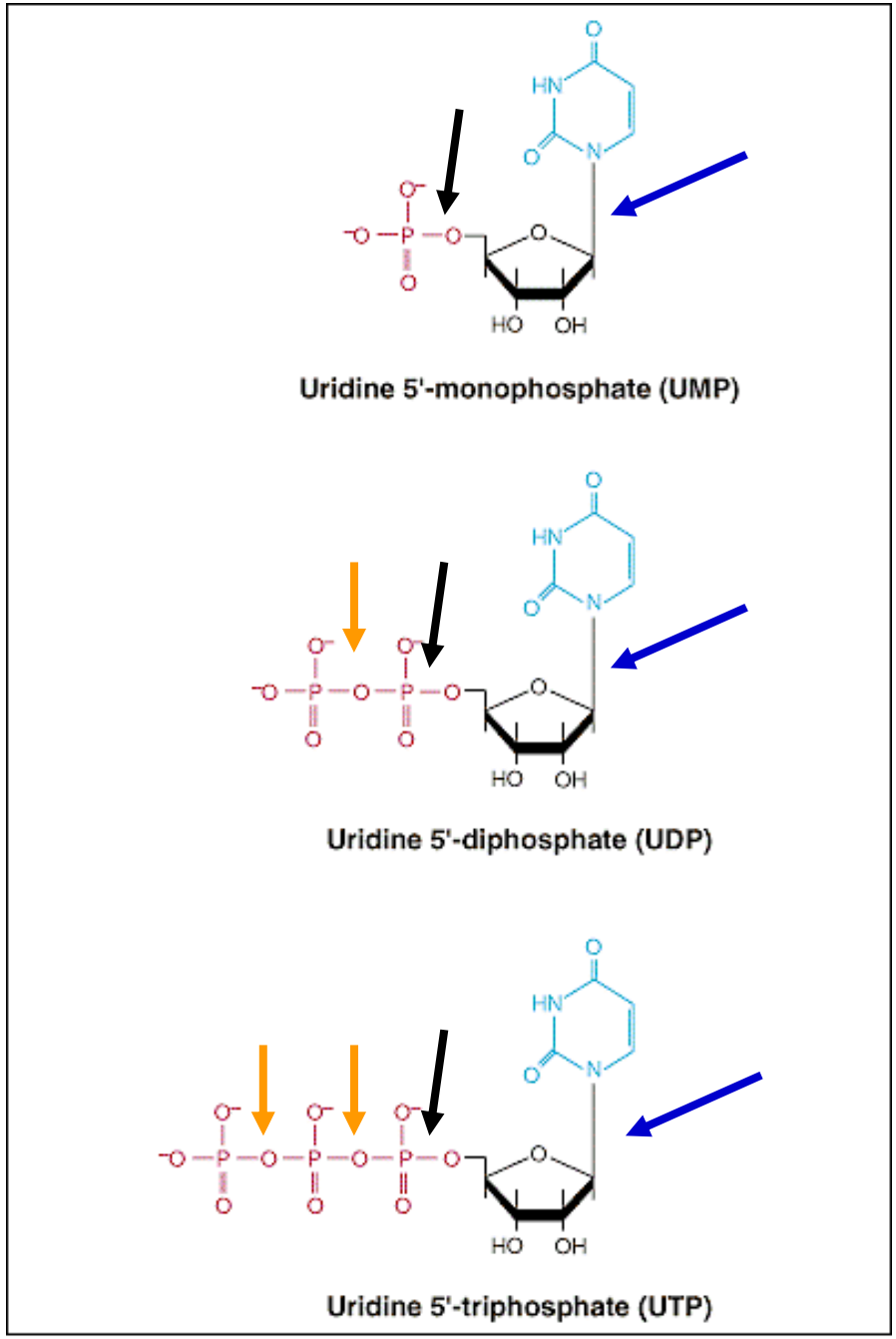
Ribonucleotides

* N-glycosidic bond
* ester bond
* anhydride bond
  (energy rich bond)



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Properties of nucleotides

- strong absorption of UV radiation (260 nm)
- purines are less stable under acidic conditions than pyrimidines
- polar terminal phosphate groups
  - alternative names:
    e.g. adenosine triphosphate (ATP) = adenylate
    or adenylic acid