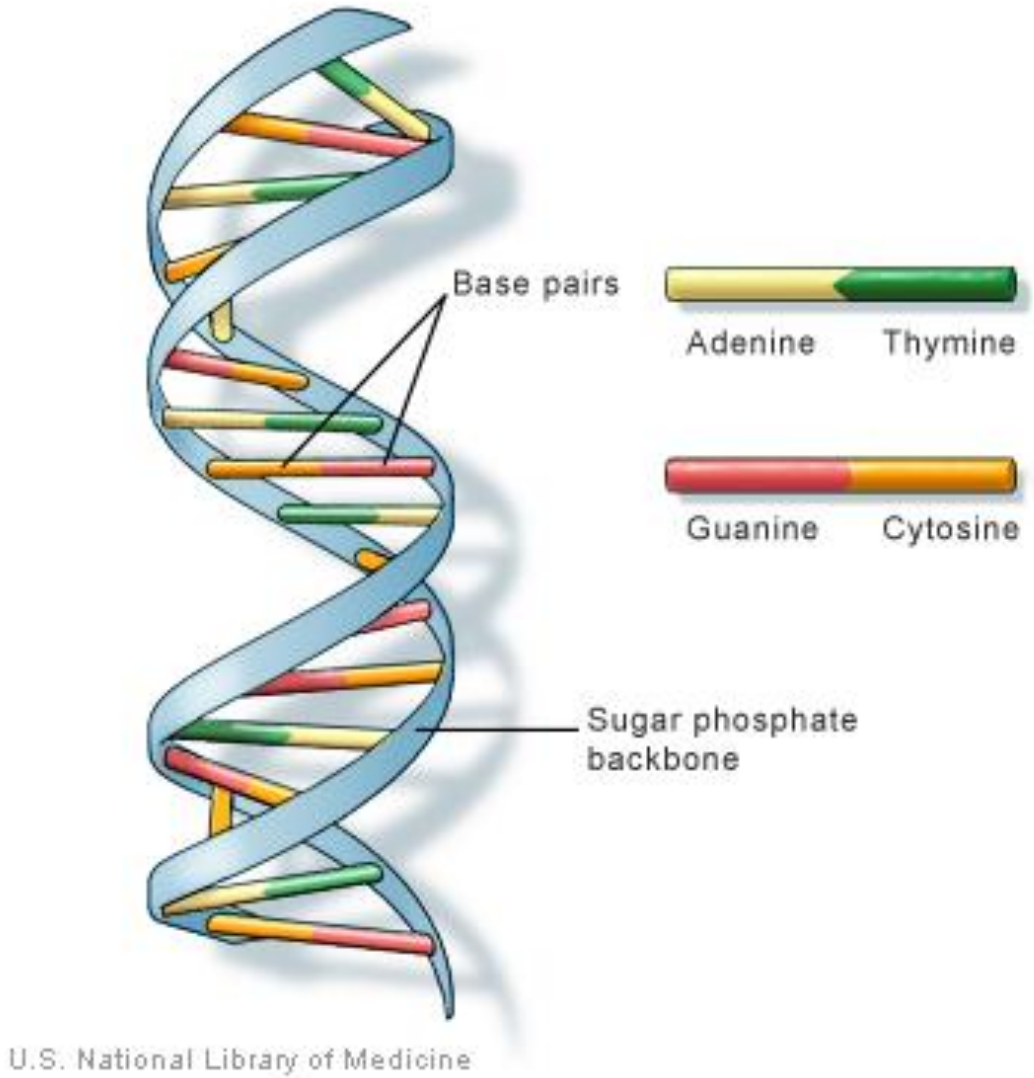
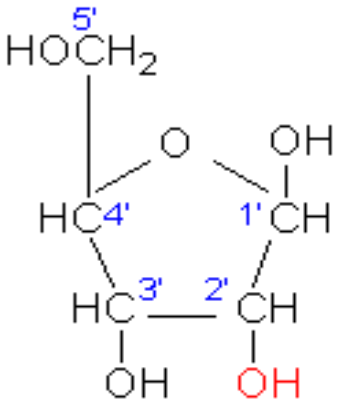
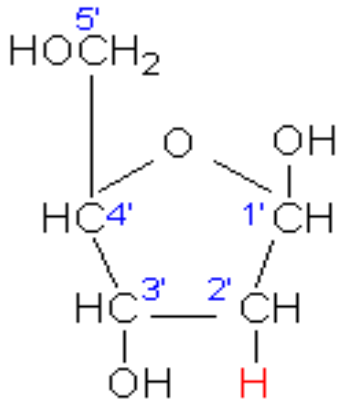
DNA STRUCTURE





Ribose
(in RNA)

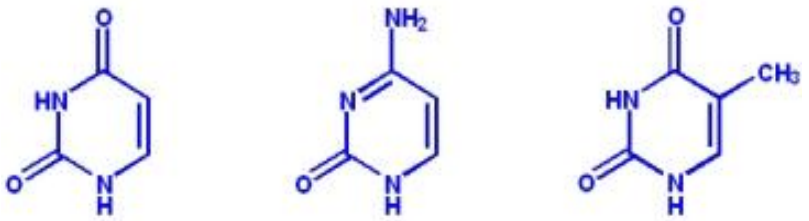


2'-Deoxyribose
(in DNA)

The Sugars

The Bases

DNA



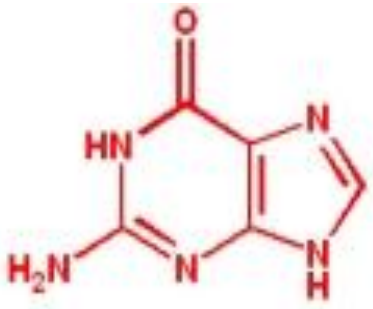
Uracil Cytosine Thymine

RNA

PYRIMIDINES

PURINES

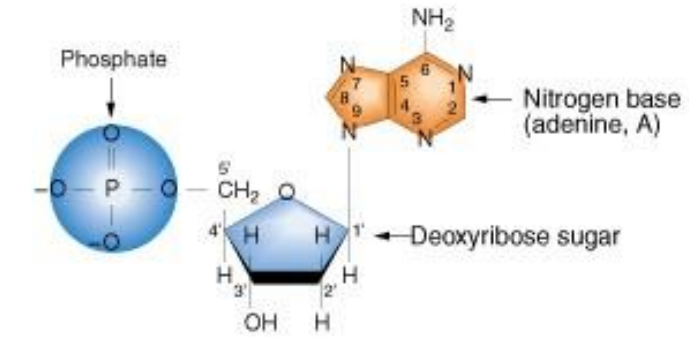
Adenine



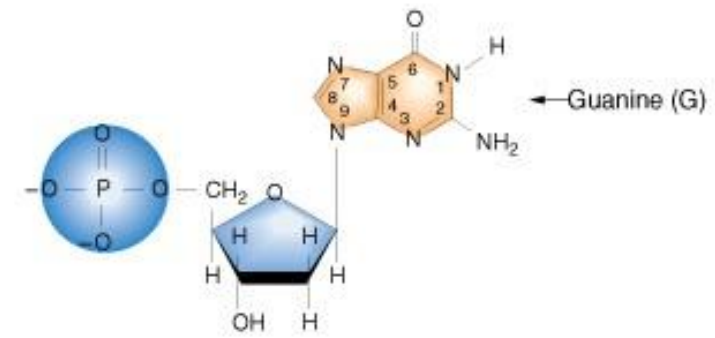
Guanine

Nucleotides and Nucleosides

Purine nucleotides

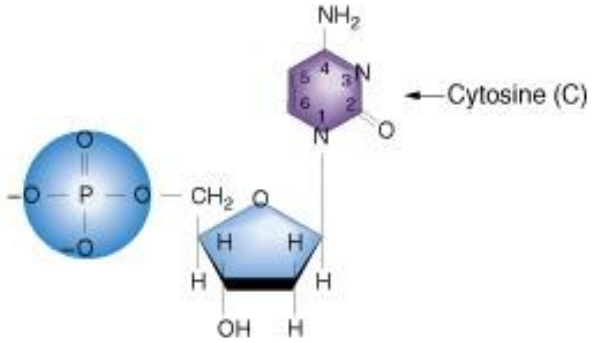


Deoxyadenosine 5'-phosphate (dAMP)

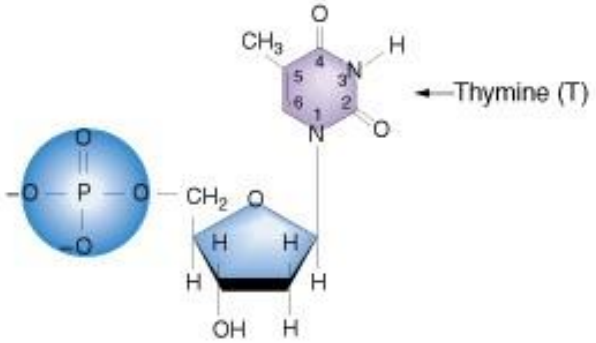


Deoxyguanosine 5'-phosphate (dGMP)

Pyrimidine nucleotides



Deoxycytidine 5'-phosphate (dCMP)



Deoxythymidine 5'-phosphate (dTMP)

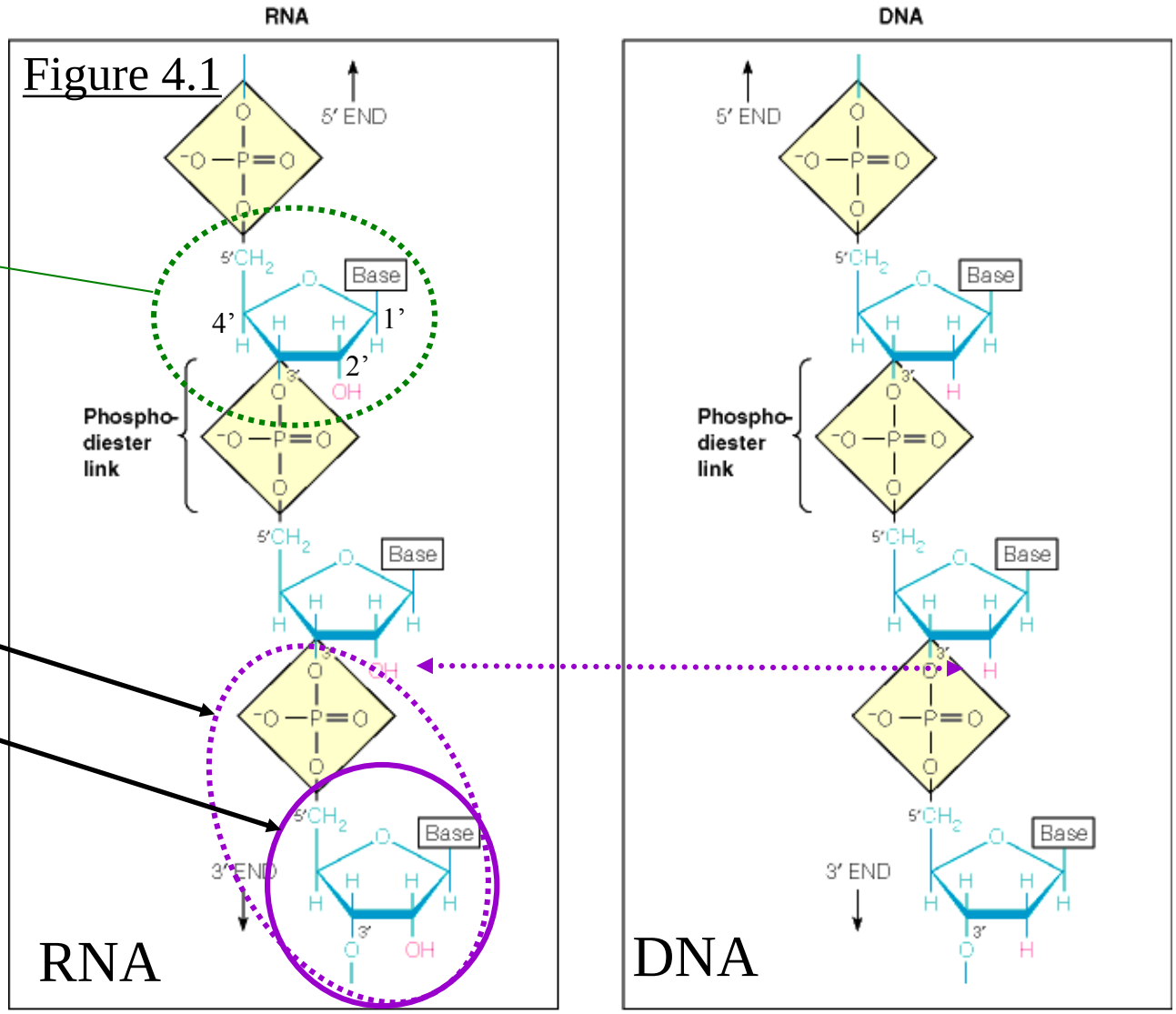
cytosine nitrogenouos base

Chemical Structure of DNA and RNA

The C is named 1'-5'

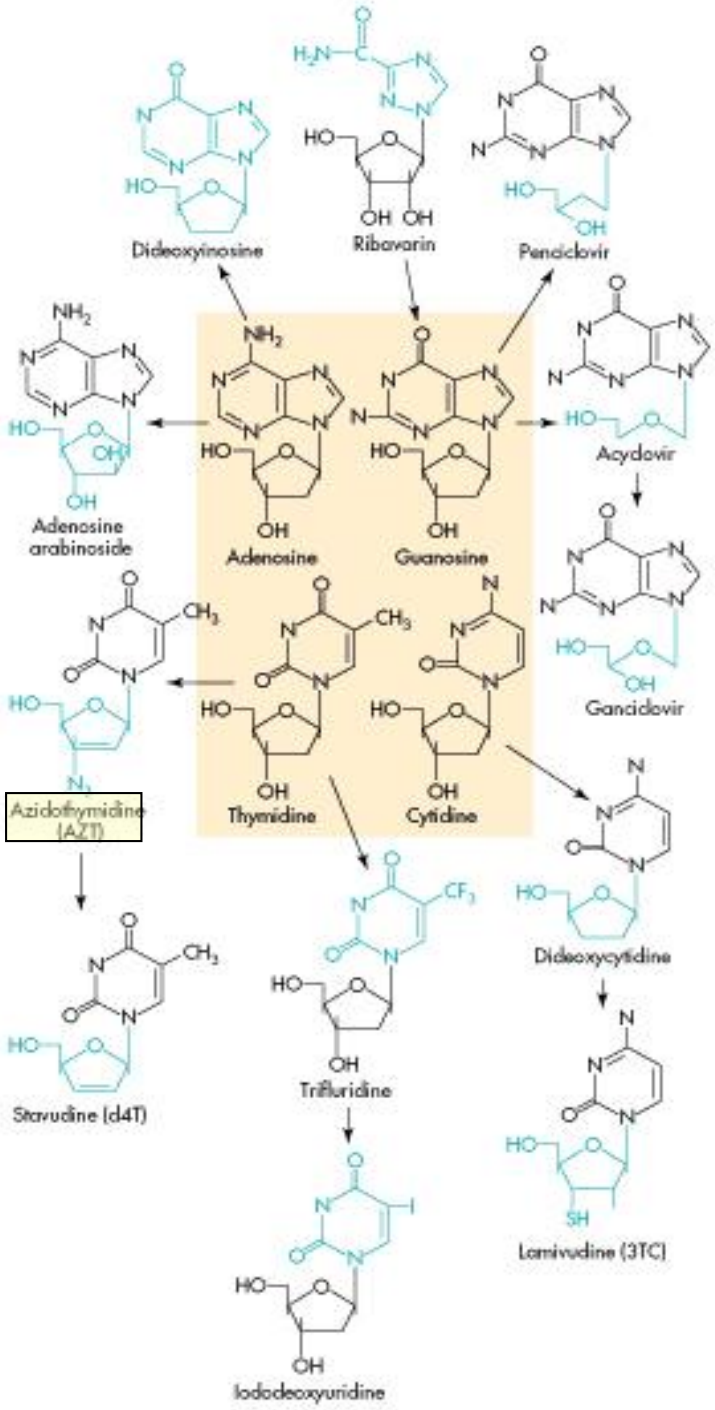
Nucleotide

Nucleoside

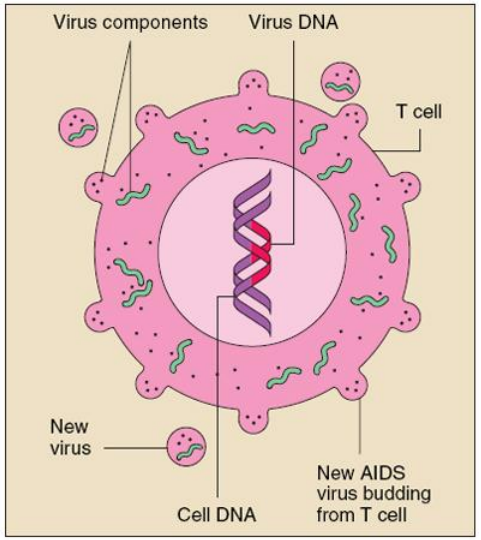


Resume

Nucleotide Analogs as Drugs



These agents can be used against hepatitis B virus, hepatitis C virus, herpes simplex, and HIV. Once they are phosphorylated, they work asantimetabolites by being similar enough to nucleotides to be incorporated into growing DNA strands; but they act as chain terminators and stop viral DNA Polymerase. They are not specific to viral DNA and also affect mitochondrial DNA. Because of this they have side effects such as bone marrow suppression.



1. DNA Stabilization– Complementary Base Pairing

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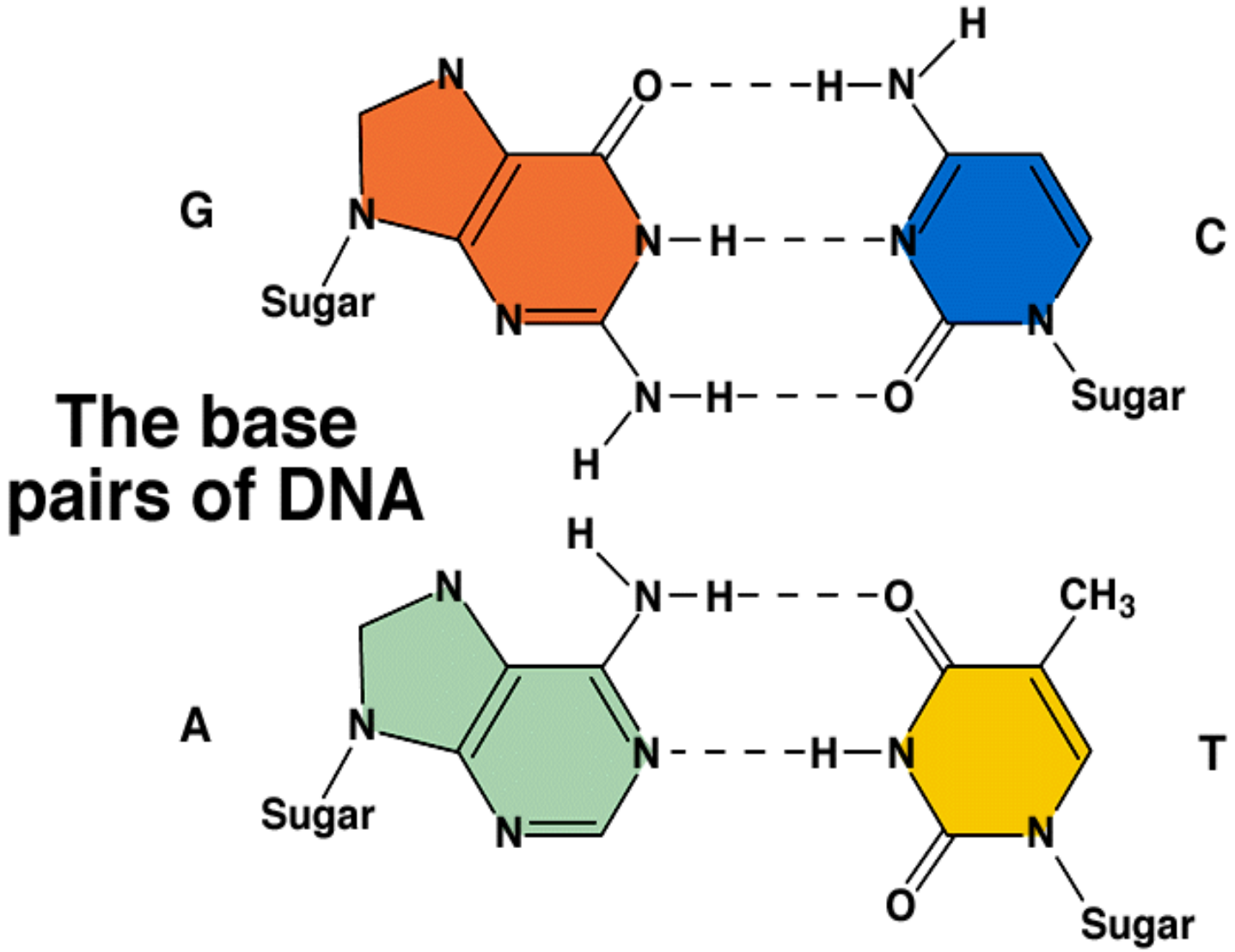
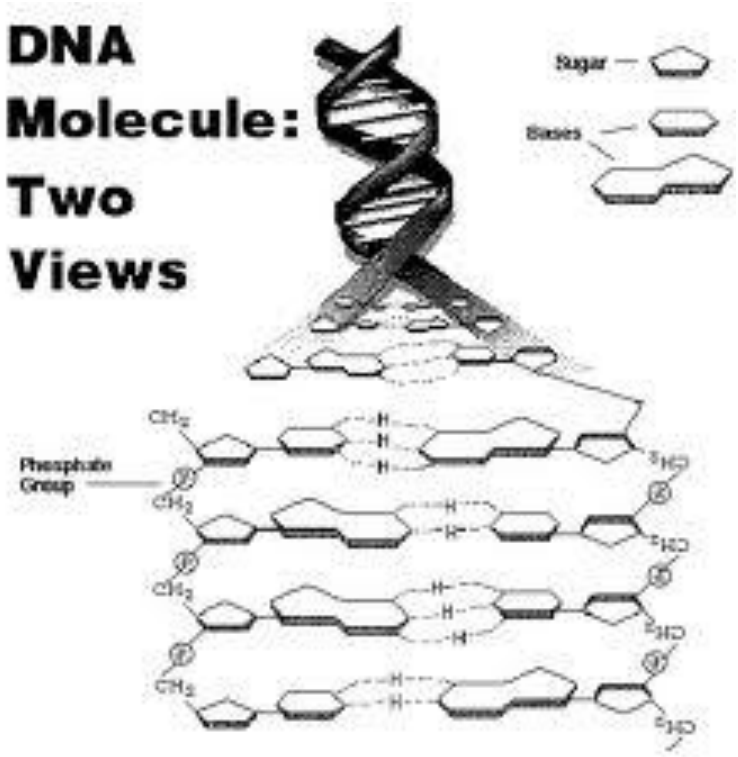
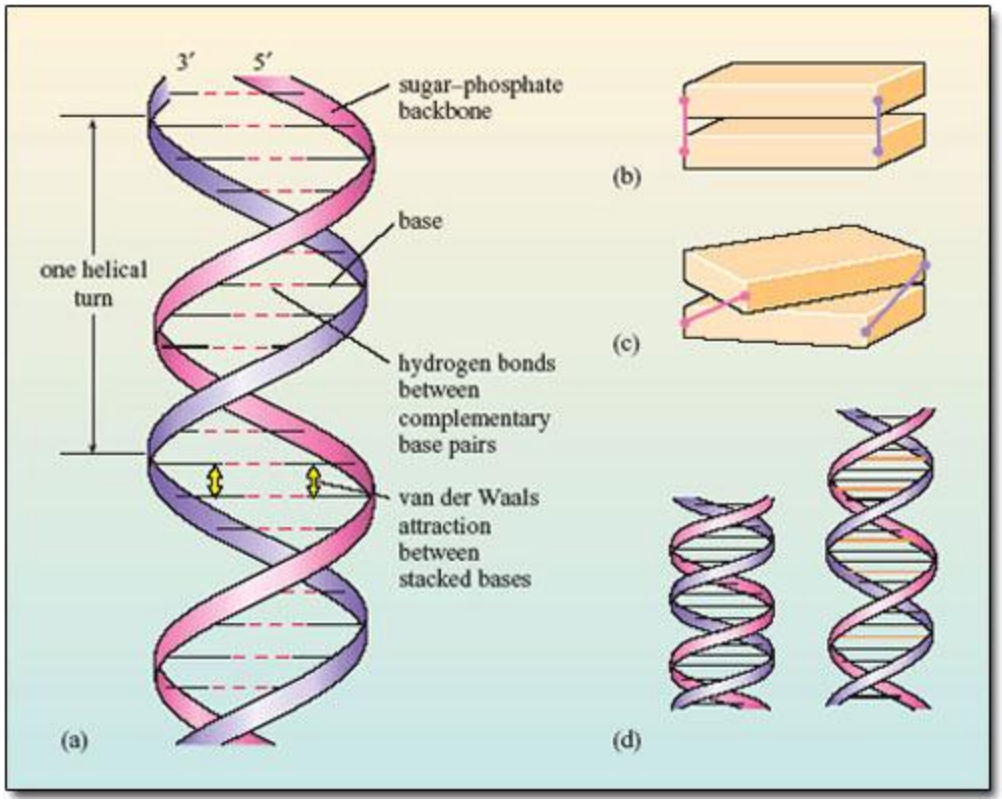
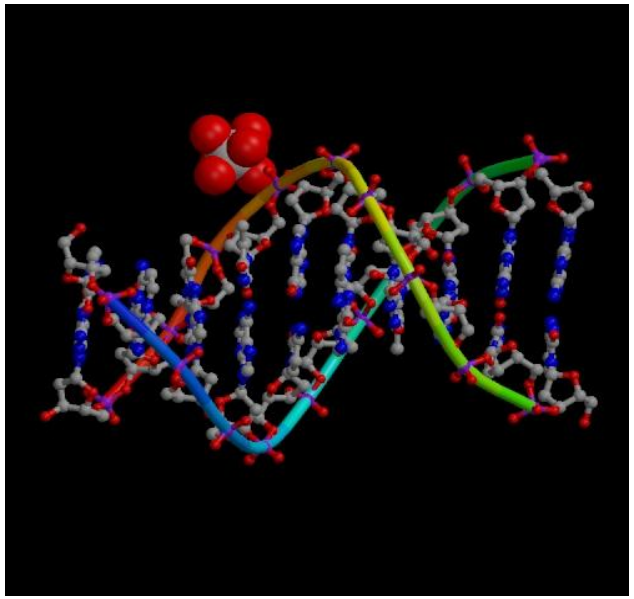


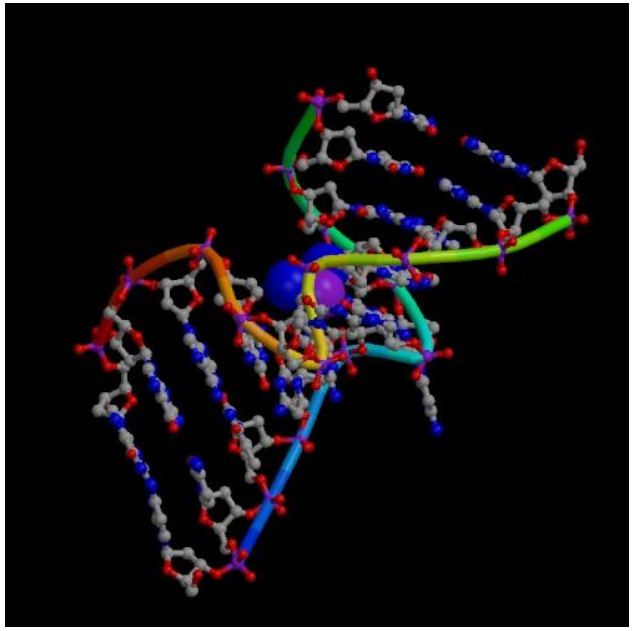
2. Stacking of bases

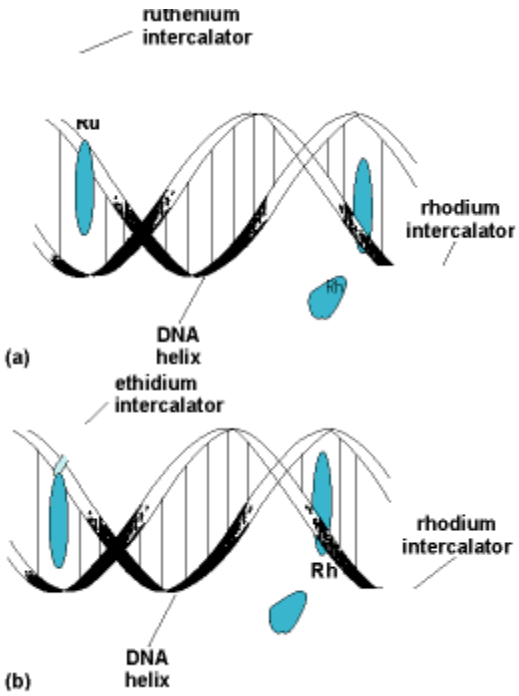
Stacking: refers to attractive, noncovalent interactions between aromatic rings. These interactions are important in nucleobase stacking within DNA and RNA molecules

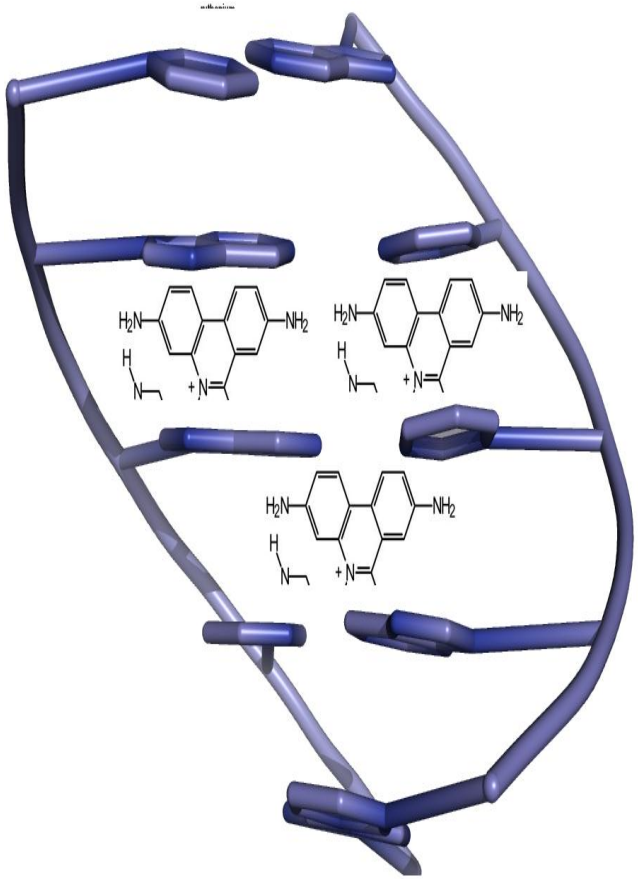






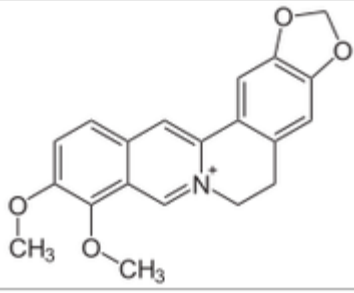



ruthenium
intercalator
Ru
rhodium
intercalator
DNA
helix
(a)
ethidium
intercalator
Rh
rhodium
intercalator
DNA
helix
(b)

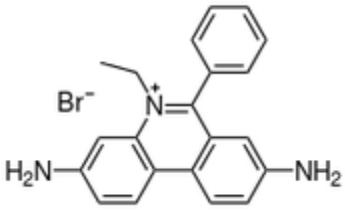


here are several ways molecules (in this case, also known as *ligands*) can interact with DNA. Ligands may interact with DNA by covalently binding, electrostatically binding, or intercalating.[1] Intercalation occurs when ligands of an appropriate size and chemical nature fit themselves in between base pairs of DNA. These ligands are mostly polycyclic, aromatic, and planar, and therefore often make good nucleic acid stains. Intensively studied DNA intercalators include berberine, ethidium bromide, proflavine,daunomycin, doxorubicin, and thalidomide.

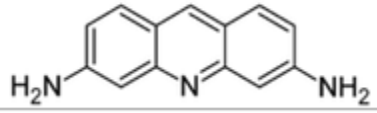
Berberine



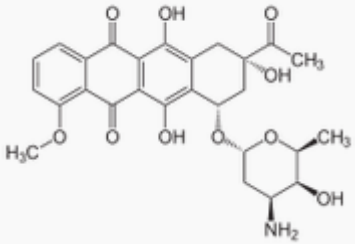
Ethidium bromide



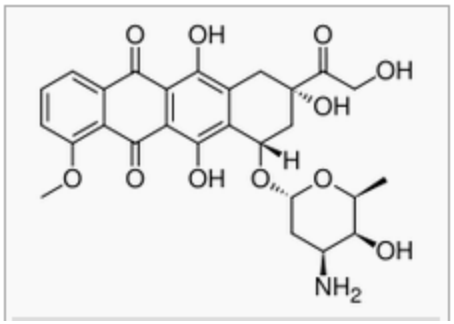
Proflavine



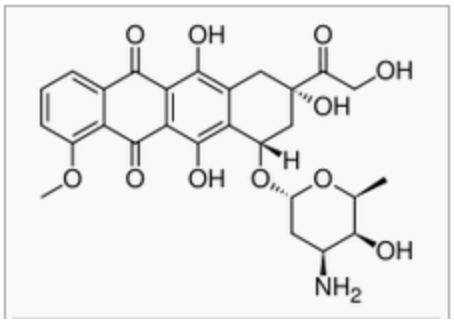
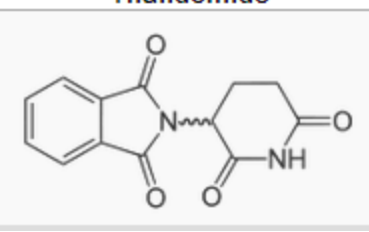
Daunorubicin



Doxorubicin



Doxorubicin



Thalidomide