

4. Nukleotide und Nukleinsäuren

Nukleotide:

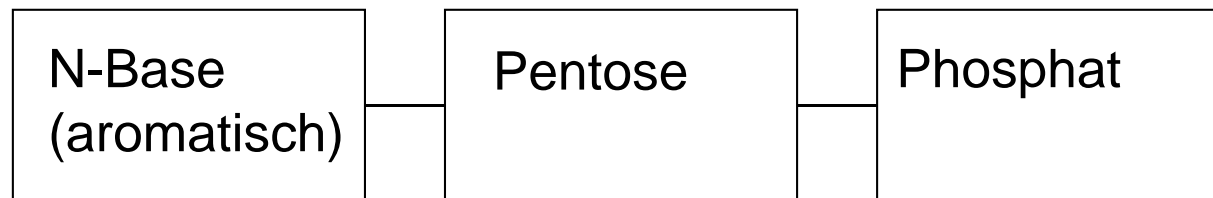
Bestandteil von Coenzymen der Oxidoreduktasen, Transferasen
Bausteine der Nukleinsäuren

Nukleinsäuren:

Speicherung, Umsetzung und Weitergabe der genetischen Information

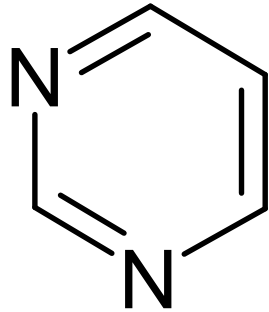
Bestandteile

Nukleotid

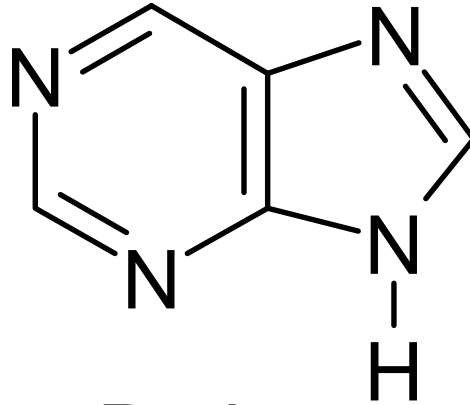


Nukleosid
(N-Glykosid)

N-Heterocyclen der Nukleotide



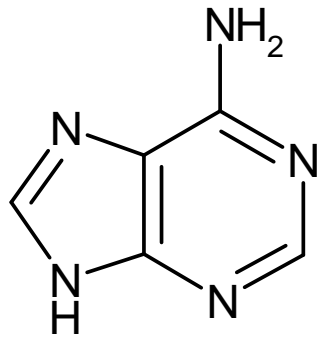
Pyrimidin
(1,3-Diazin)



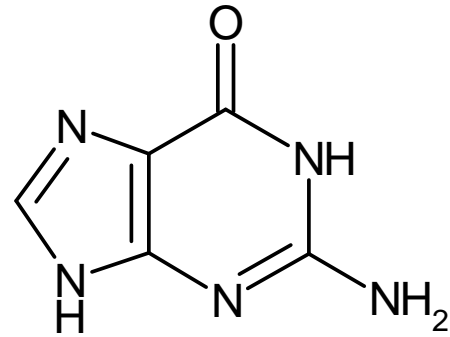
Purin

Pyrimidin + Imidazol

Die N-Basen von DNA und RNA

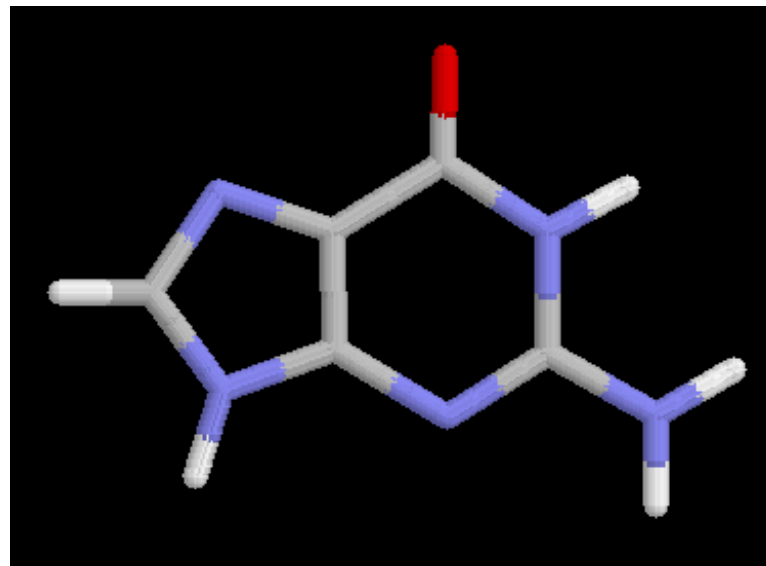


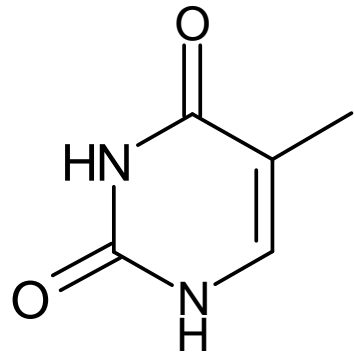
Adenin



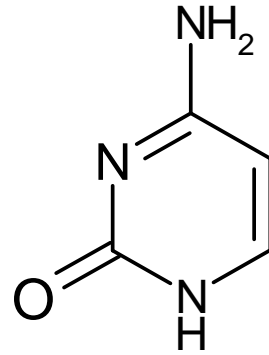
Guanin

Purin-Basen

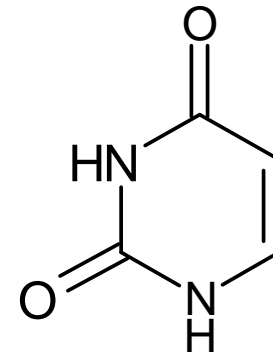




DNA Thymin

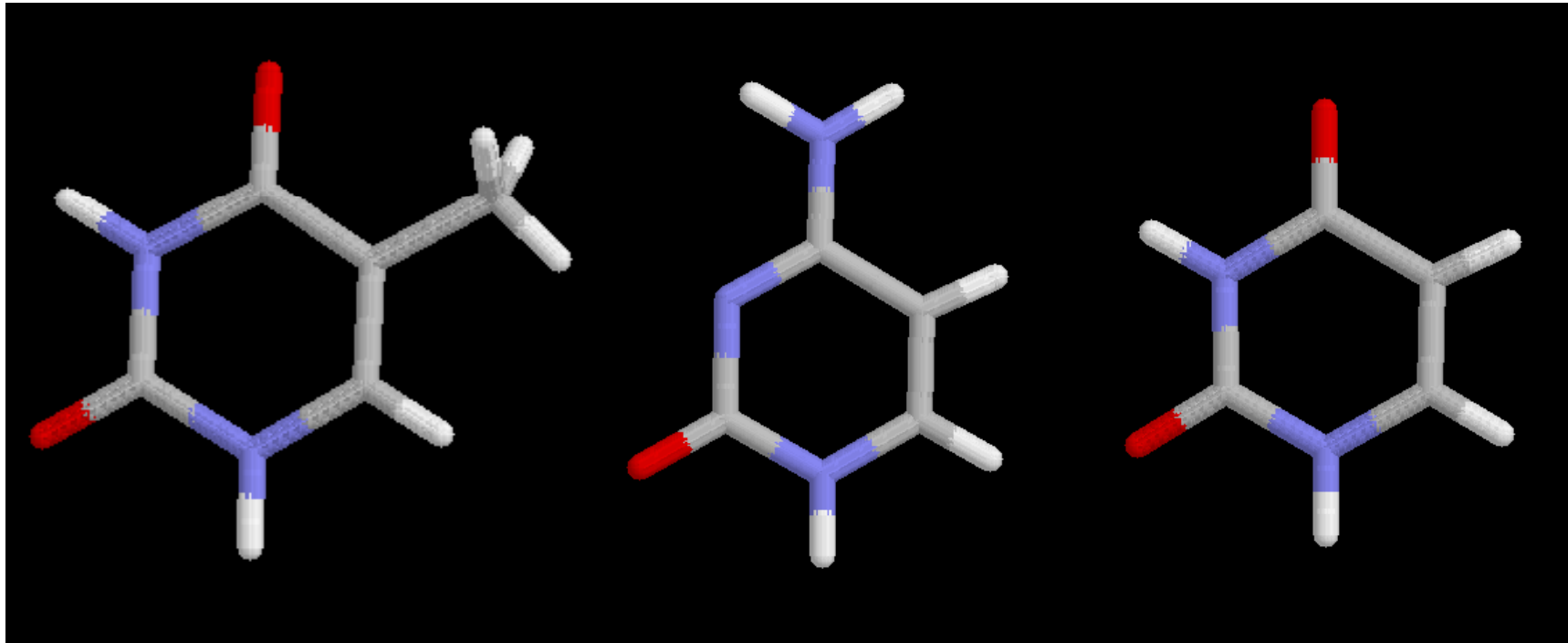


Cytosin

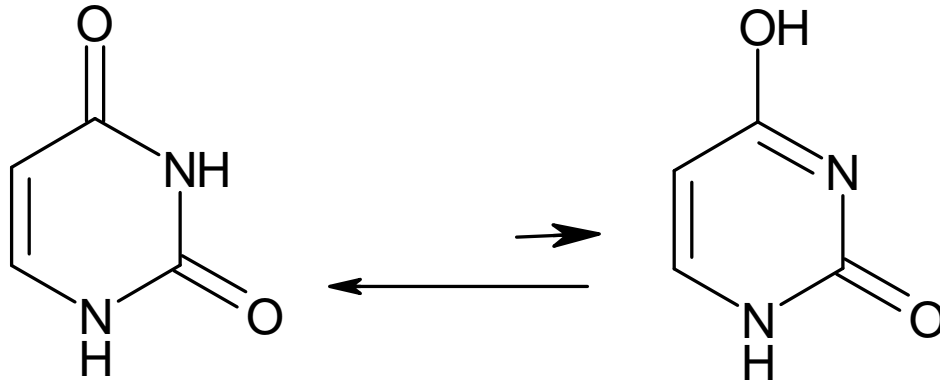


Uracil RNA

Pyrimidin-Basen



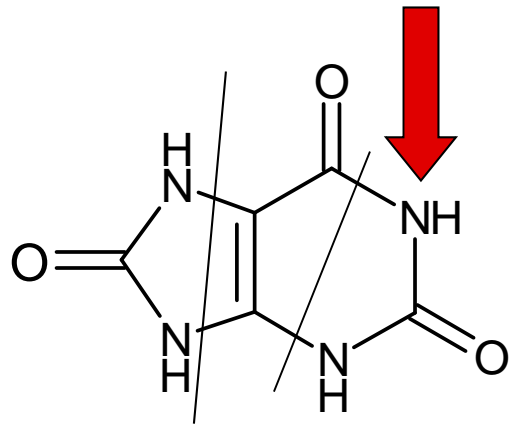
Lactam-Lactim Tautomerie



Uracil: Lactamform

Lactimform

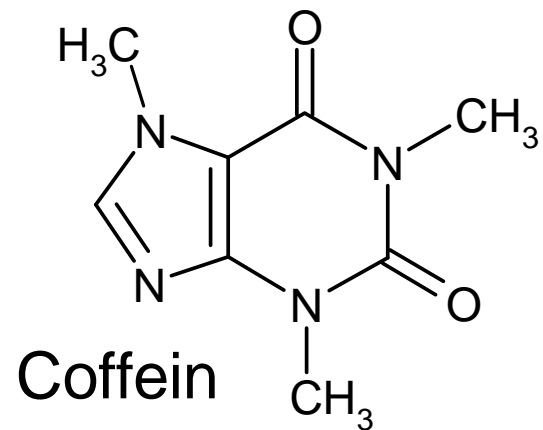
Abbau der Purinbasen zu Harnsäure



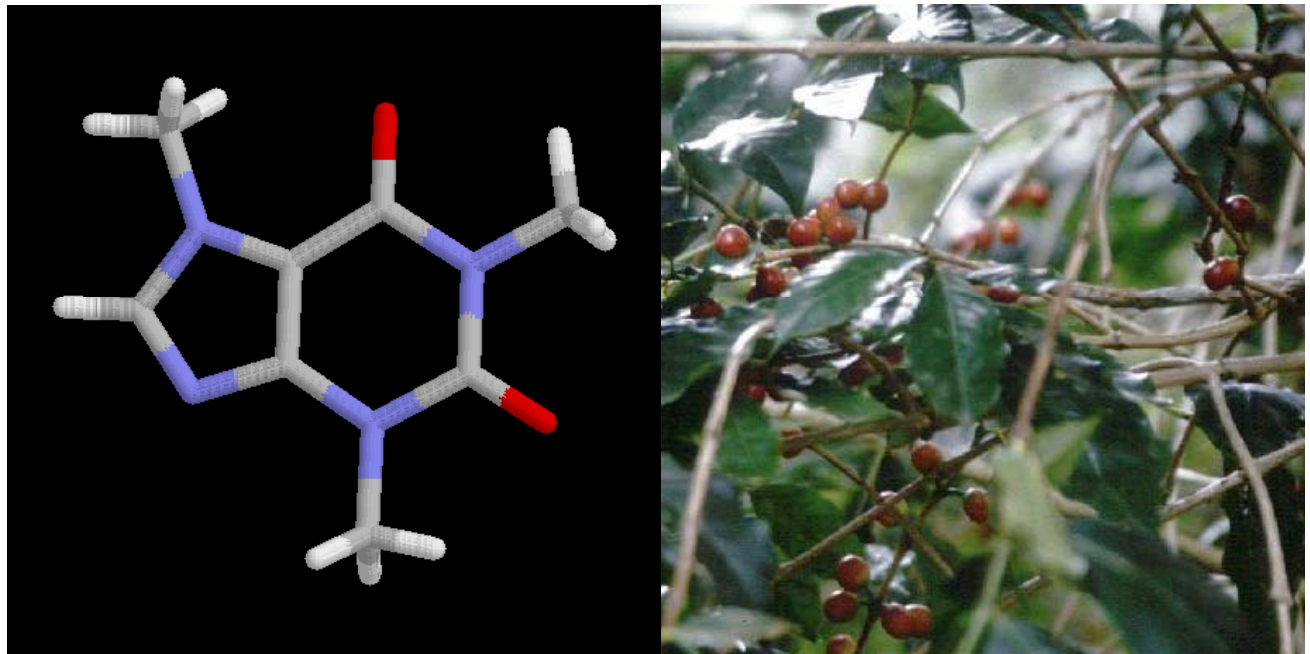
Harnsäure

pKs: 5.4

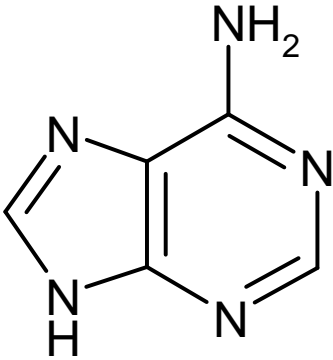
Weiterer Abbau zu Harnstoff (H₂NCONH₂)



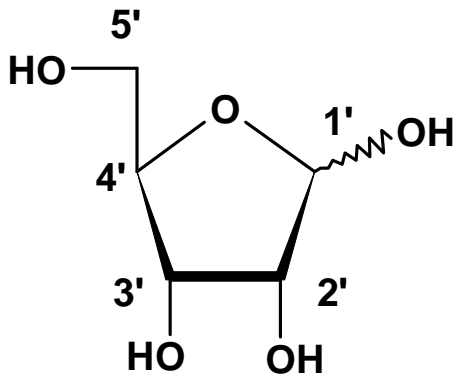
Coffein



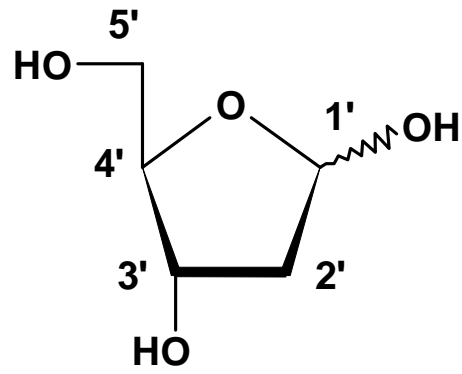
Nucleoside: N-Glycoside der N-Basen



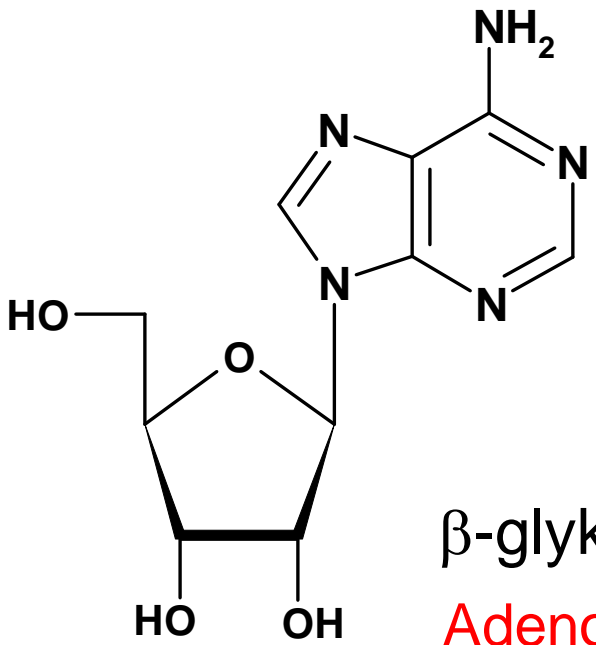
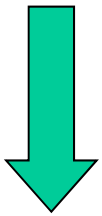
Adenin



Ribose
(Furanose)

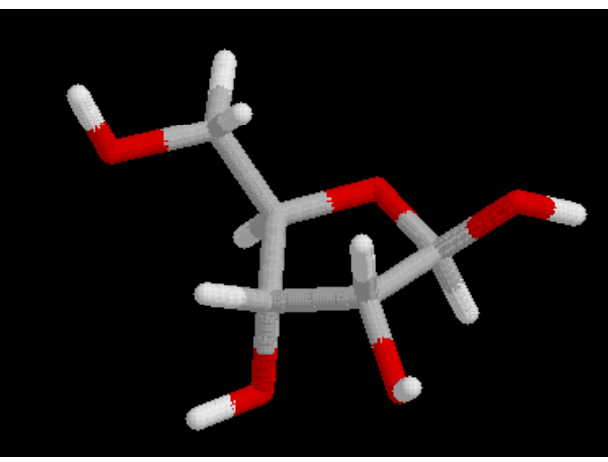


2'-Desoxyribose
(Furanose)

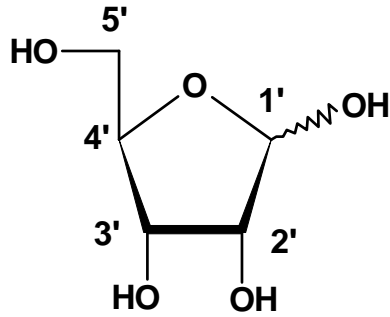


β -glykosidische Bindung (β -Ribofuranosid)

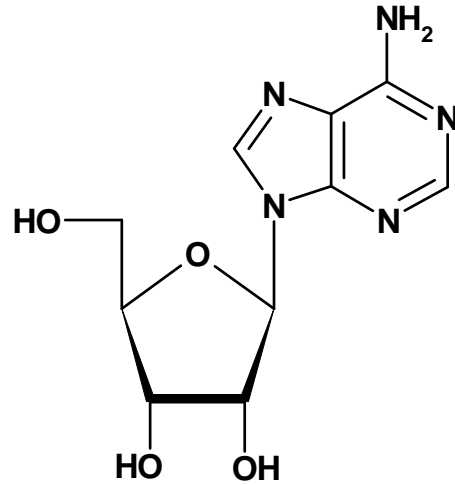
Adenosin



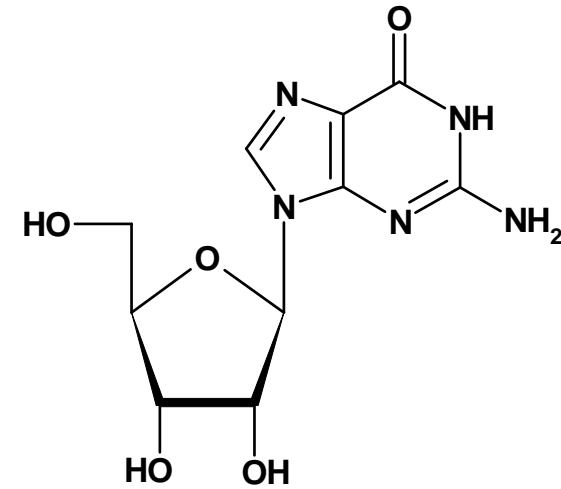
Purin-Nucleoside



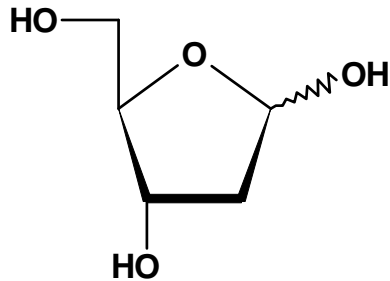
**Ribose
(Furanose)**



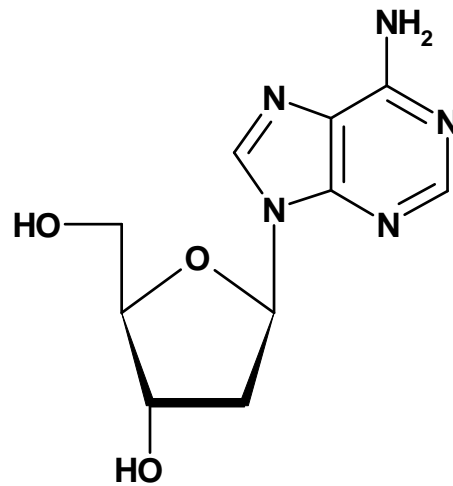
Adenosin



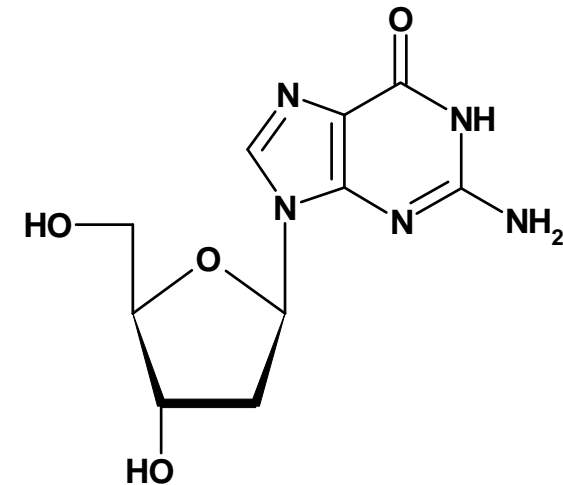
Guanosin



**2'-Desoxyribose
(Furanose)**

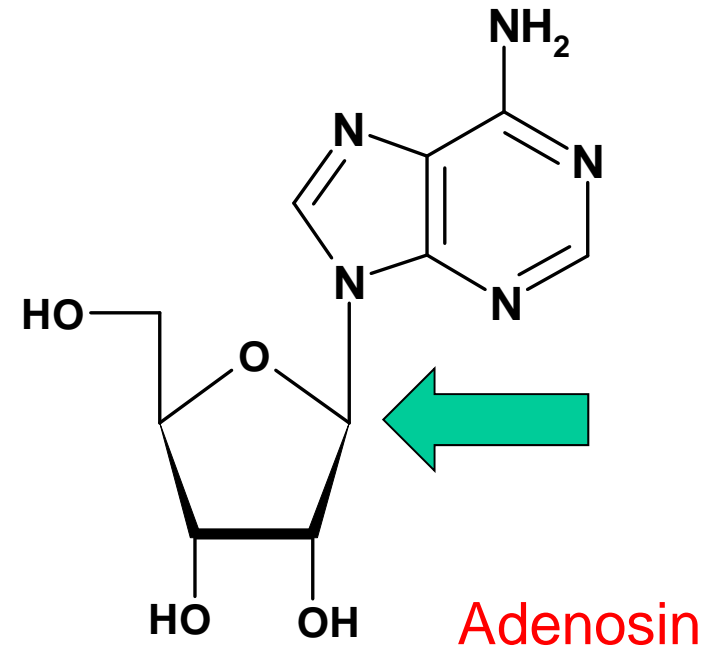
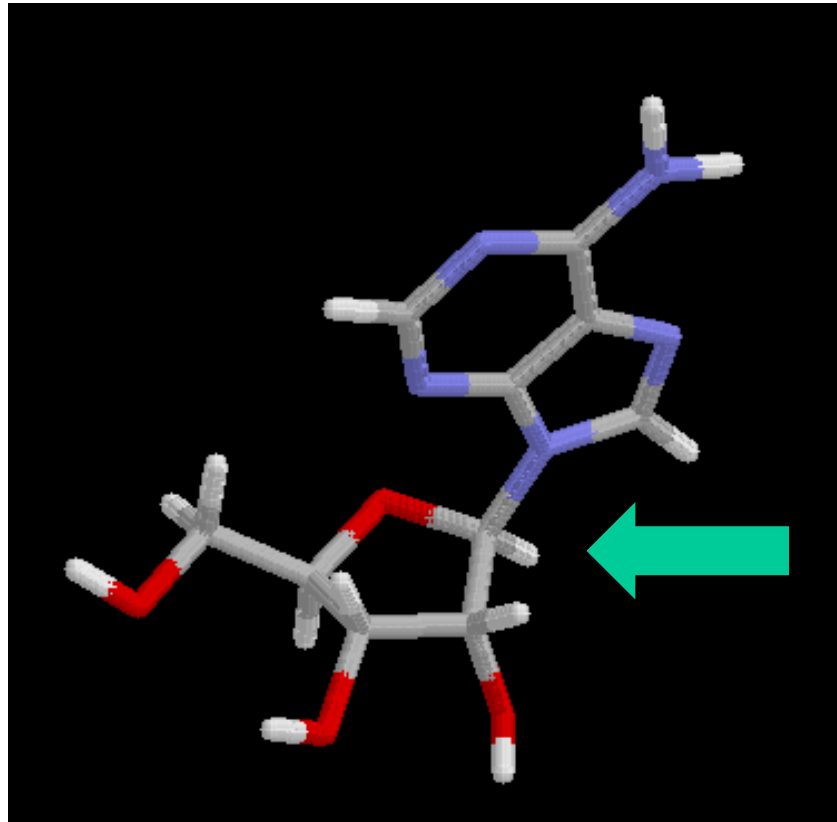


**2'-desoxy-Adenosin
dA**



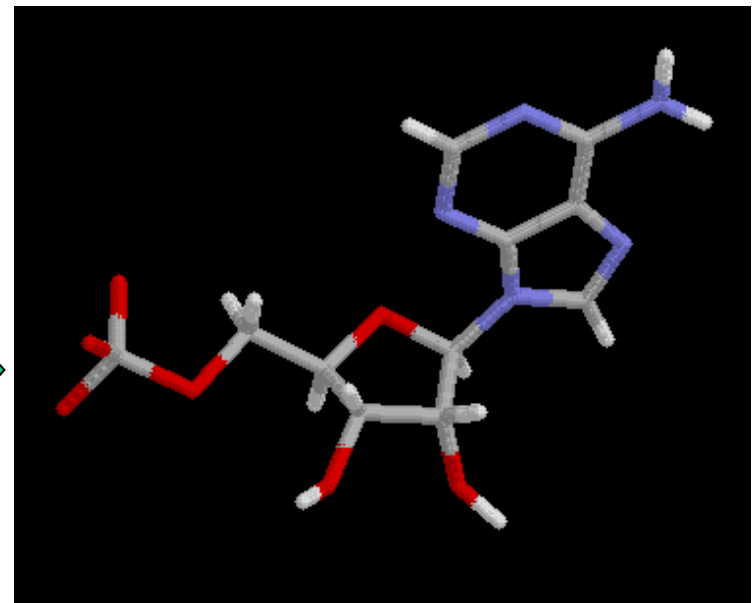
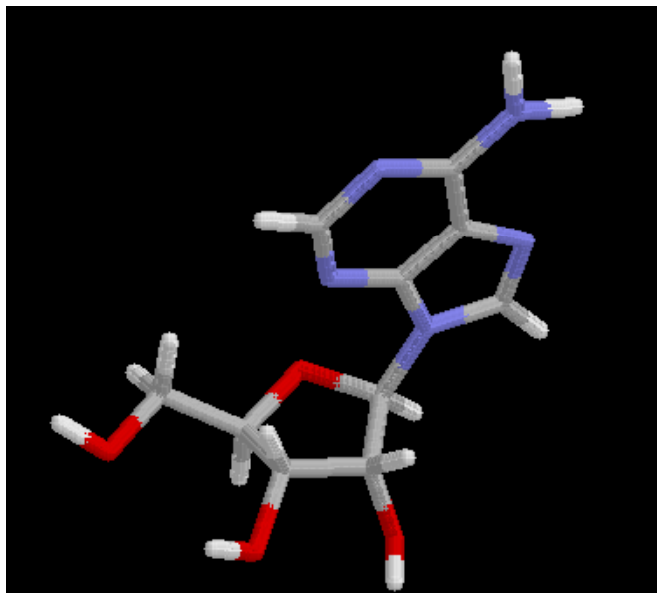
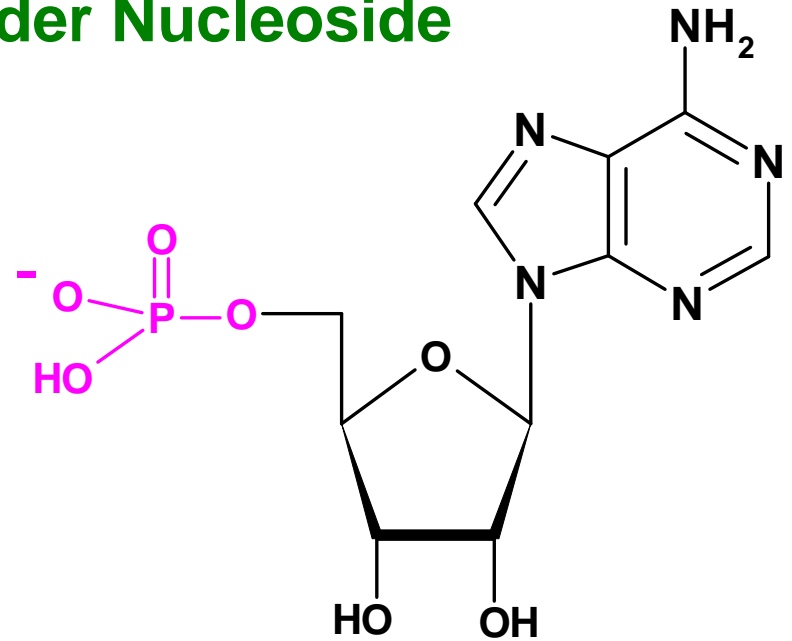
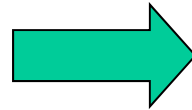
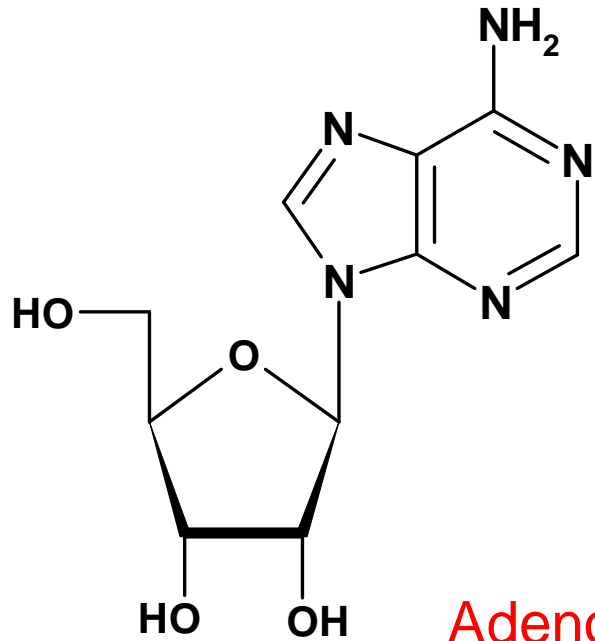
**2'-desoxy-Guanosin
dG**

Purin-Nucleoside



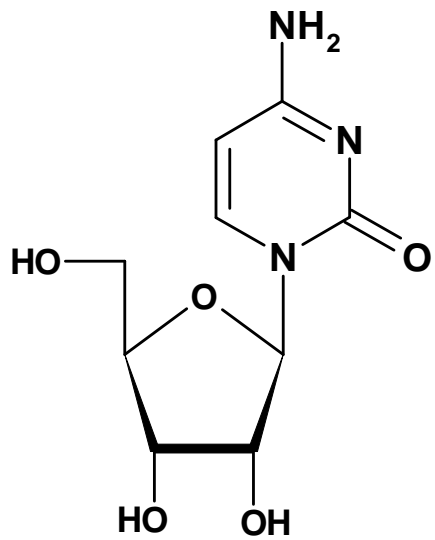
N-glykosidische Bindung

Nucleotide: Phosphorsäureester der Nucleoside

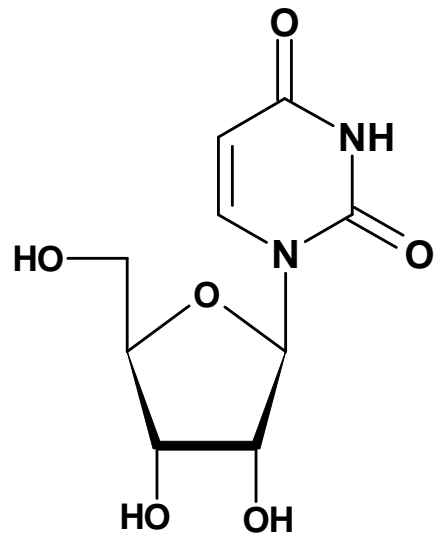


Phosphorsäure
ester

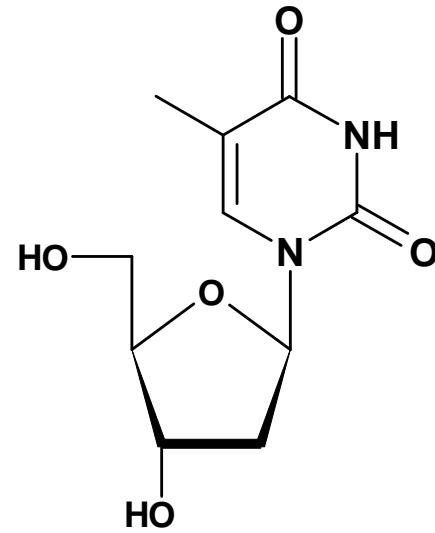
Pyrimidin-Nucleoside



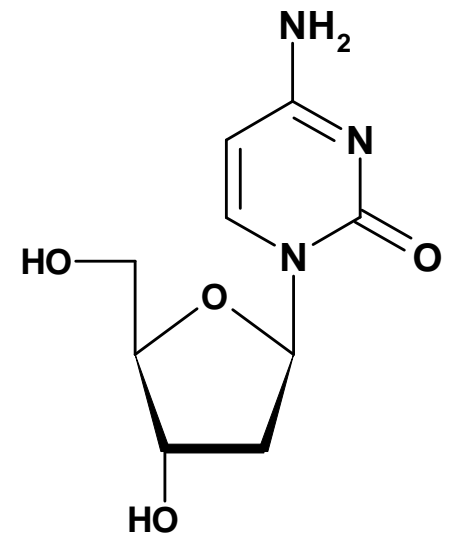
Cytidin
C



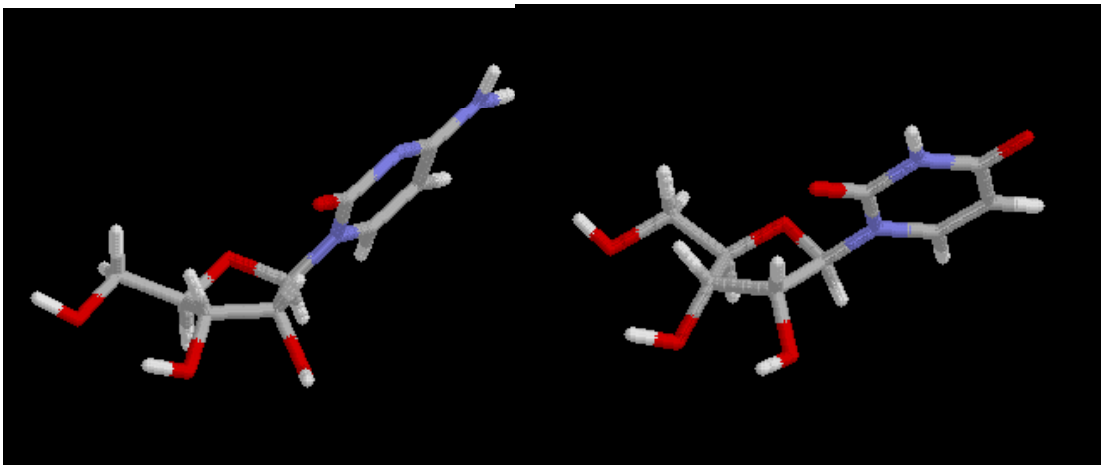
Uridin
U



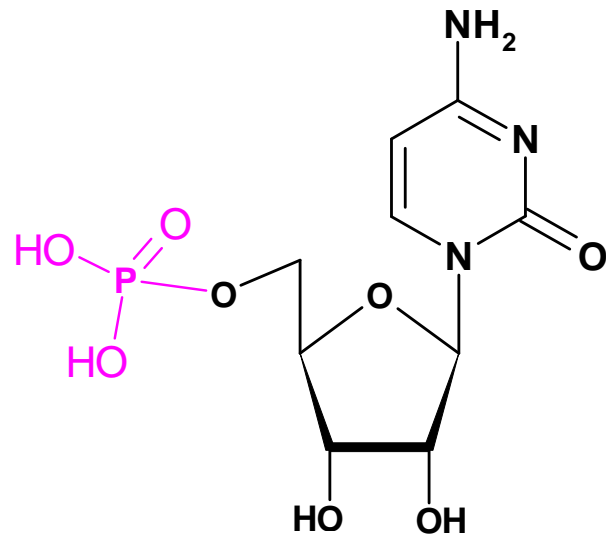
Thymidin
2'-Desoxyribosylthymidin
dT



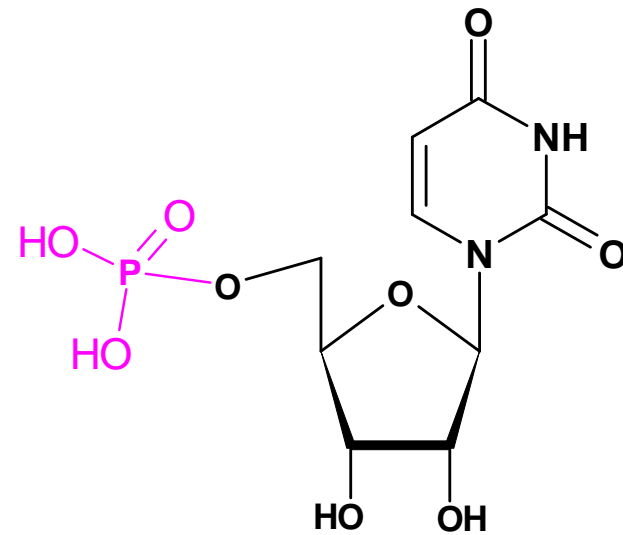
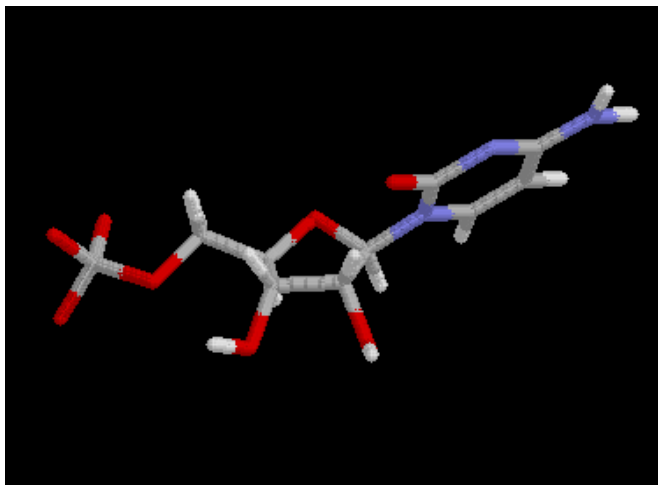
2'-desoxy-Cytidin
dC



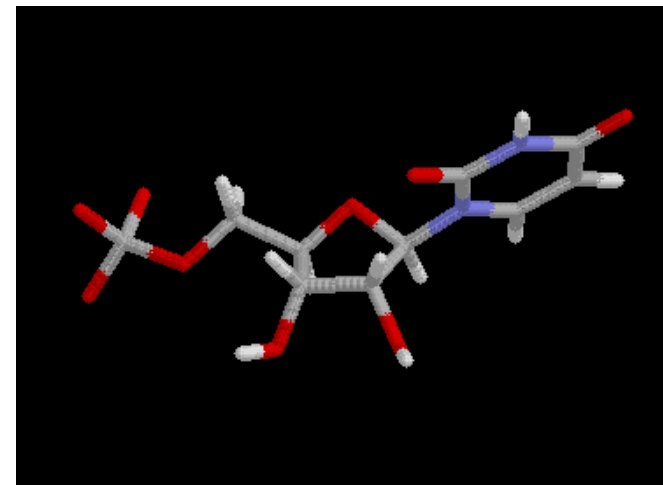
Pyrimidin-Nukleotide



Cytidinmonophosphat
CMP

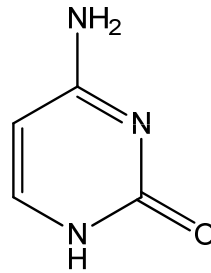


Uridinmonophosphat
UMP

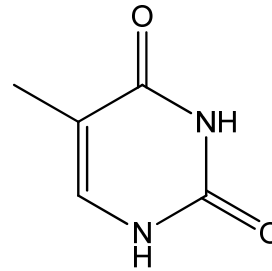


Pyrimidin-Derivate

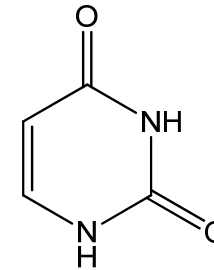
Basen



Cytosin

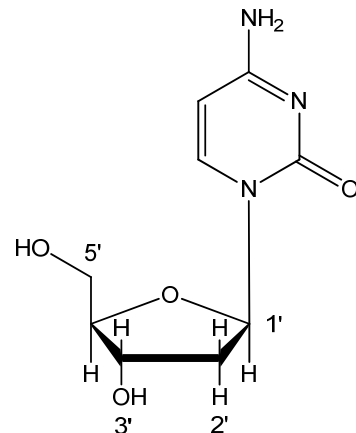


Thymin

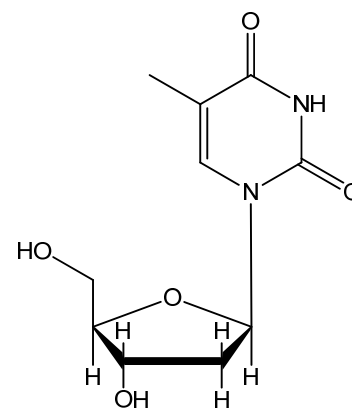


Uracil

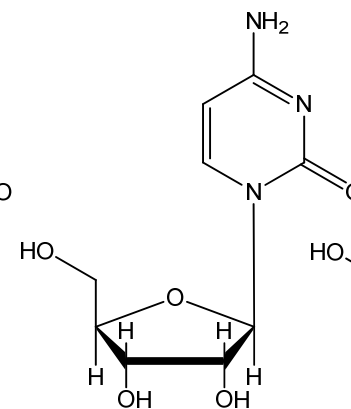
Nucleoside



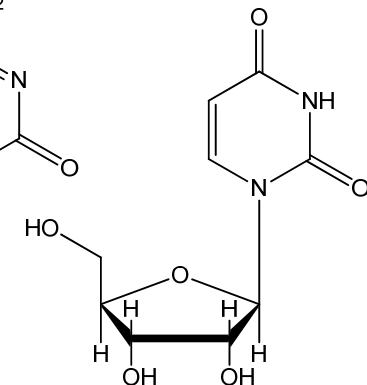
deoxyCytidin (dC)



Thyminid (dT)

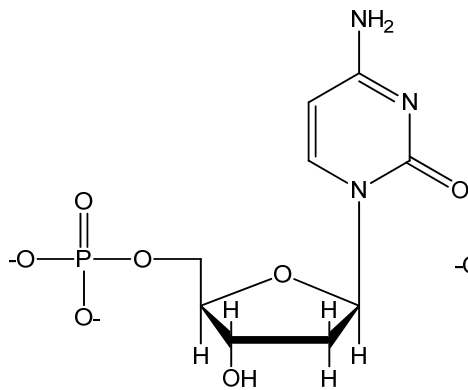


Cytidin (C)

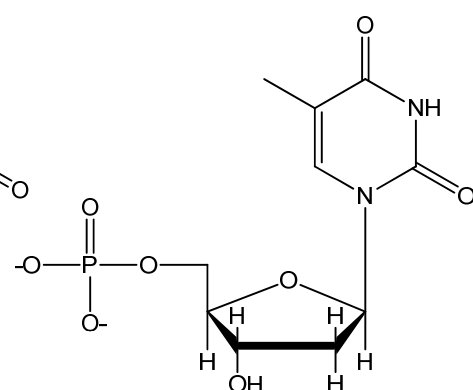


Uridin (U)

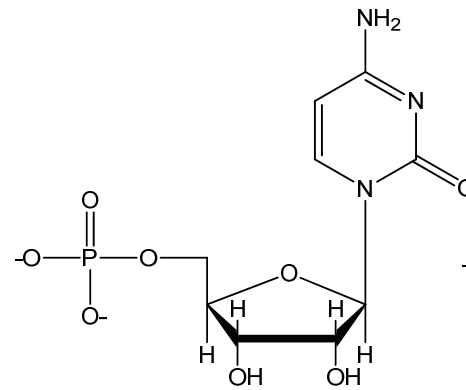
Nucleotide



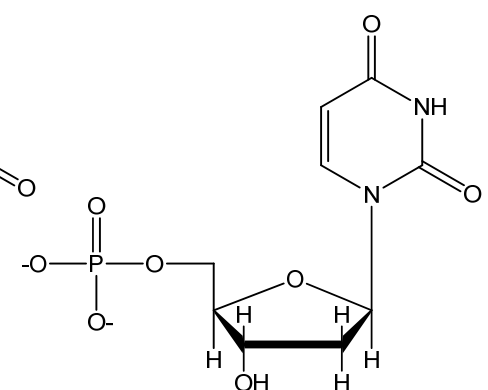
deoxyCytidin-
5'-monophosphat
dCMP



deoxyThyminid-
5'-monophosphat
dTMP



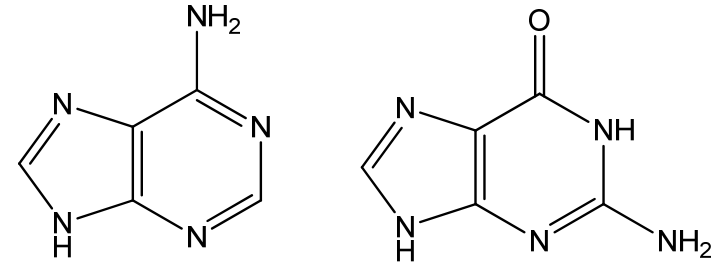
Cytidin-
5'-monophosphat
CMP



Uridin-
5'-monophosphat
UMP

Purin-Derivate

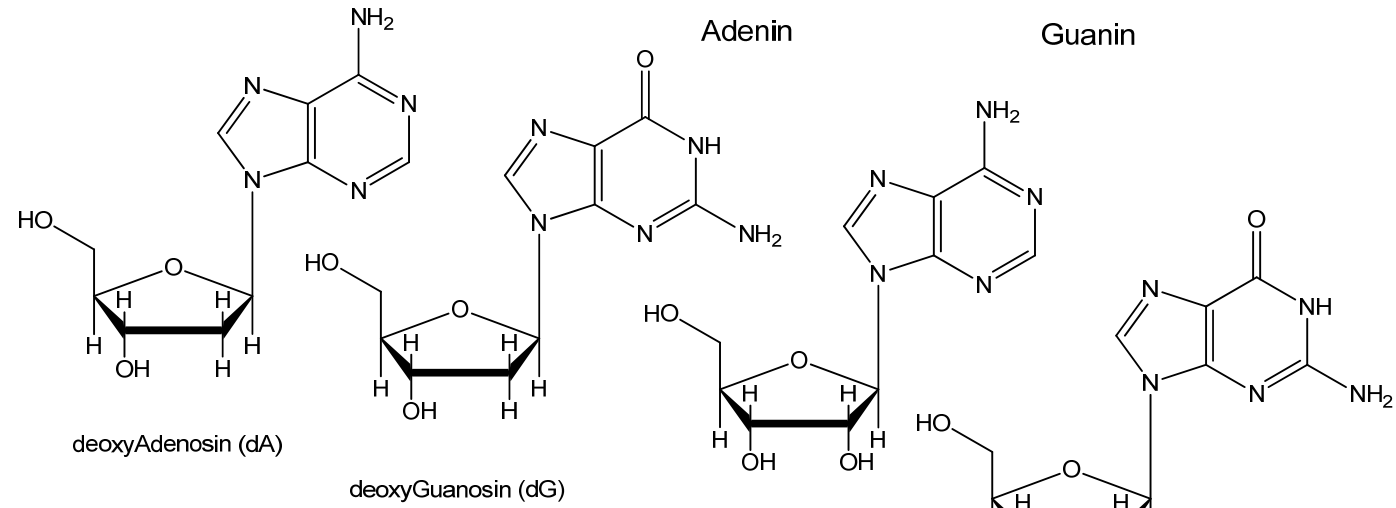
Basen



Adenin

Guanin

Nucleoside



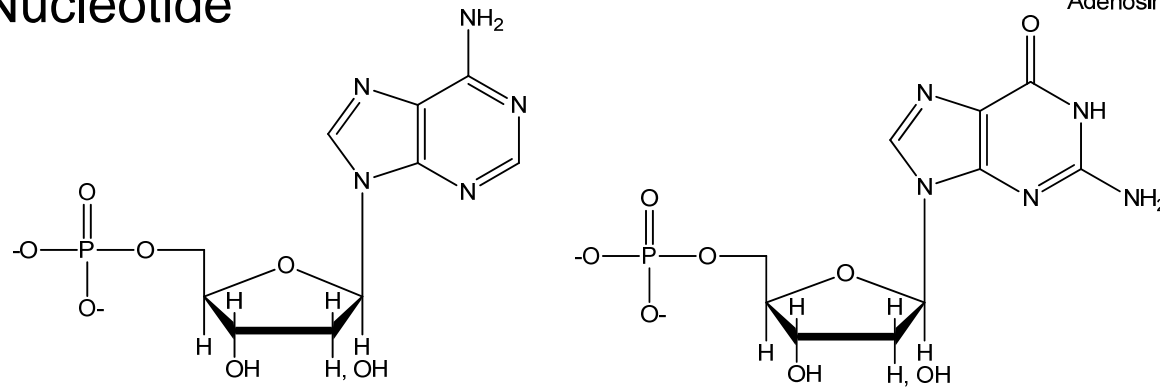
deoxyAdenosin (dA)

deoxyGuanosin (dG)

Adenosin (A)

Guanosin (G)

Nucleotide



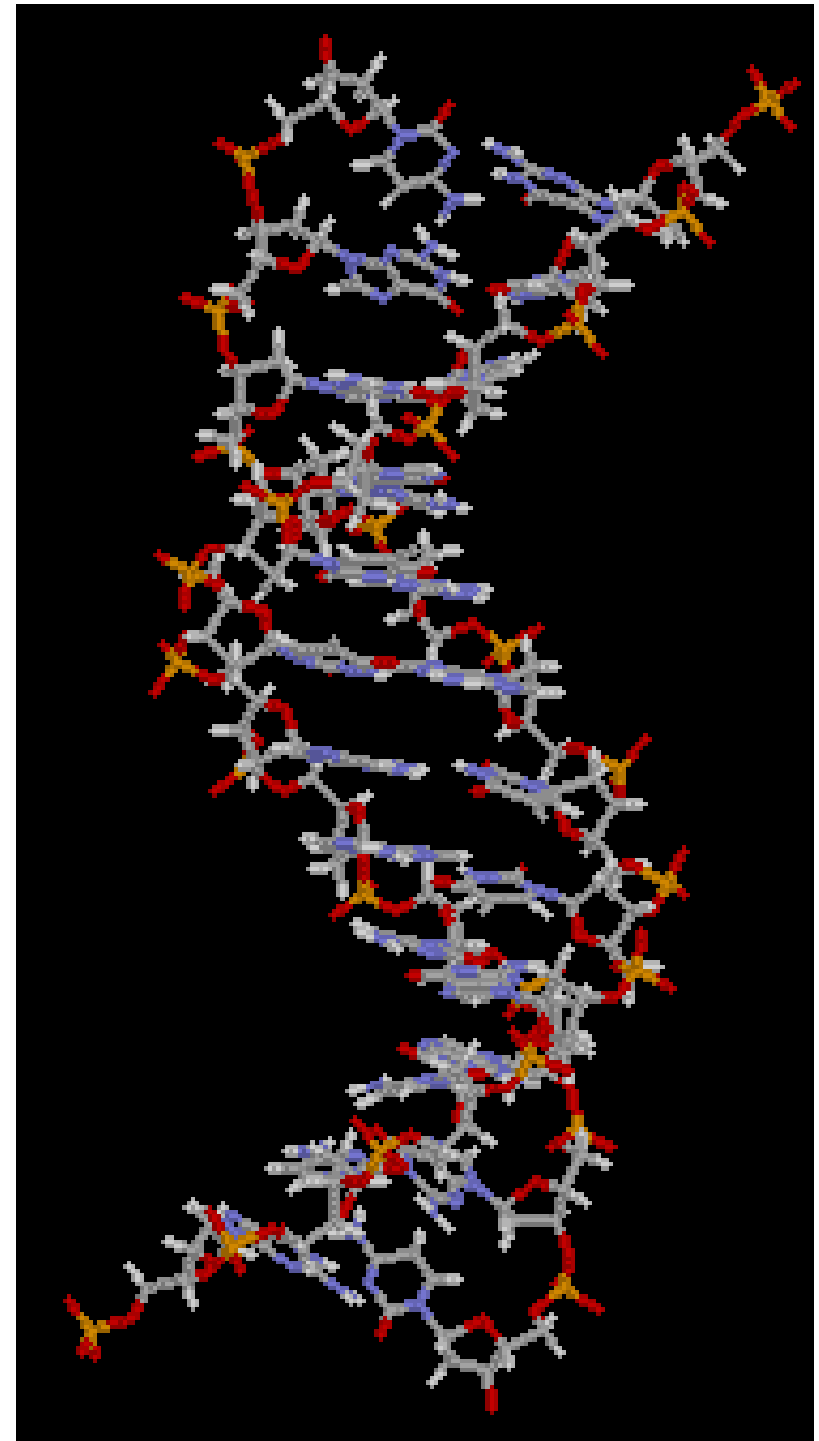
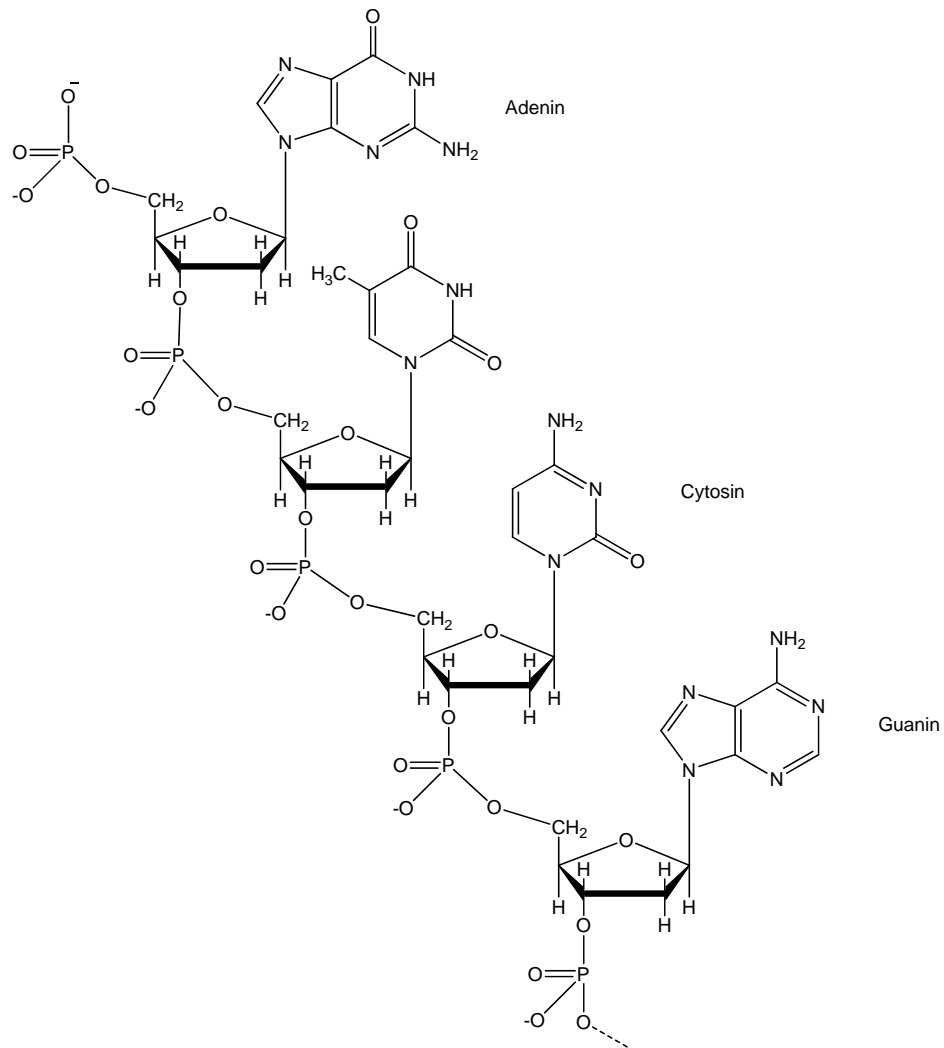
(deoxy)Adenosin-5'-monophosphat (d)AMP

(deoxy)Guanosin-5'-monophosphat (d)GMP

Struktur der Desoxyribonukleinsäure DNA

Doppelhelix

~ 10 Basen eine Umdrehung



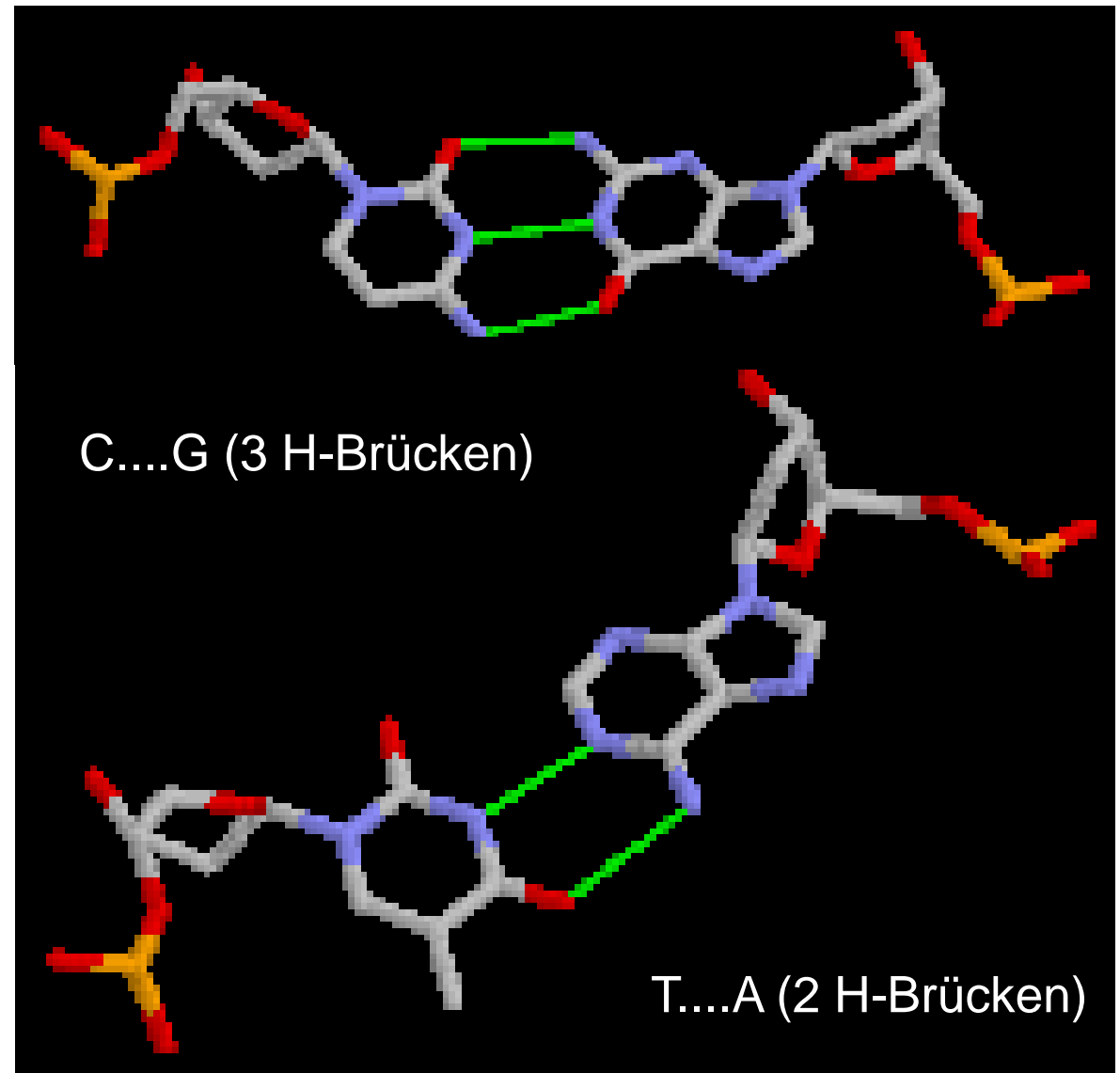
Prinzip der komplementären Basenpaarung

PurinPyrimidin

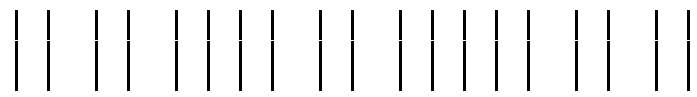
Spezifisch:

A....T (2 H-Brücken)

C....G (3 H-Brücken)

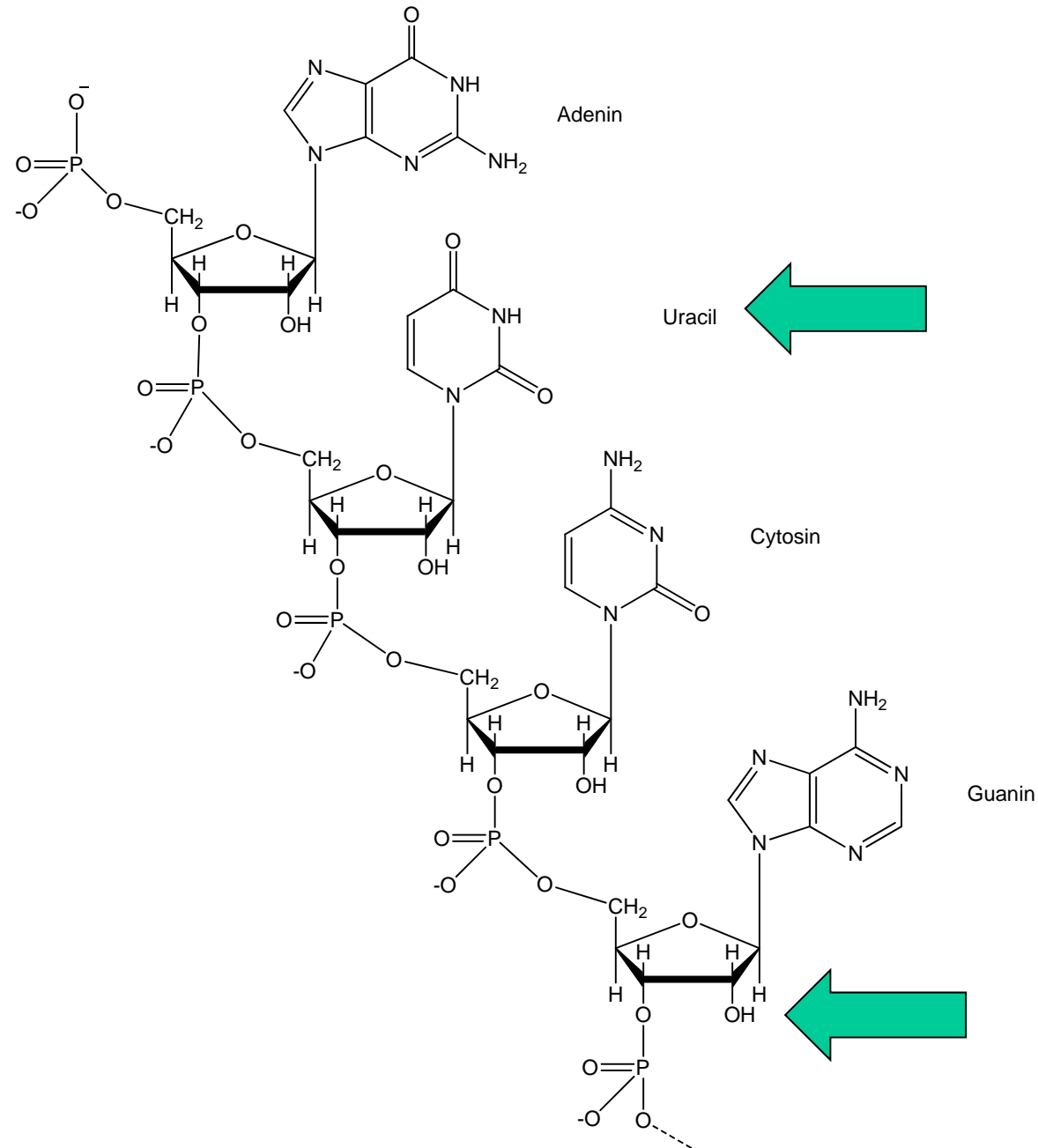


CCGATTCCCAATTGTGTCT.....



GGCTAAGGGTTAACACAGA....

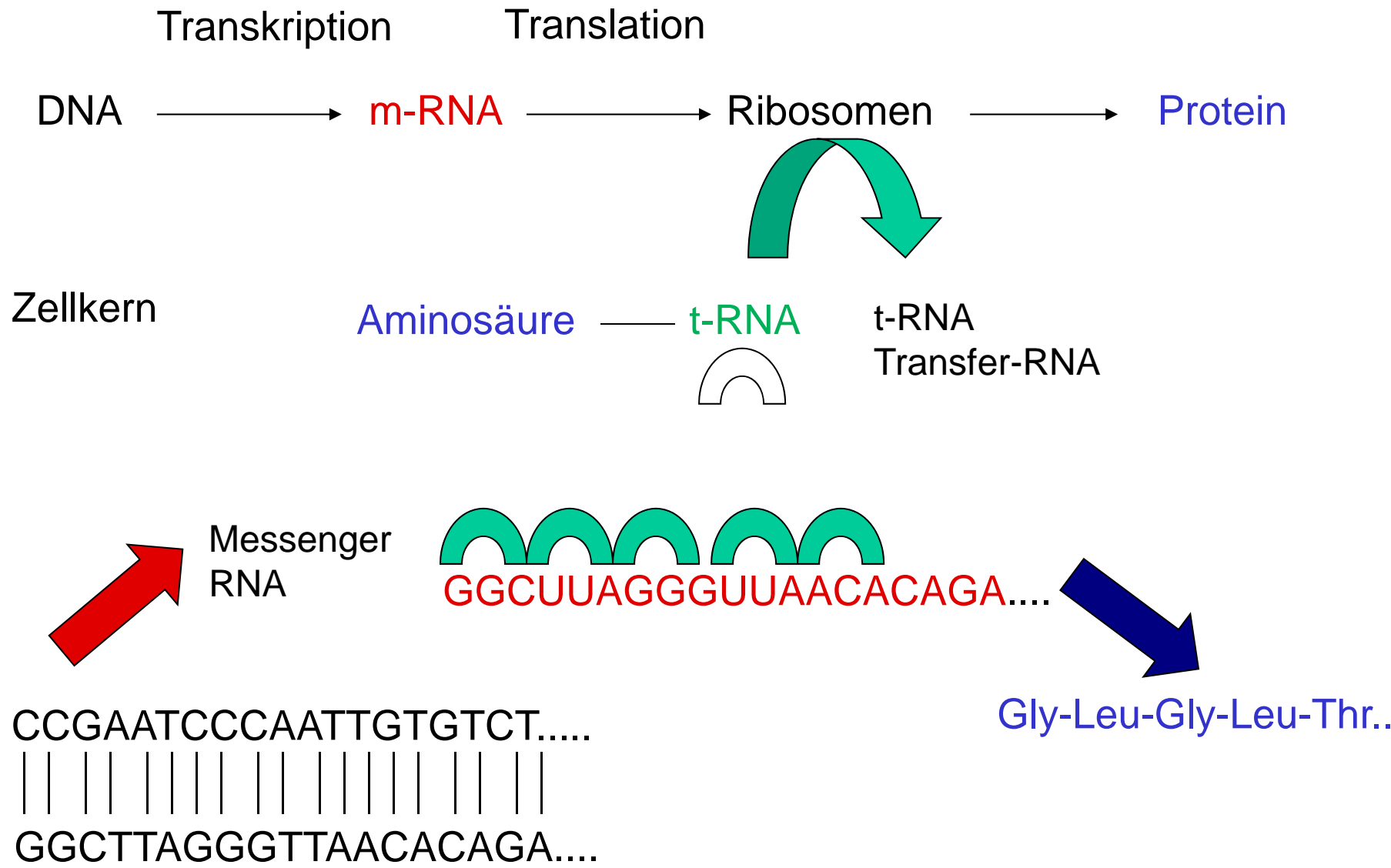
Struktur der Ribonukleinsäure (RNA)



Prinzip der Proteinbiosynthese

Basensequenz

Aminosäuresequenz



Genetischer Code:

Basentriplett codiert eine Aminosäure

$4^3 = 64$ Möglichkeiten

Aminosäure

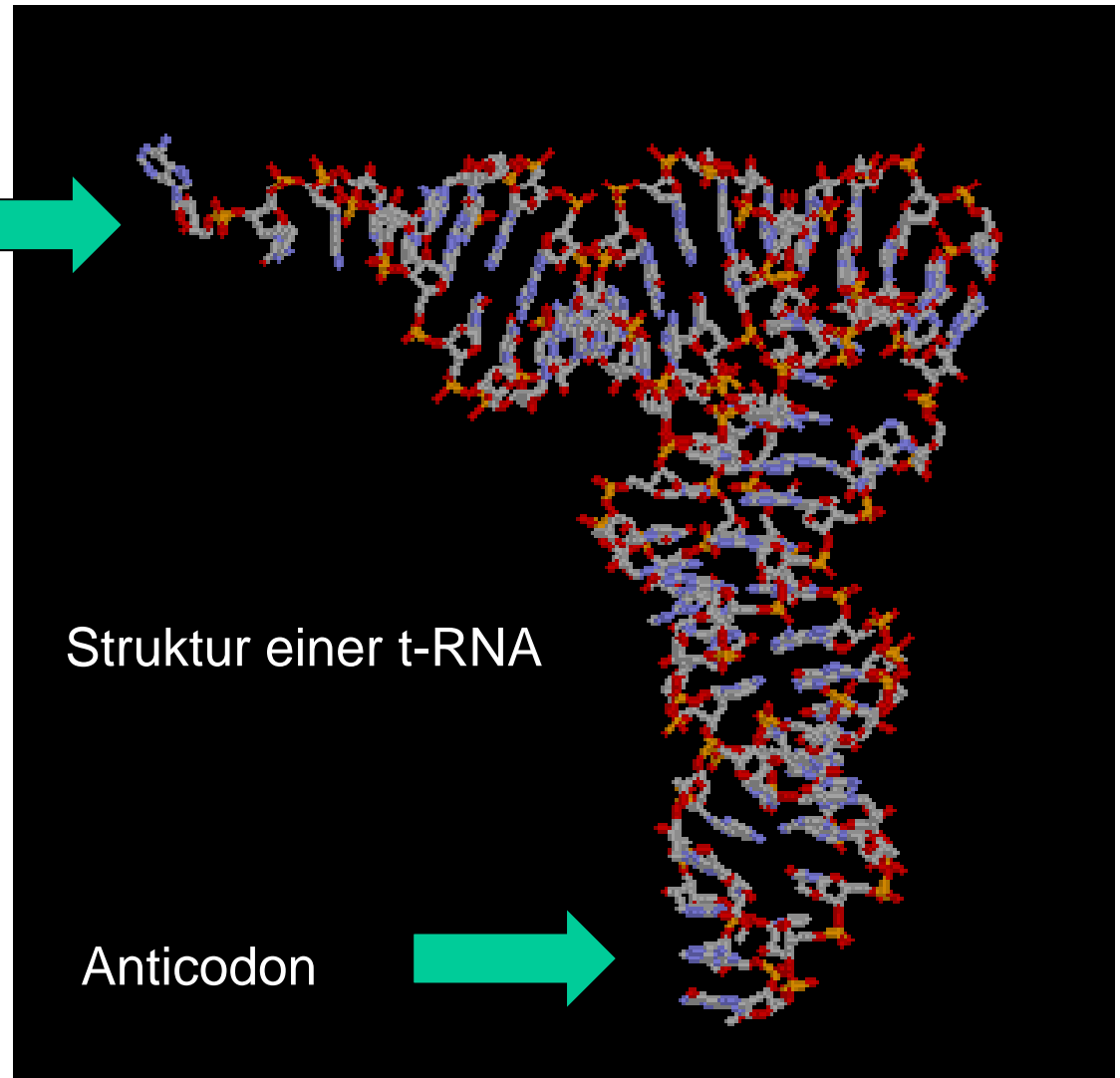


Struktur einer t-RNA

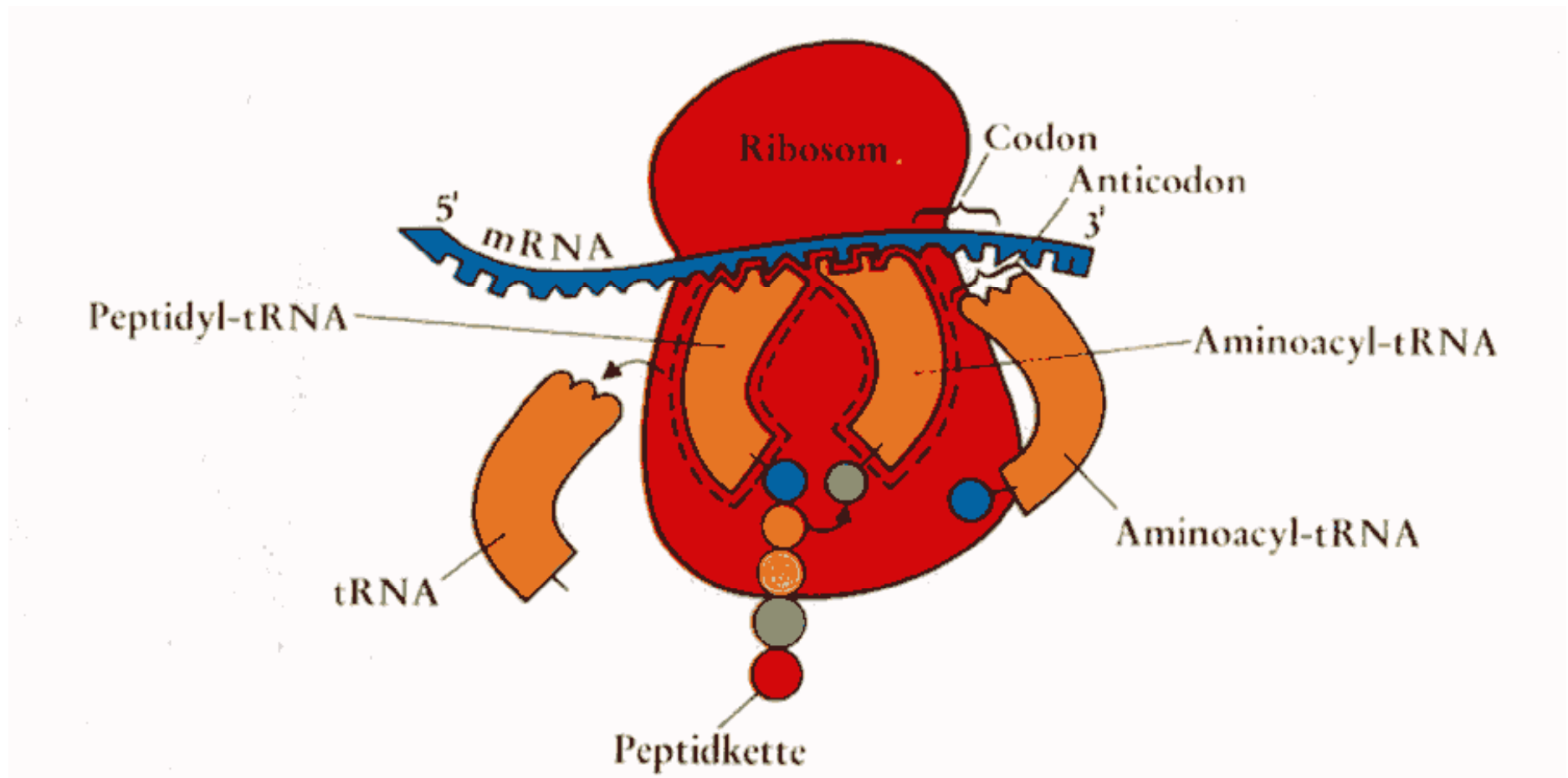
Genetischer Code:

universell
degeneriert

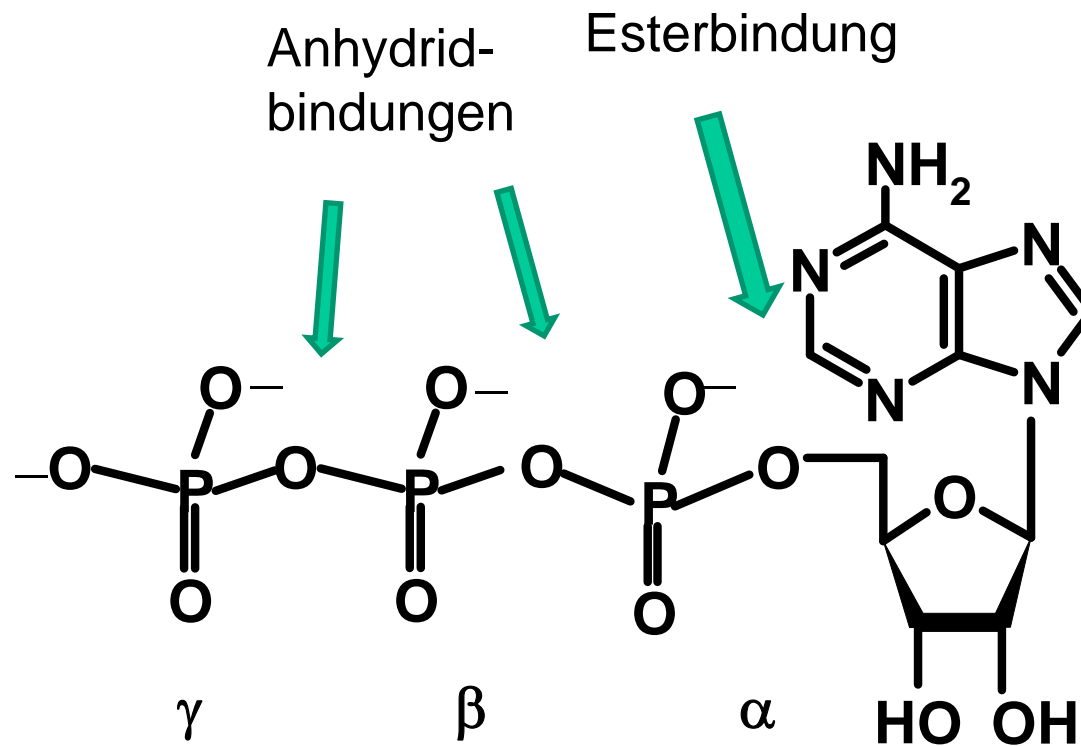
Anticodon



Proteinbiosynthese

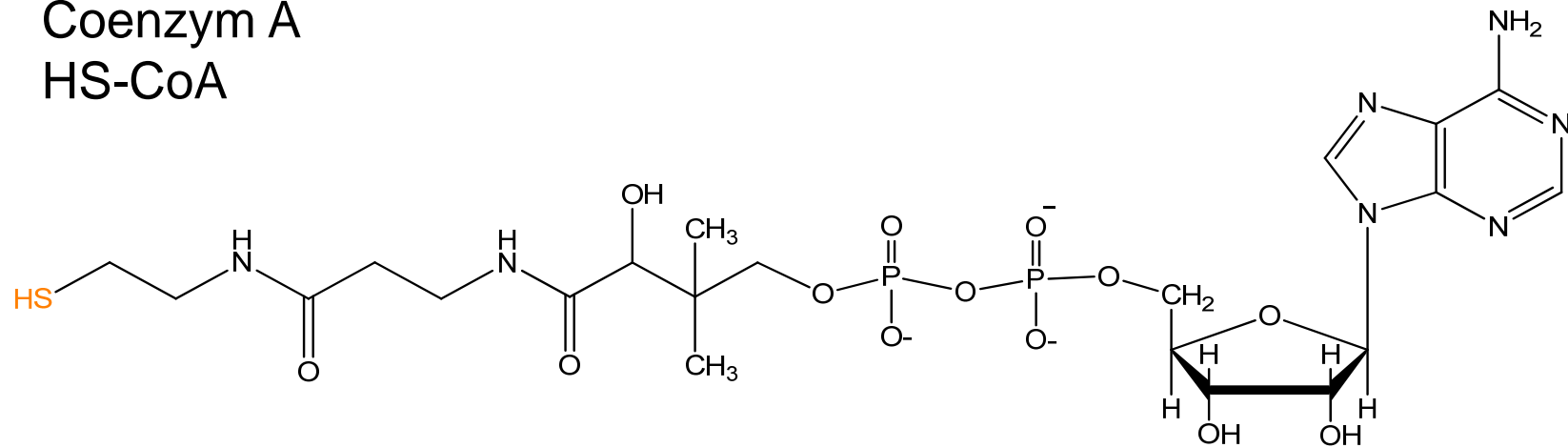


Nukleotide als Bestandteil der Coenzyme



Adenosintriphosphat, ATP

Coenzym A
HS-CoA



Nicotinamid

adenin

dinucleotid

NAD⁺, bzw. NADP

