

HETEROCIKLIČNA JEDINJENJA



Ciklična jedinjenja koja sem C i H sadrže i atome drugih elemenata (S, O, N..)

Podela heterocikličnih jedinjenja:

- vrsta i broj heteroatoma u prstenu
- ukupnom broju atoma u prstenu
- aromatičnosti
- kondenzovani prstenovi...

Nomenklatura heterocikličnih jedinjenja:

IUPAC nomenklatura:

Prefiks oksa – O; aza – N; tia – S

Trivijalna imena



Oksaciklopropan
Etilen-oksid

PETOČLANA HETEROCIKLIČNA JEDINJENJA SA JEDNIM HETEROATOMOM



tetrahidrofuran



pirolidin



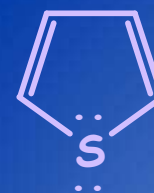
tetrahidrotiofen



furan



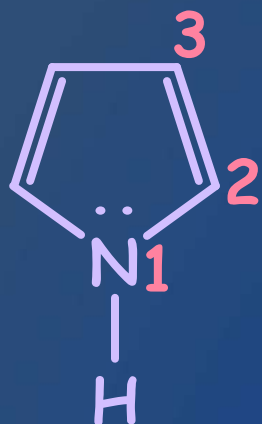
pirol



tiofen

PETOČLANA HETEROCIKLIČNA SA AZOTOM

- sa jednim atomom azota -

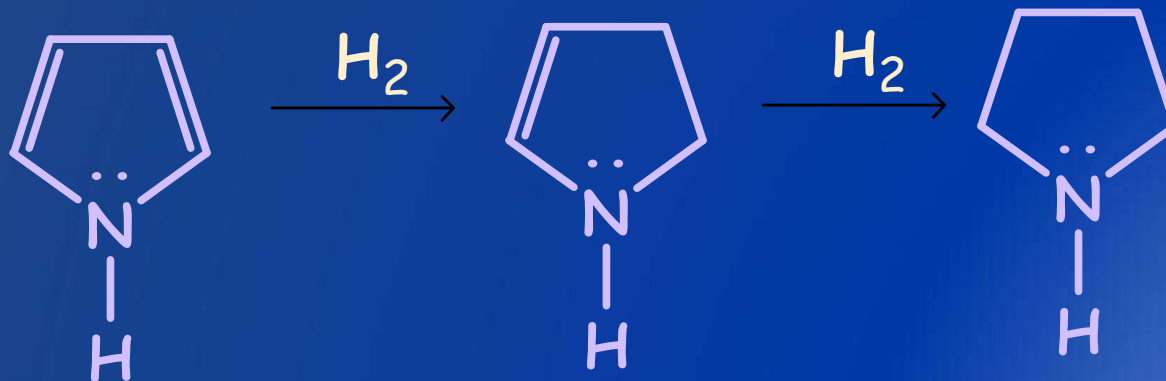


aromatican

nerastvoran u vodi

ne pokazuje bazne osobine (usled delokalizacije elektrona)

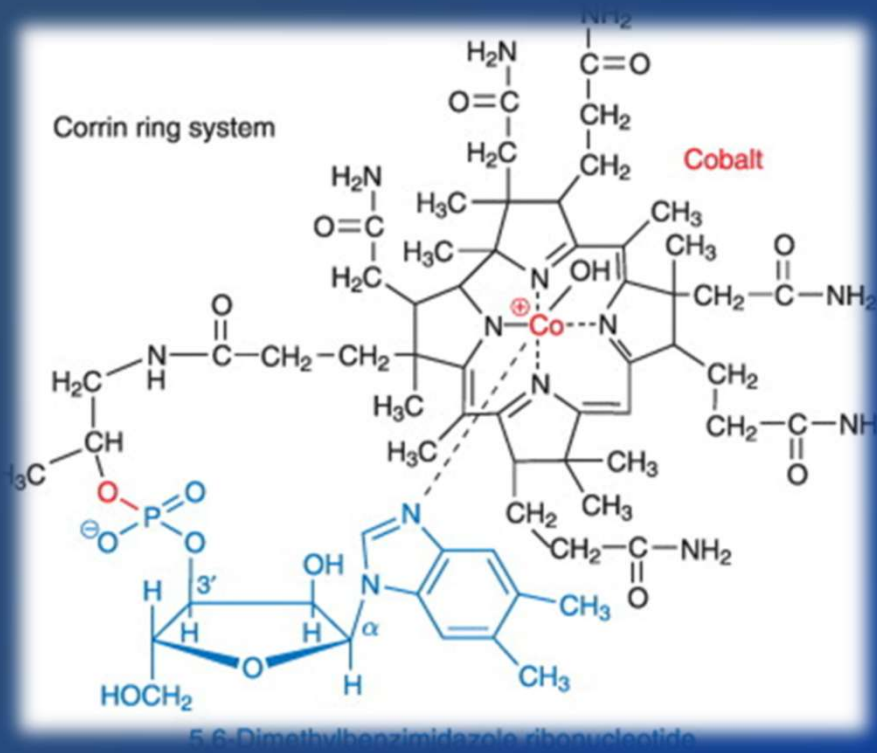
Postepena redukcija



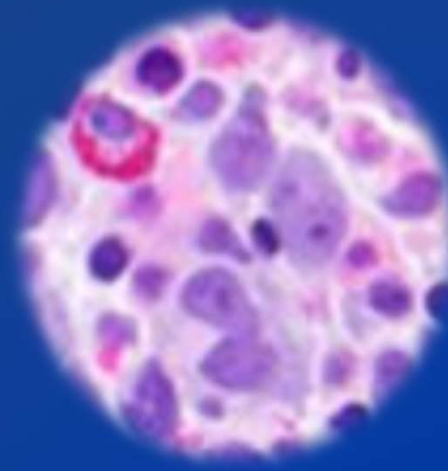
pirol

pirolin

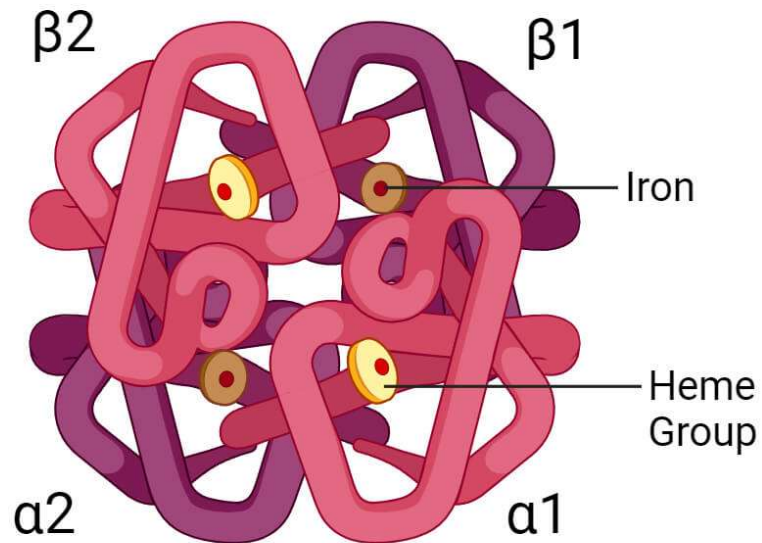
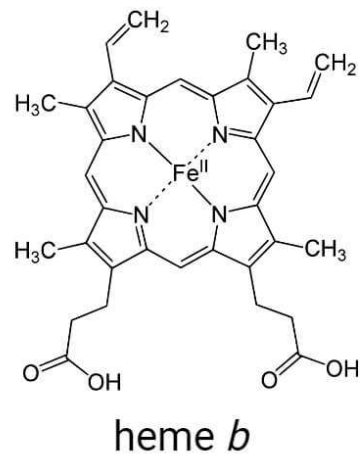
pirolidin



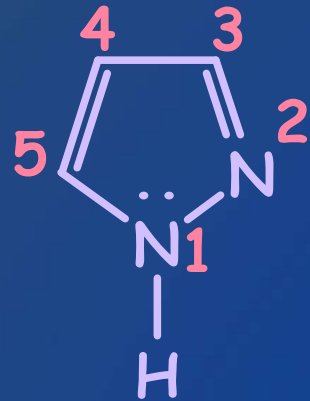
<https://ars.els-cdn.com/content/image/3-s2.0-B0122266943000612-gr1.jpg>



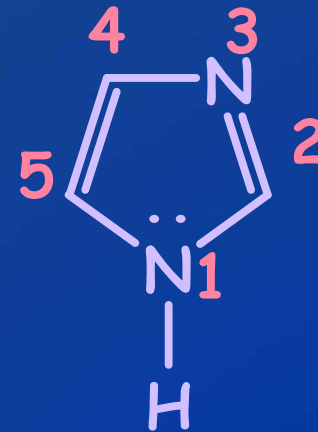
Hemoglobin



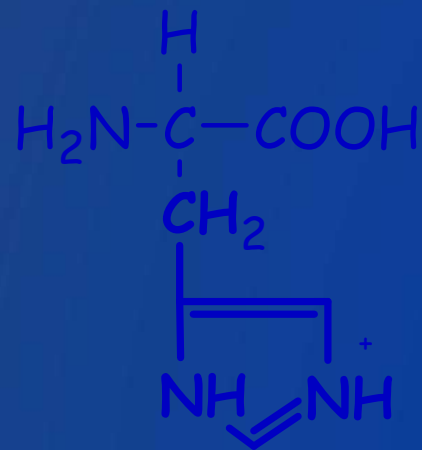
- sa dva atoma azota -



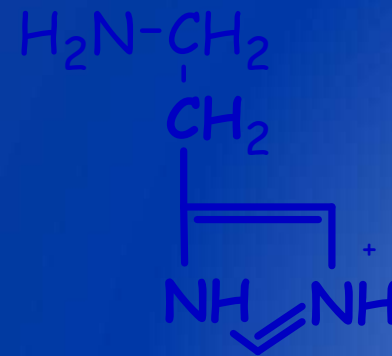
pirazol



imidazol



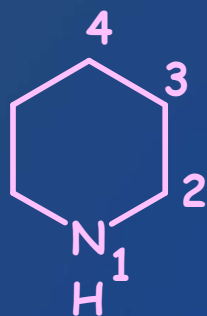
histidin



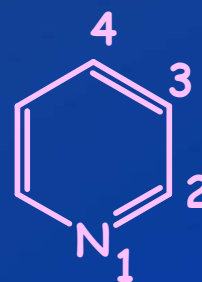
histamin

ŠESTOČLANA HETEROCIKLIČNA SA AZOTOM

- sa jednim atomom azota -

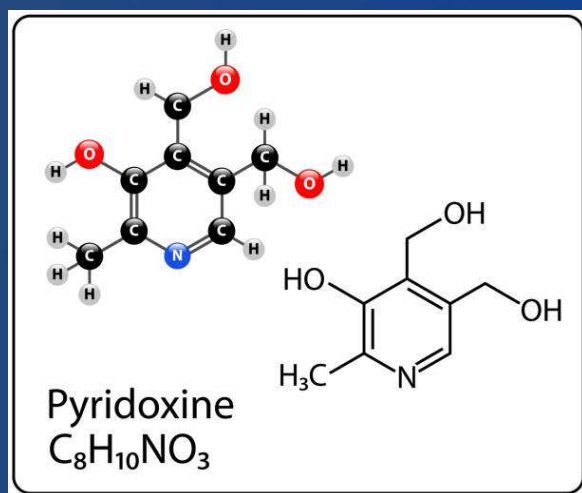


piperidin

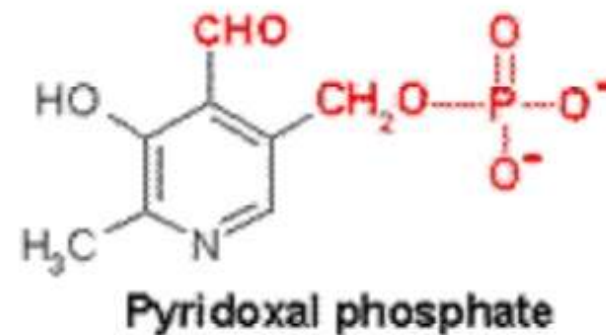
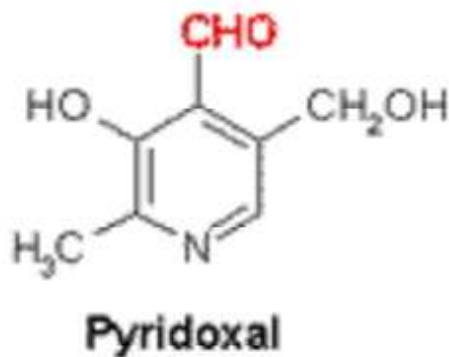


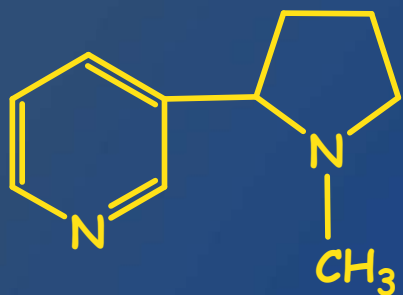
piridin

Derivati piridina

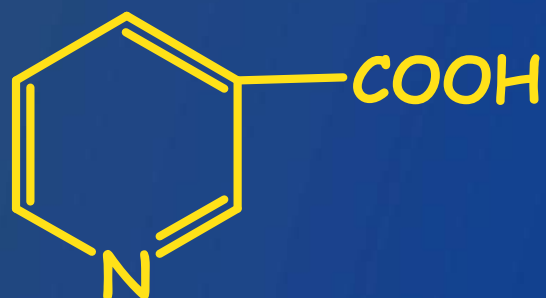


Vitamin B6





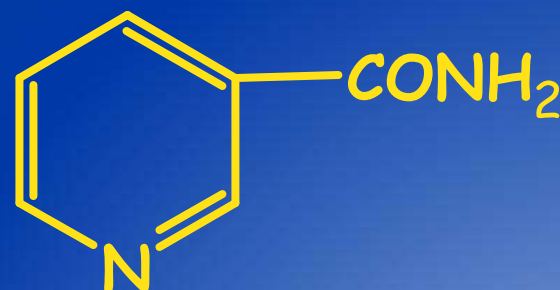
Nikotin



Nikotinska kiselina

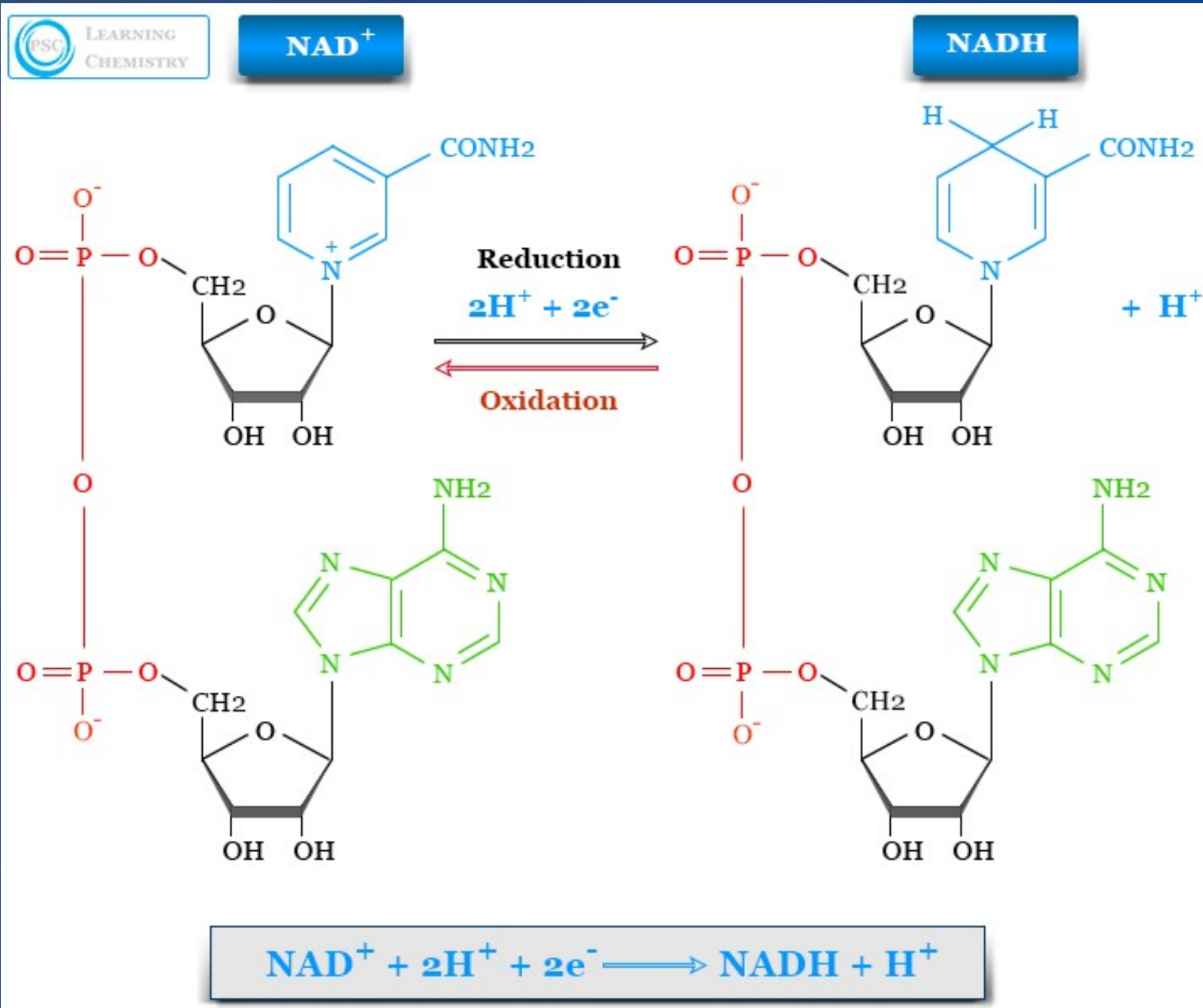


Izonikotinska kiselina

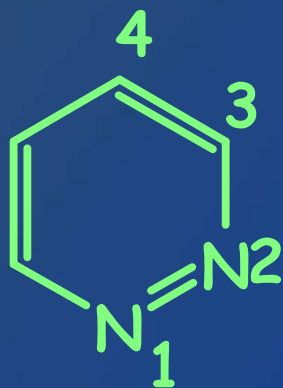


Nikotinamid

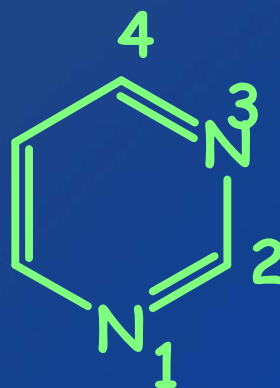
Koenzim



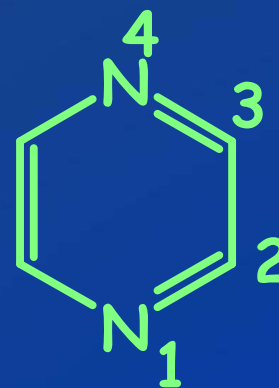
- sa dva atoma azota -



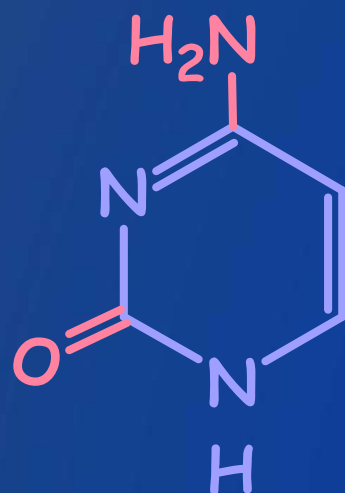
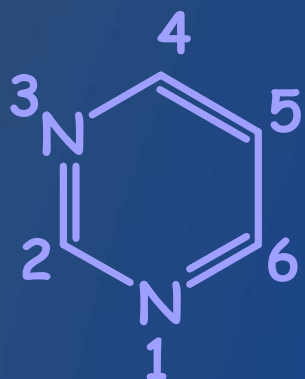
Piridazin



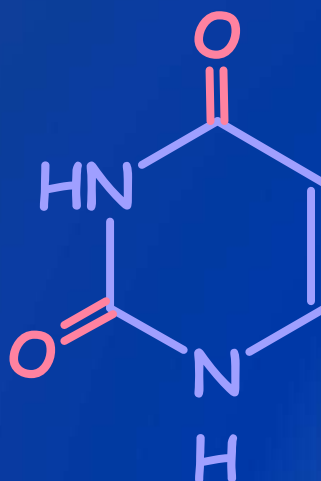
Pirimidin



Pirazin



CITOZIN
2-oksi-4-amino
pirimidin



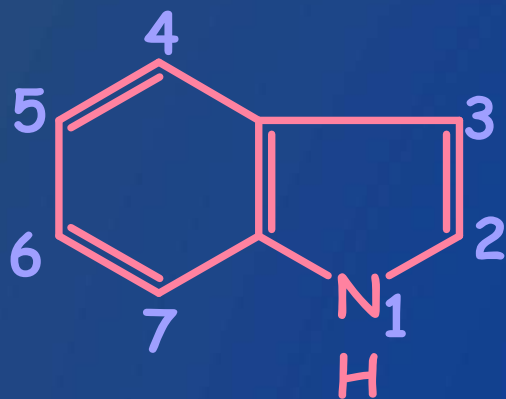
URACIL
2,4-dioksi
pirimidin



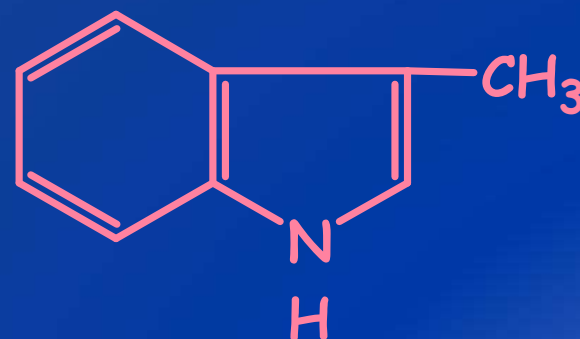
TIMIN
2,4-deoksi-5-metil
pirimidin

KONDENZOVANA HETEROCIKLIČNA JEDINJENJA SA AZOTOM

Sastoje se iz 2 ili više molekula heterocikličnog jedinjenja, međusobno kondenzovana



Indol



Skatol



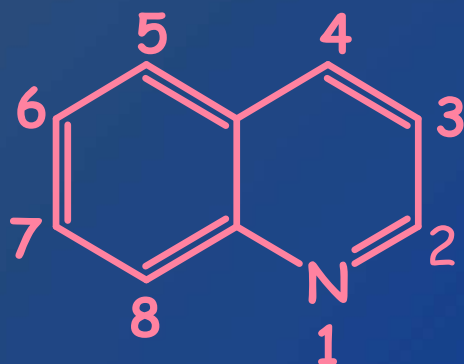
<https://www.google.com/url?sa=i&url=https%3A%2F%2Flebo.in%2Fhealth%2Fserotonin-functions-normal-range-side-effects-and-more%2F&psig=AOvVaw3uungR4JHyVK00WhZVQ9Ax&ust=1748612729196000&source=images&cd=vfe&opi=89978449&ved=0CBQQjRxqFwoTCLCBqJzoyl0DFQAAAAAdAAAAABAE>

Neurotransmitter, nađen u raznim tkivima

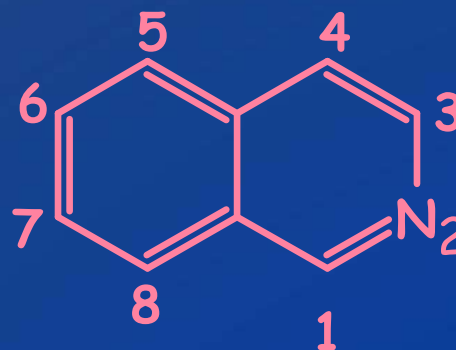
Nastaje u crevima iz triptofana

Utiče na gastrointestinalni trakt, zarastanje rana,
ublažavanje bola, psihičku ravnotežu

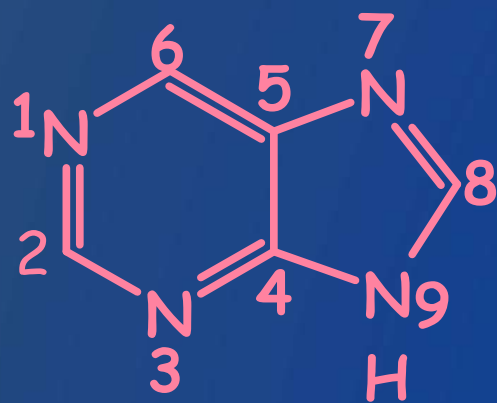
Visok nivo bolje pamćenje



hinolin



izohinolin



purin



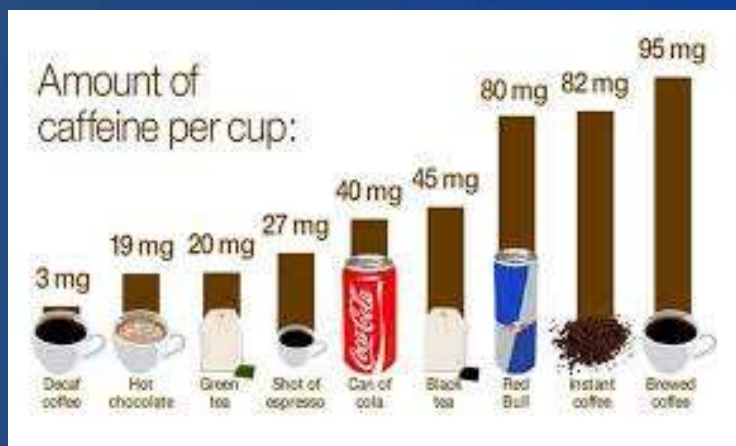
Adenin
6-amino-purin



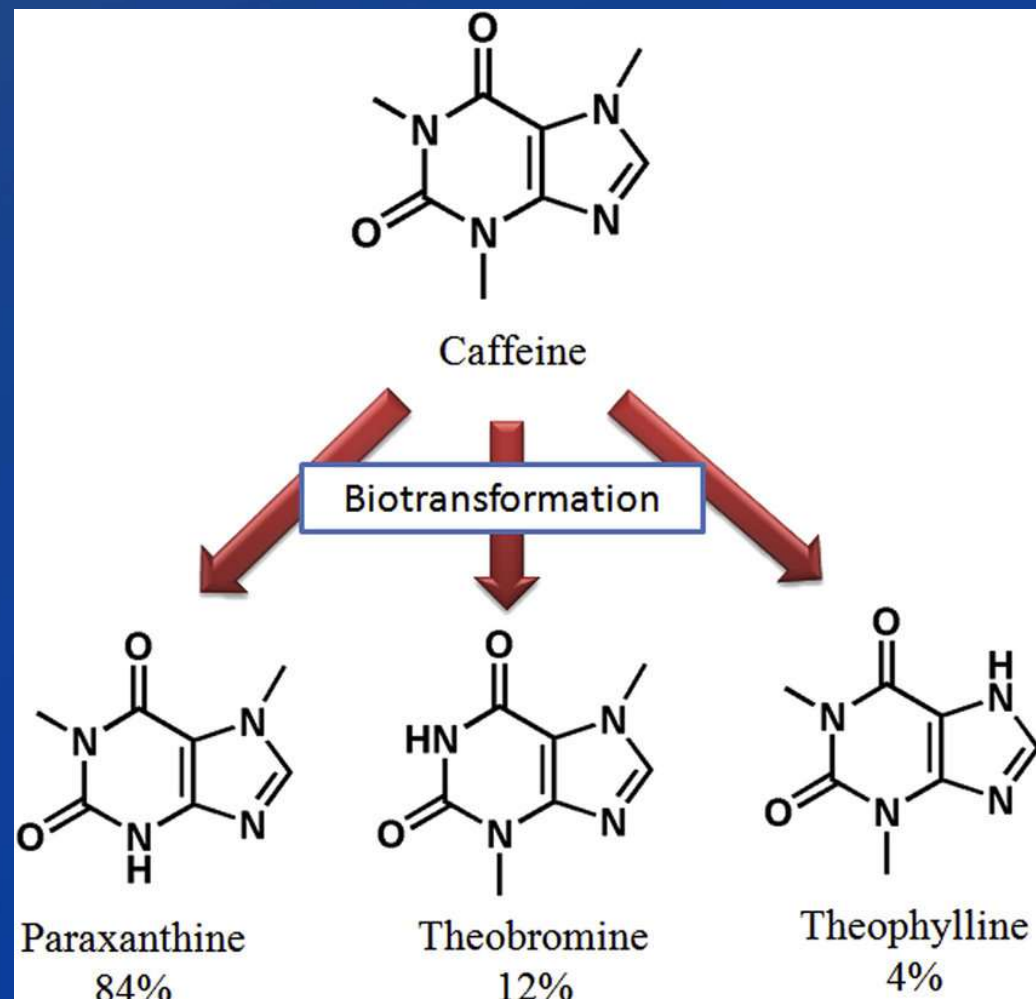
Guanin
2-amino-6-oksi-purin



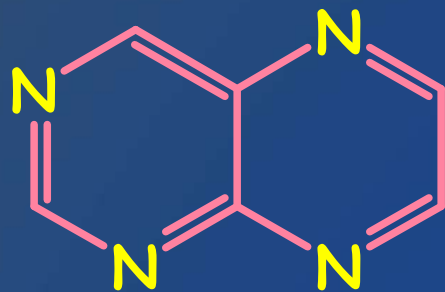
<https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.ebay.com%2Fitm%2F143336163680&psig=AOvVaw2m97kCDiXPgOyaZZ21-sXn&ust=1748613246170000&source=images&cd=vfe&opi=89978449&ved=0CBQQjRxqFwoTC0jBzPqyI0DFQAAAAAdAAAAABAJ>



<https://www.billi-uk.com/wp-content/uploads/2017/08/amount-of-caffeine-in-drinks.jpg>



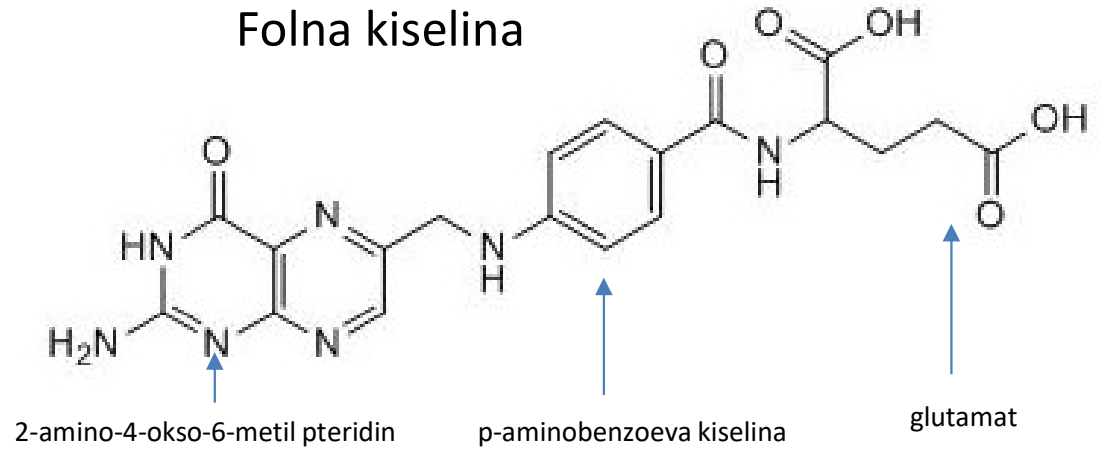
<https://www.researchgate.net/publication/328053849/figure/fig3/AS:680519838744583@1539259981569/Biotransformation-of-caffeine-into-other-natural-xanthine-derivatives-in-mammalian-system.jpg>



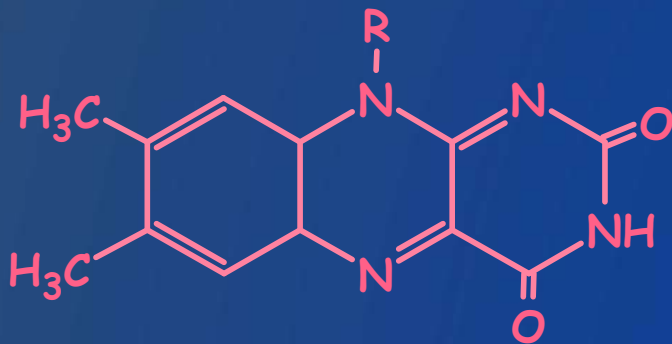
pteridin

Koenzim

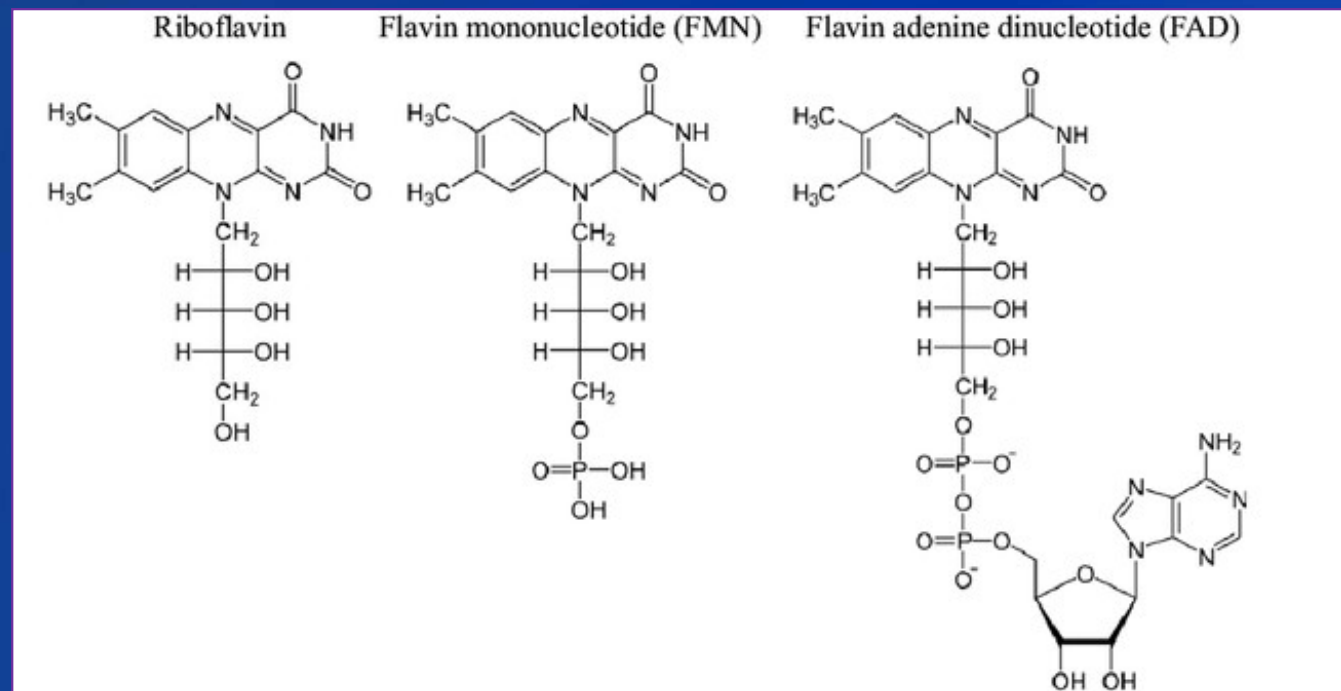
Folna kiselina



Koenzim



flavin



HETEROCIKLIČNA JEDINJENJA SA JEDNIM ILI DVA HETEROATOMA



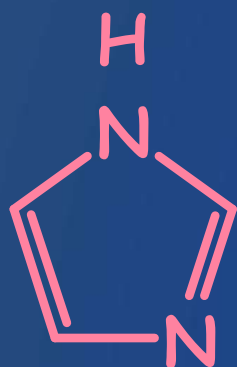
Furan



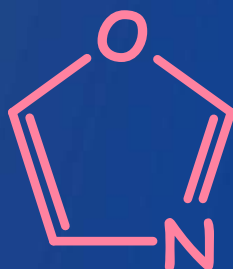
Pirol



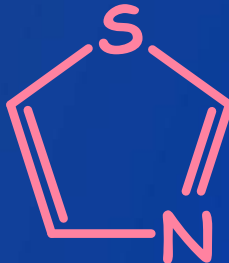
Tiofen



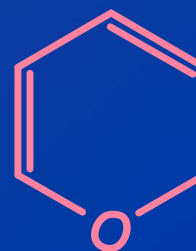
Imidazol



okazol



Tiazol



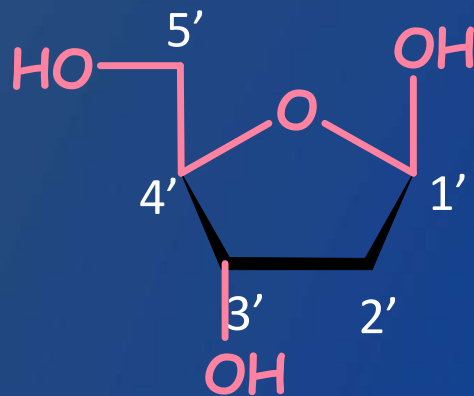
α -piran



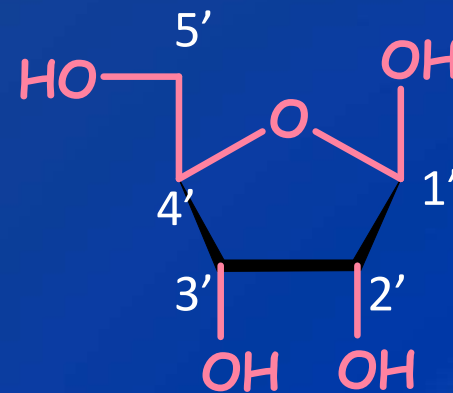
γ -piran

Nukleinske kiseline

Makromolekuli sastavljeni iz fosforne kiseline, šećera (riboze ili deoksiriboze) i azotovih baza (purinskih ili pirimidinskih)



Deoksiriboza



Riboza

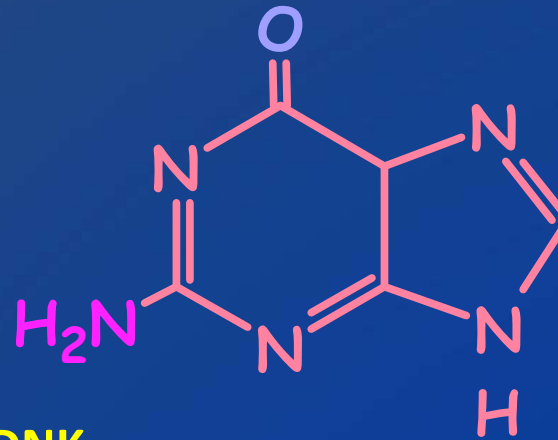
Dve vrste nukleinskih kiselina: dezoksiribonukleinska i ribonukleinska kiselina.

Fosforna kiselina je vezana estarkom vezom za C-5' atom riboze ili deoksiriboze.



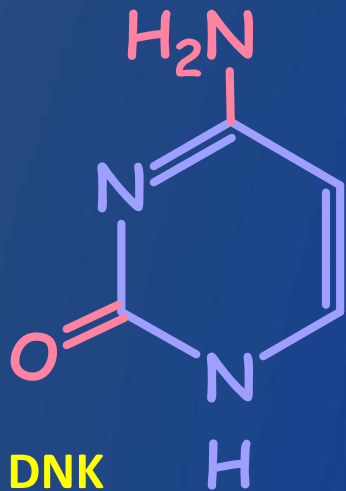
DNK
RNK

Adenin
6-amino-purin



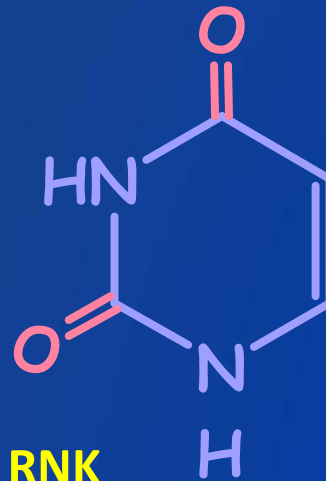
DNK
RNK

Guanin
2-amino-6-oksi-purin



DNK
RNK

CITOZIN
2-oksi-4-amino
pirimidin



RNK

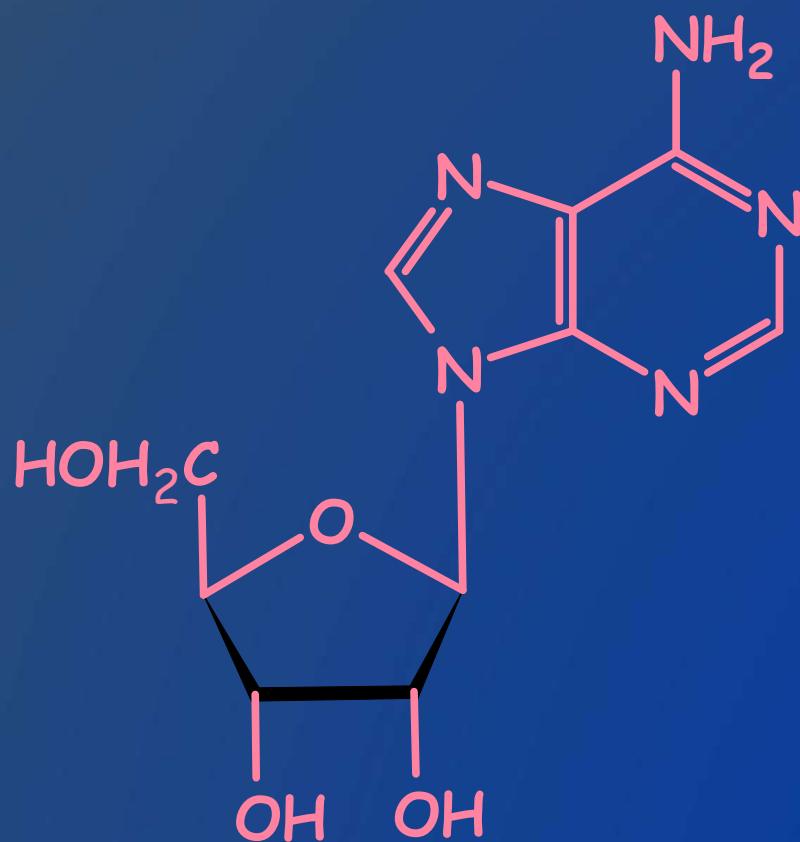
URACIL
2,4-dioksi
pirimidin



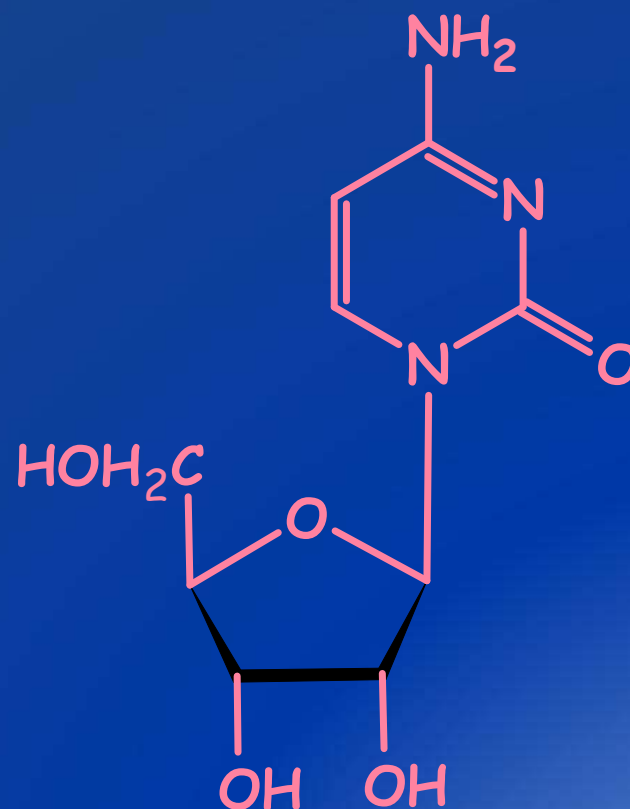
DNK

TIMIN
2,4-deoksi-5-metil
pirimidin

Nukleozid – nukleinska baza + šećerna komponenta



Adenozin, A



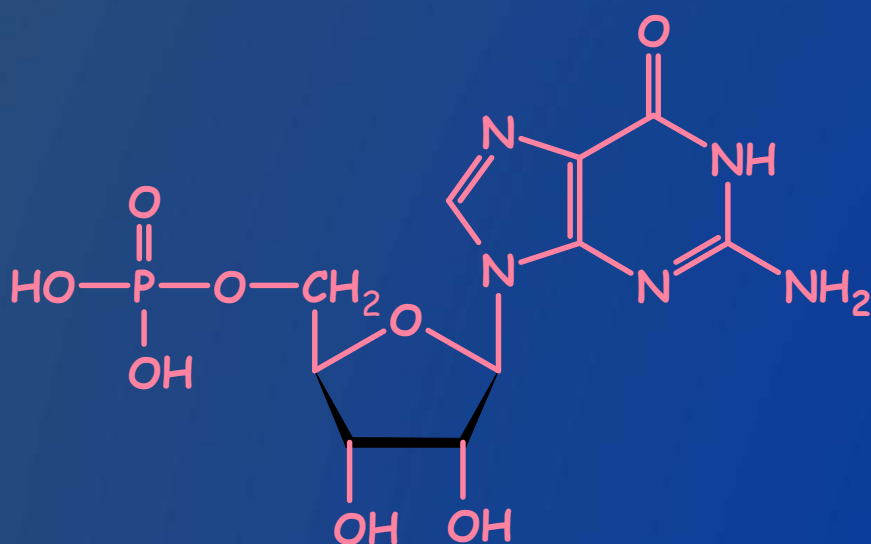
Citidin, C

Nukleotid – nukleinska baza + šećerna komponenta + fosforna kiselina

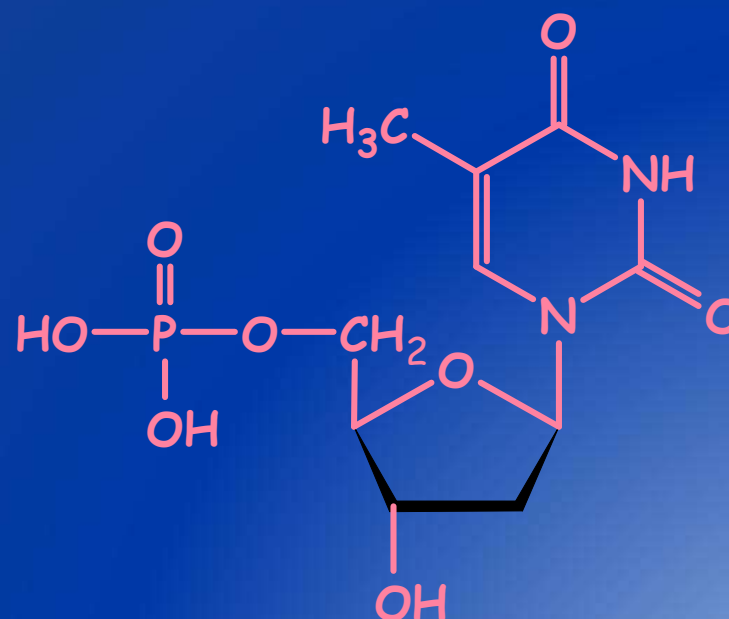
Spadaju u fosfatne estre nukleozida gde je hidroksilna grupa na C-5' ili C-3' riboze ili dezoksiriboze esterifikovana fosforom kiselinom

Ribonukleotidi – monomeri RNK

Dezoksiribonukleotidi – monomeri DNK

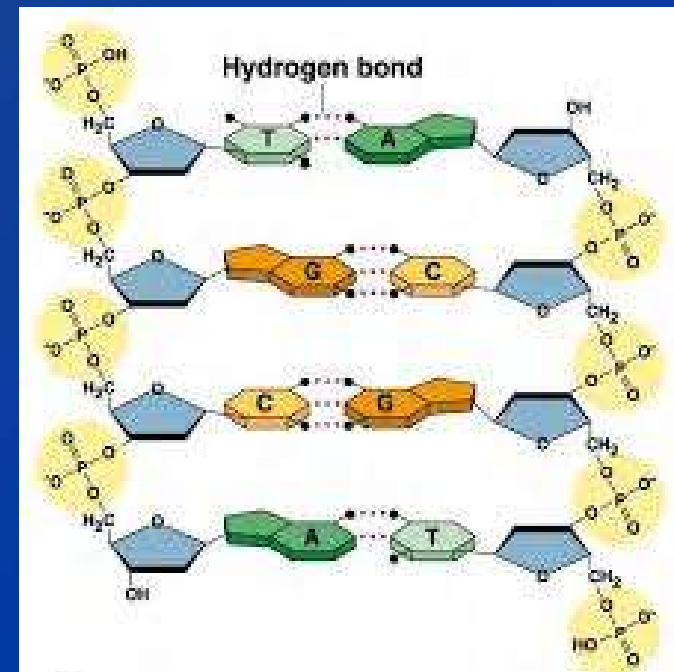
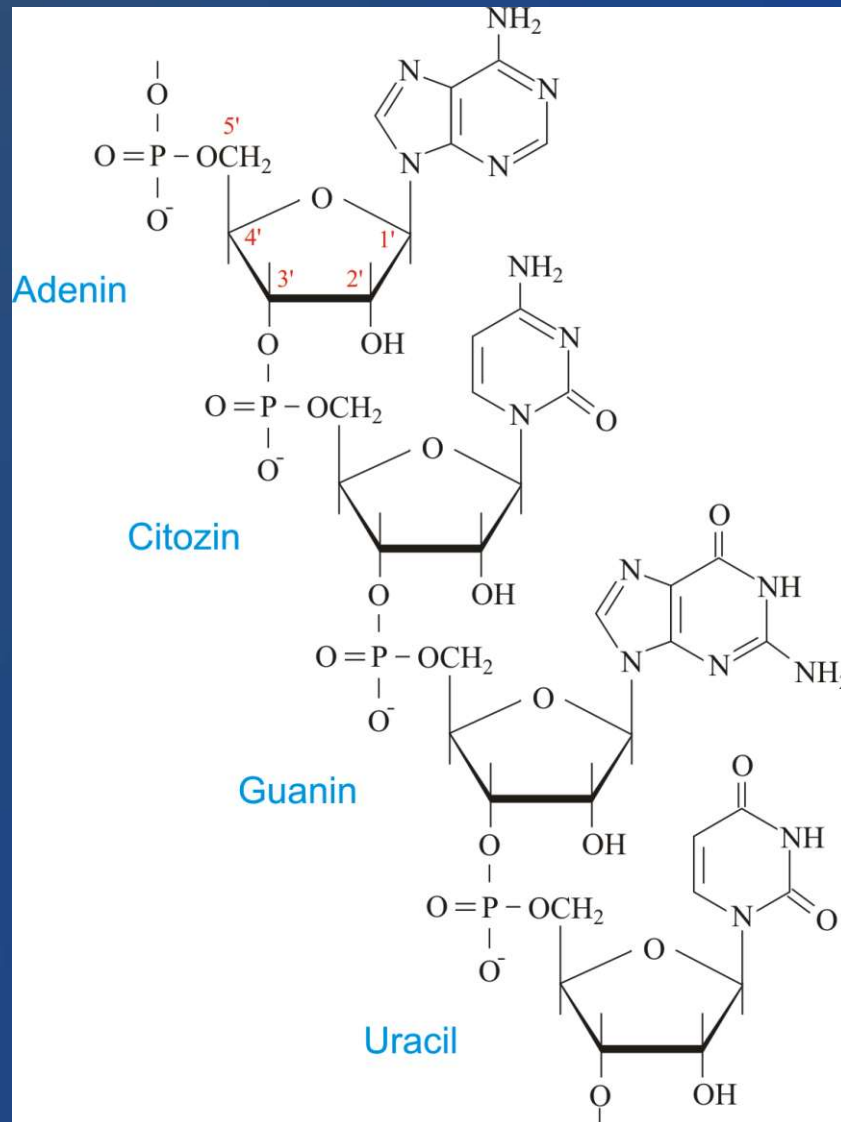


Guanozin-5'-fosfat
Guanozinmonofosfat (GMP)
5' – Guanilna kiselina



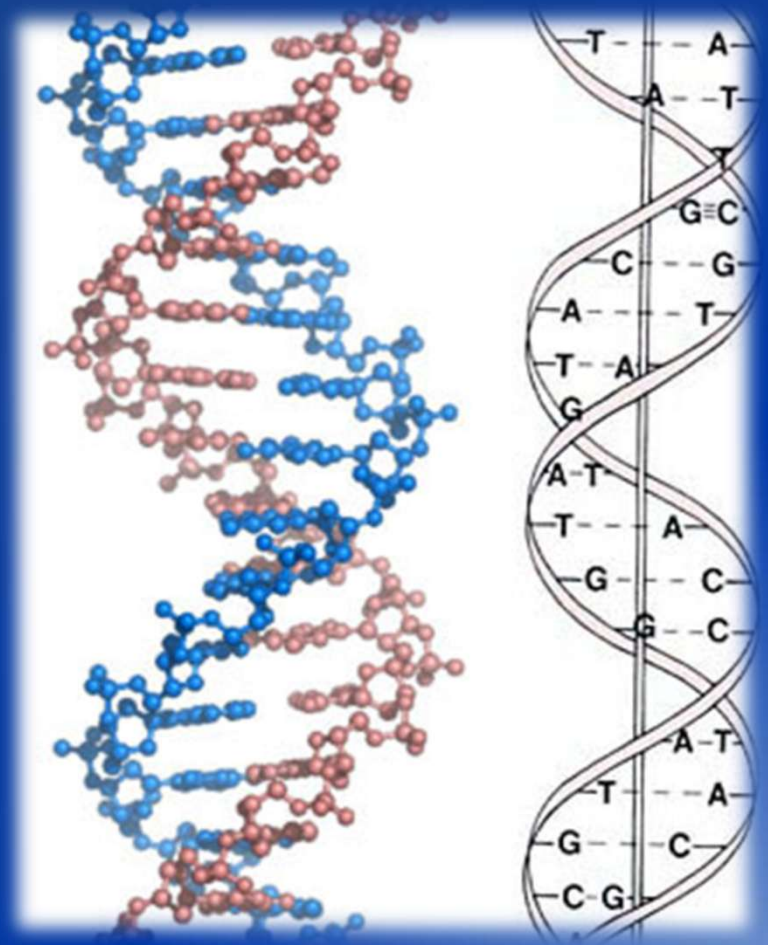
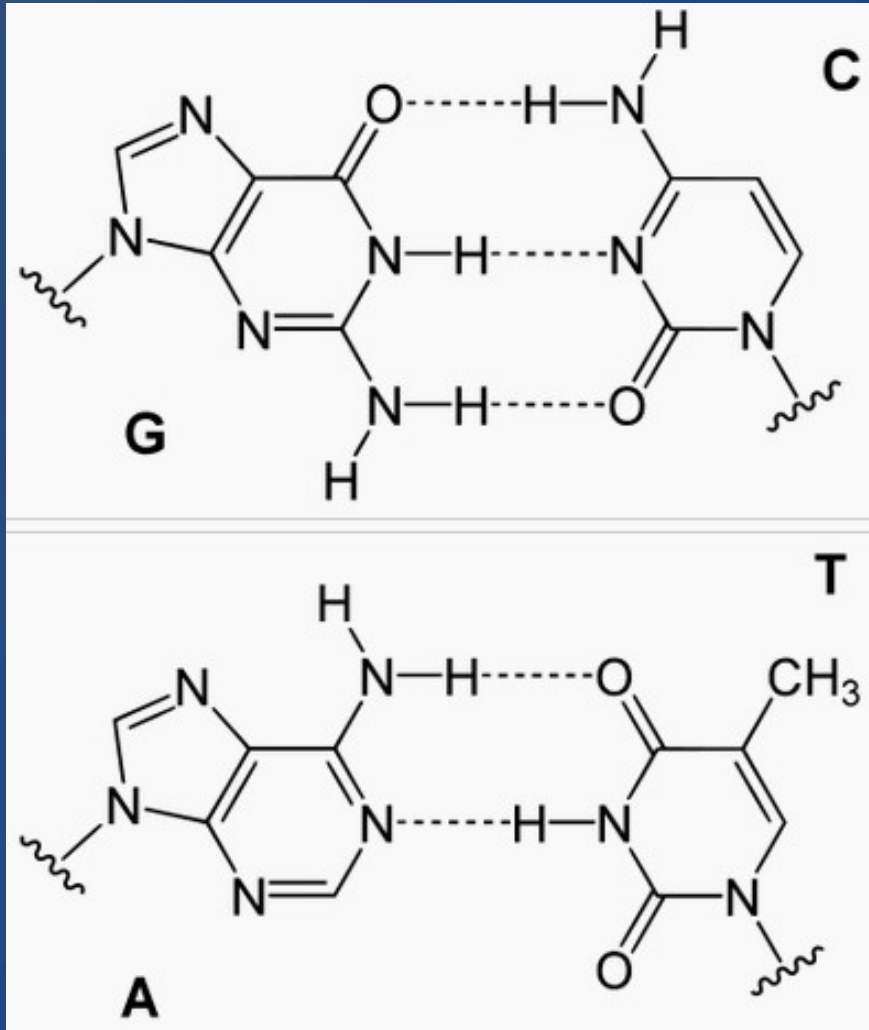
Timidin-5'-fosfat
Timidinmonofosfat (GMP)
5' – Timidilna kiselina

Dezoksiribonukleinska kiselina, DNK – polinukleotidni lanac koji čine fosforna kiselina i deoksiriboza koja u položaju C-1' vezuje β-N glikozidnom vezom purinsku ili pirimidinsku bazu



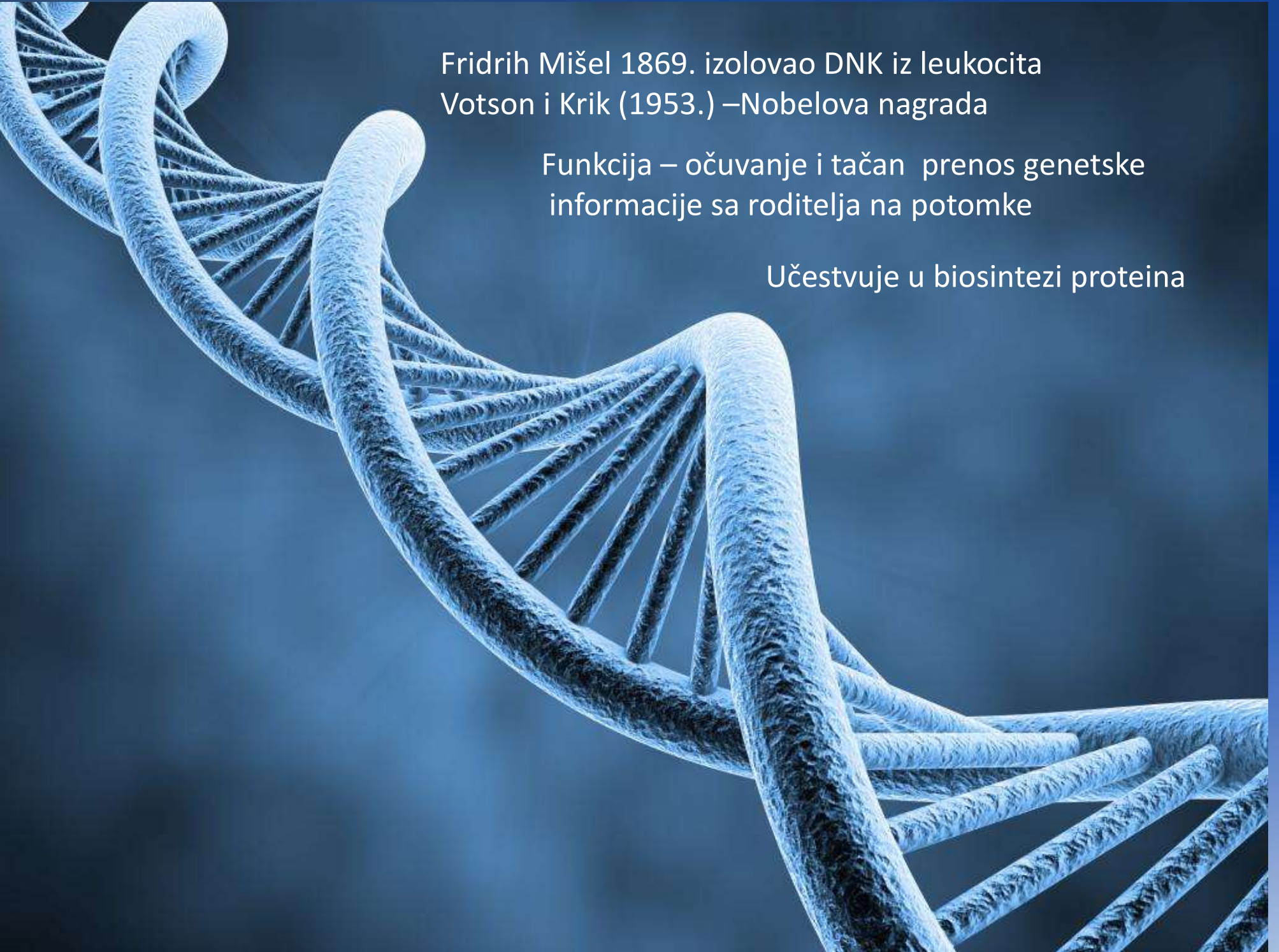
<https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcTLHZ1t3UKtCKqbWfHtyRw7m0PF7msKH8leMA&usqp=CAU>

Komplementarne baze – baze koje se sparuju,
tj. grade vodonične veze



<https://i0.wp.com/scienceland.info/images/biology/gc-at.png>

https://4.bp.blogspot.com/-v13sXJZNoFA/US4AVmyAf6I/AAAAAAAAAP3c/m1-JcEulv_g/s1600/dna_figure.jpg



Fridrih Mišel 1869. izolovao DNK iz leukocita
Votson i Krik (1953.) –Nobelova nagrada

Funkcija – očuvanje i tačan prenos genetske
informacije sa roditelja na potomke

Učestvuje u biosintezi proteina