

# NITROGÉNTARTALMÚ SZERVES VEGYÜLETEK

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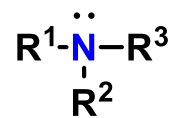
# NITROGÉNTARTALMÚ VEGYÜLETEK



nitrovegyületek



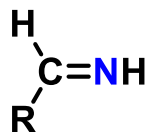
aromás azovegyületek



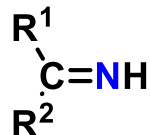
aminok



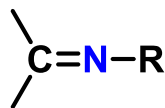
aromás diazóniumsók



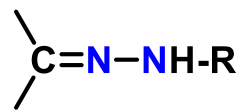
aldimineek



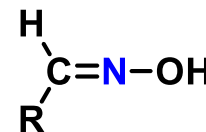
ketimineek



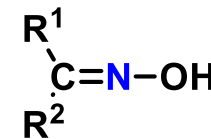
Schiff bázisok



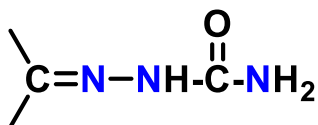
hidrazonok



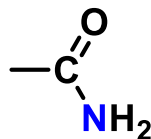
aldoximok



ketoximok



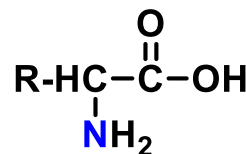
szemikarbazonok



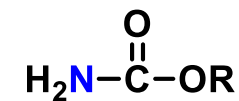
karbonsavamidok



karbonsavnitrilek



$\alpha$ -aminokarbonsavak

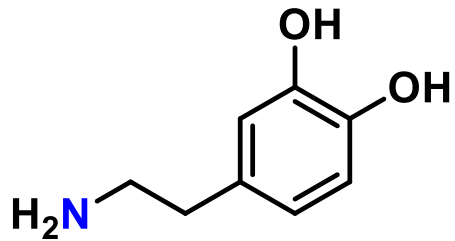


karbamidsavészterek  
(uretánok)

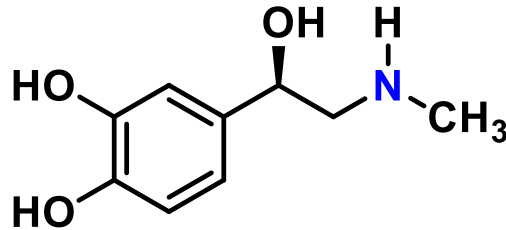
**AMINOK**



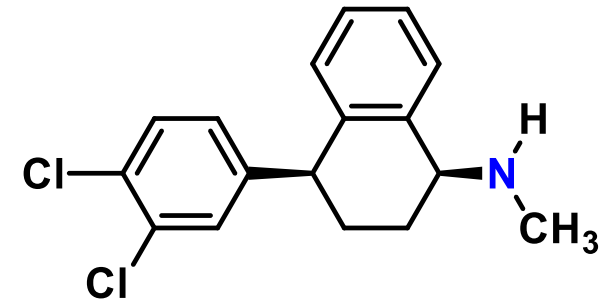
## Példák aminok előfordulására



dopamin

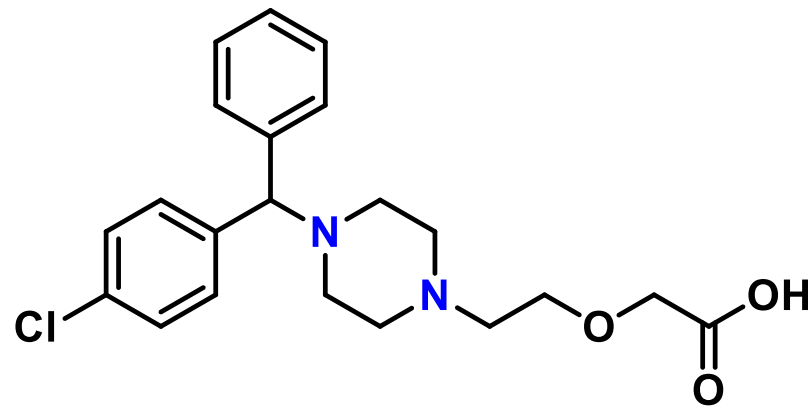


adrenalin



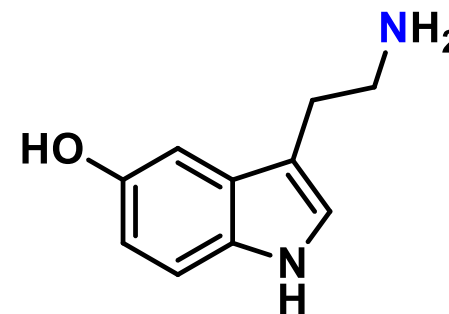
szertralin

*antidepresszáns*



cetirizin

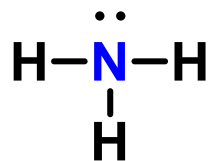
*allergiás tünetek kezelése*



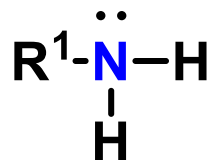
szerotonin

# AMINOK

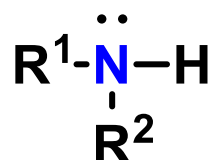
- Aminok rendűsége



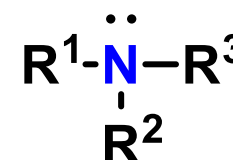
ammónia



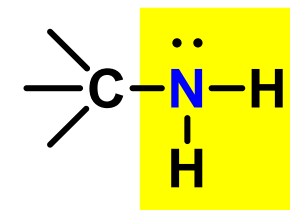
elsőrendű /  
primer amin



másodrendű /  
szekunder amin



harmadrendű /  
tercier amin

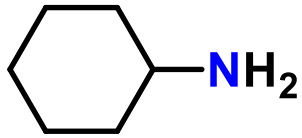


aminocsoport

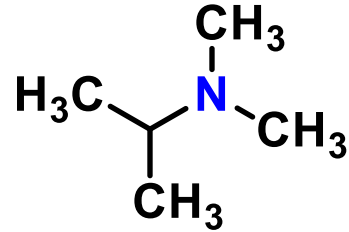
- Nevezéktan: nitrogénatomhoz kapcsolódó szénhidrogéncsoportok neve (ABC) + **-amin**  
szükség esetén di-, tri- többszöröző  
más funkciós csoport(ok) is: **amino-** előtag  
+ triviális nevek

# AMINOK - NEVEZÉKTAN

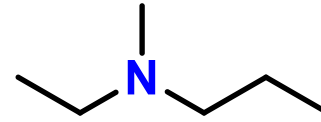
## Példák aminok elnevezésére



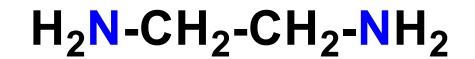
ciklohexil-amin



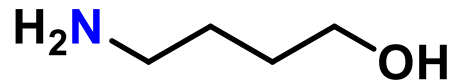
*N,N*-dimetil-izopropil-amin



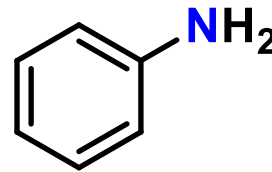
etil-metil-propil-amin



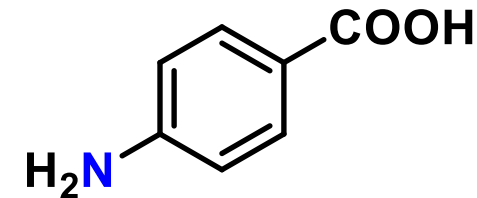
etán-1,2-diamin



4-aminobután-1-ol

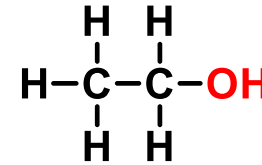
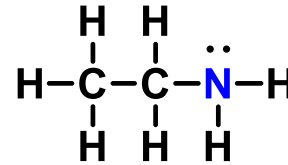
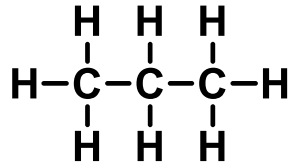


anilin  
(fenil-amin)



*para*-aminobenzoésav

# AMINOK – FIZIKAI TULAJDONSÁGOK

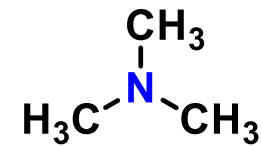
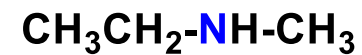


forráspont:

-42°C

17°C

78°C

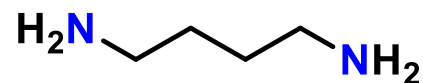


forráspont:

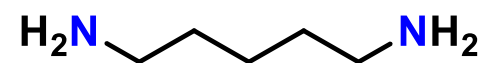
50°C

34°C

4°C



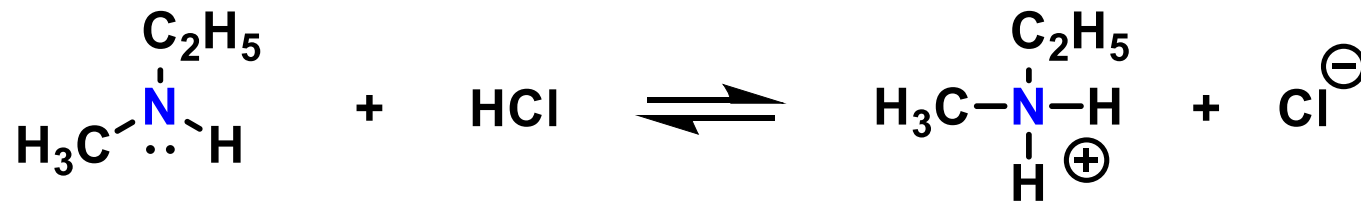
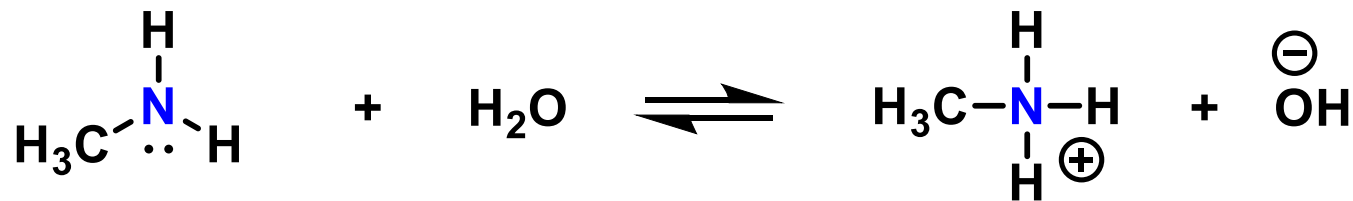
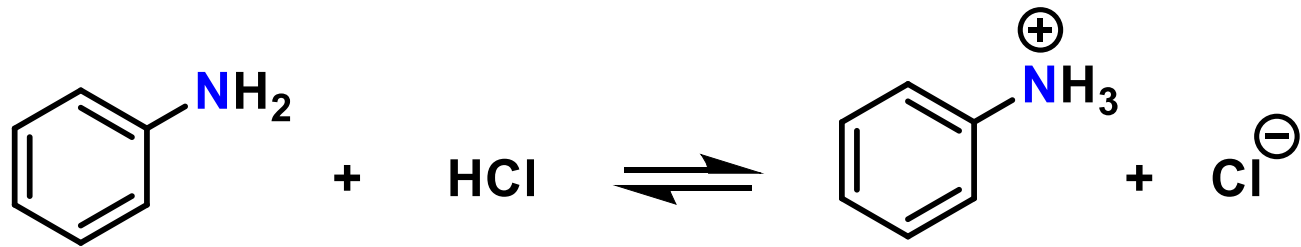
putreszcín  
(bután-1,4-diamin)



kadaverin  
(pentán-1,5-diamin)

# AMINOK – KÉMIAI TULAJDONSÁGOK

## • Bázicitás



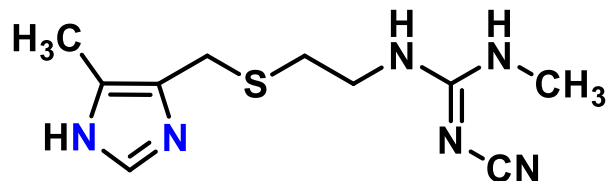


# NITROGÉNTARTALMÚ HETEROCIKLUSOK

# 2

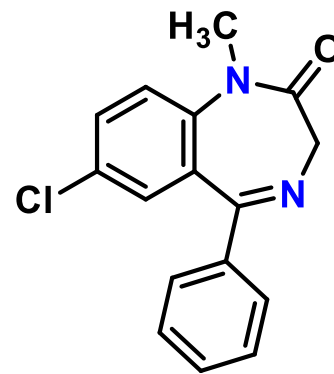
# NITROGÉNTARTALMÚ HETEROCIKLUSOK

## Példák nitrogéntartalmú heterociklusok előfordulására



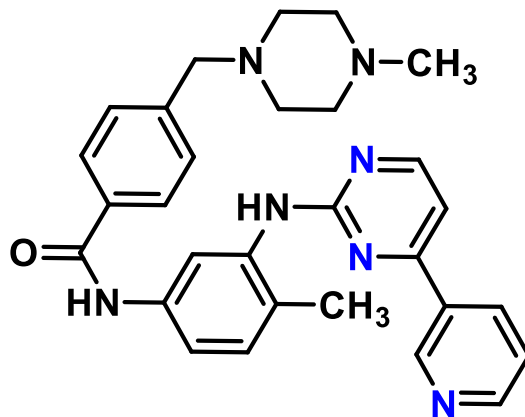
**cimetidin**

*gyomor- és nyombélfekély kezelése*



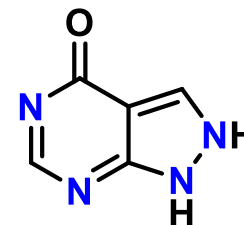
**diazepam**

*nyugtató, szorongásoldó*



**imatinib**

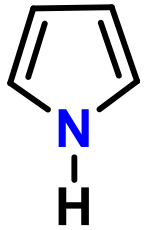
*leukémia kezelése*



**allopurinol**

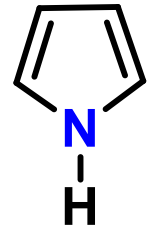
*köszvény kezelése*

# PIRROL

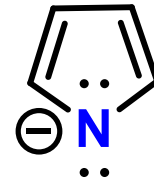
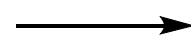


pirrol

$\pi$ -elektronfeleslegű  
rendszer



+ K

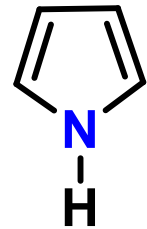


+

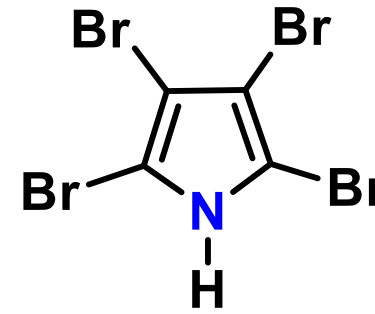


+

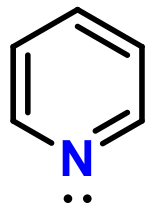
1/2 H<sub>2</sub>



+ 4 Br<sub>2</sub>

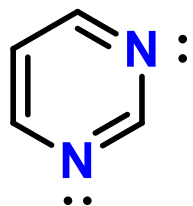


# PIRIDIN

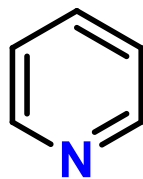


piridin

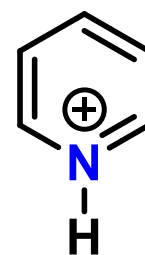
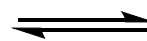
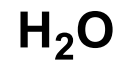
$\pi$ -elektronhiányos  
rendszer



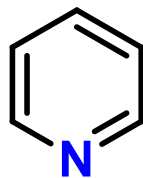
pirimidin



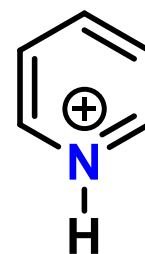
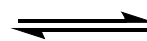
+



+



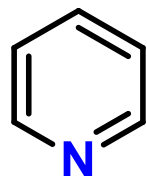
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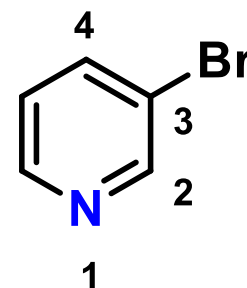
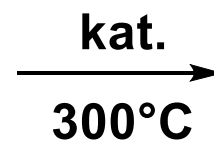
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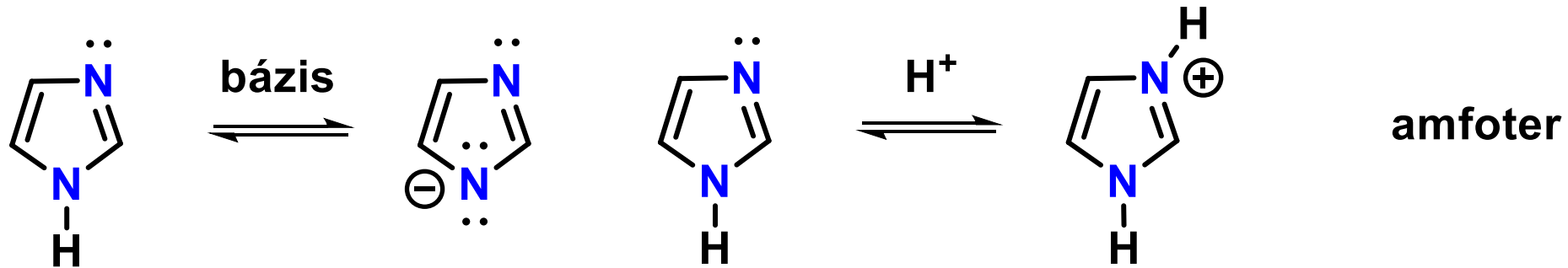
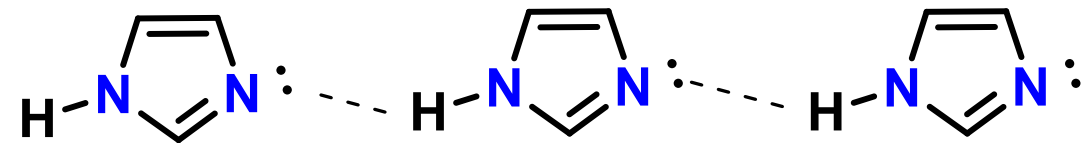
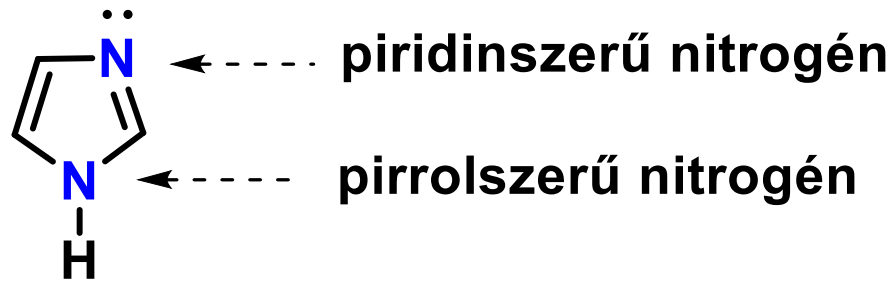
piridínium-klorid



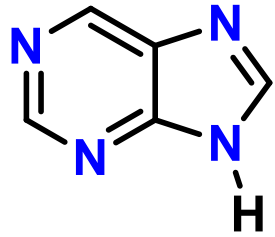
+



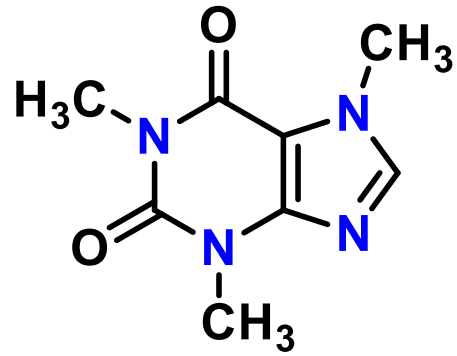
# IMIDAZOL



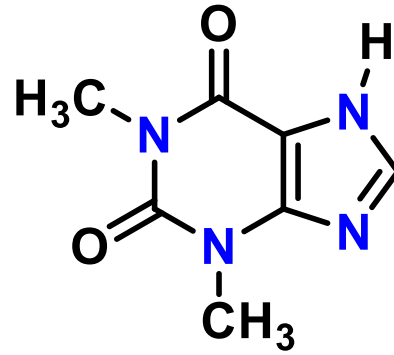
# PURIN



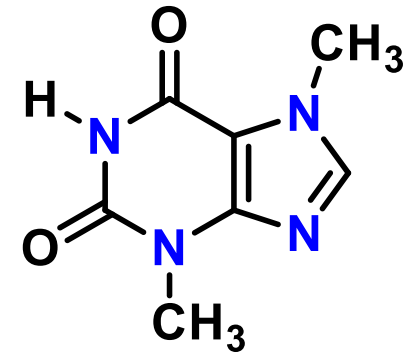
purin



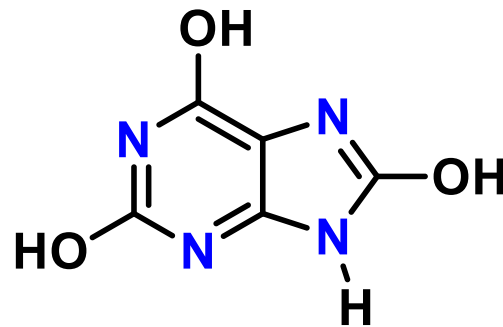
koffein



teofillin

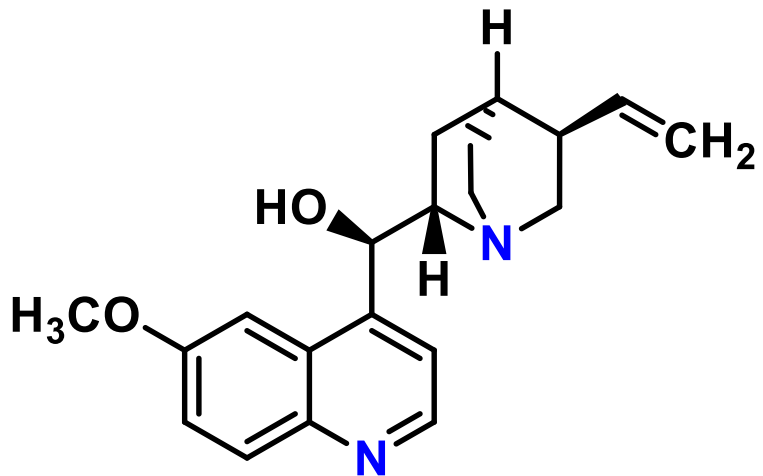


teobromin

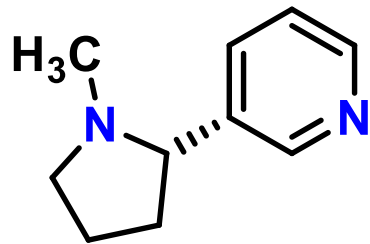


húgysav

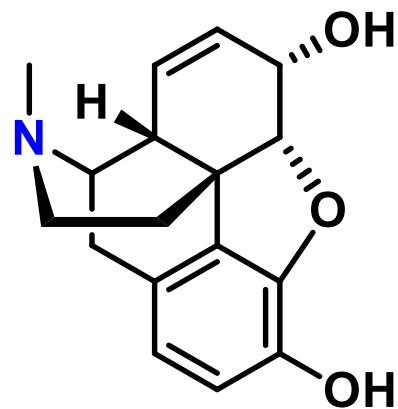
# ALKALOIDOK



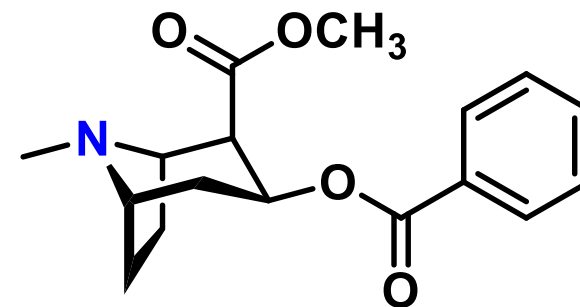
kinin



nikotin



morfin



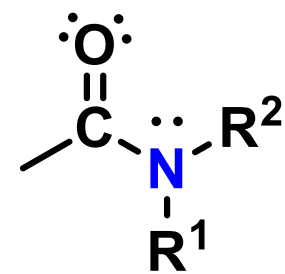
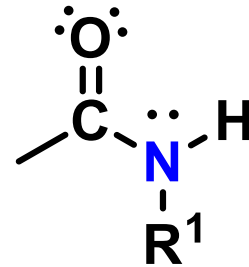
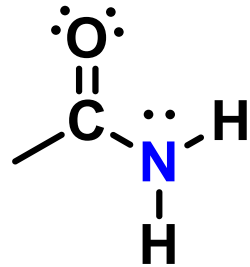
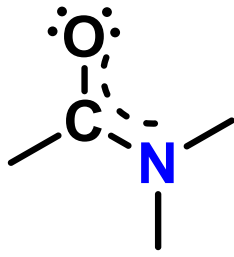
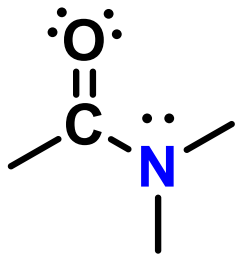
kokain

**KARBONSAVAMIDOK**

**3**



# KARBONSAVAMIDOK



elsőrendű amid

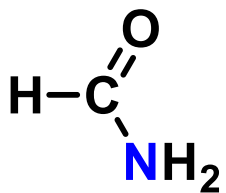
másodrendű amid

harmadrendű amid

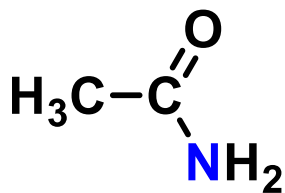
- Nevezéktan: elsőrendű amidok – amidcsoport szénatomját is tartalmazó szénhidrogén + **-amid**  
másod-, harmadrendű amidok - nitrogénatomhoz kapcsolódó szénhidrogéncsoportok neve (ABC) + alapvegyület

# KARBONSAVAMIDOK

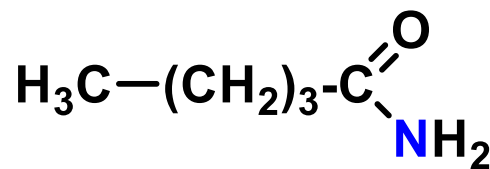
## Példák karbonsavamidok elnevezésére



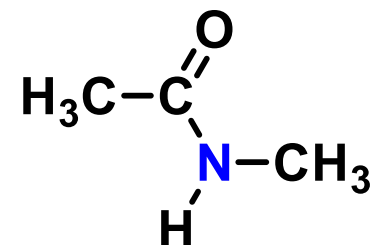
formamid  
metánamid



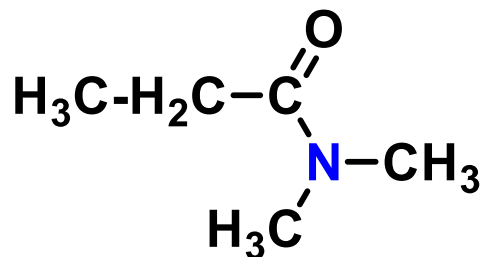
acetamid  
etánamid



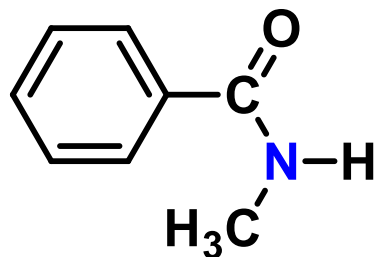
pentánamid



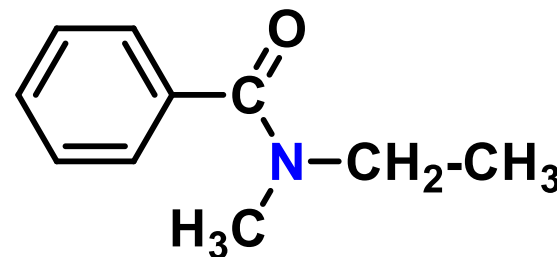
*N*-metiletánamid



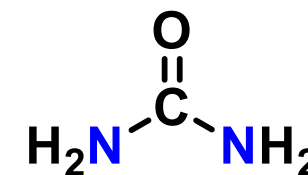
*N,N*-dimetilpropánamid



*N*-metilbenzamid

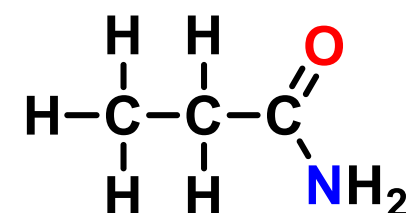
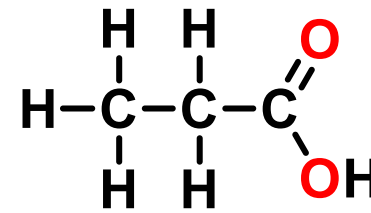
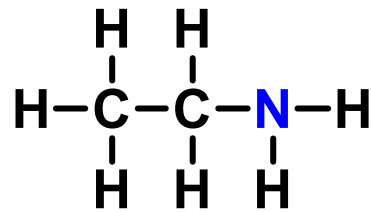
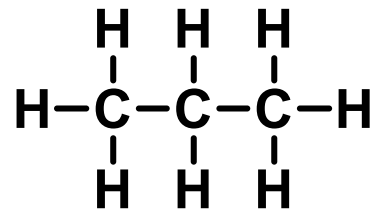


*N*-etil-*N*-metilbenzamid



karbamid

# KARBONSAVAMIDOK – FIZIKAI TULAJDONSÁGOK



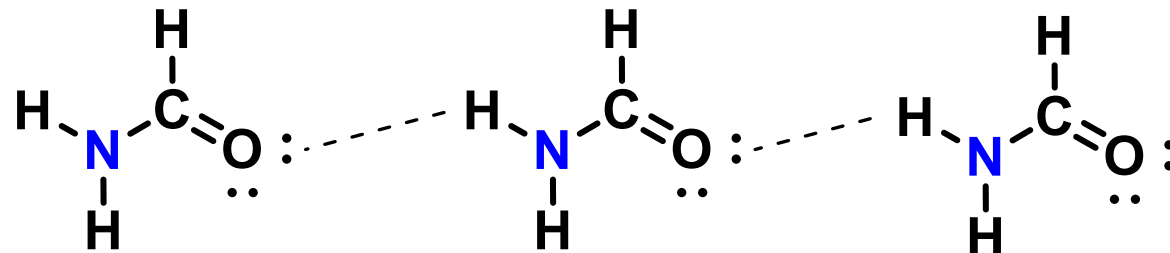
forráspont:

-42°C

17°C

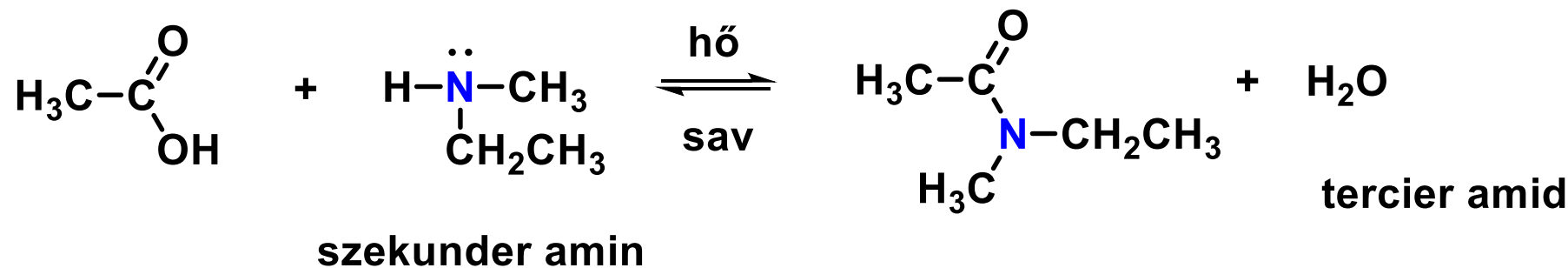
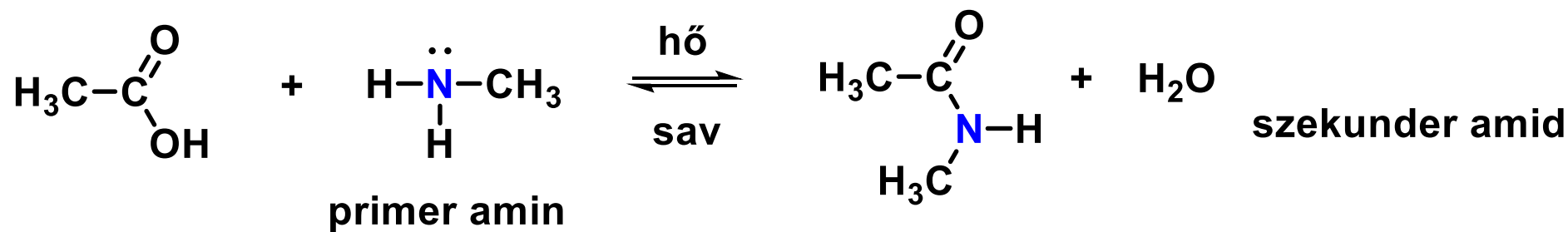
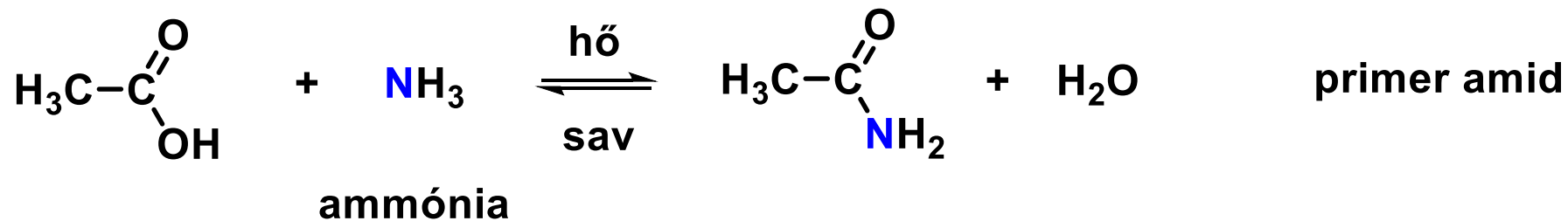
141°C

213°C

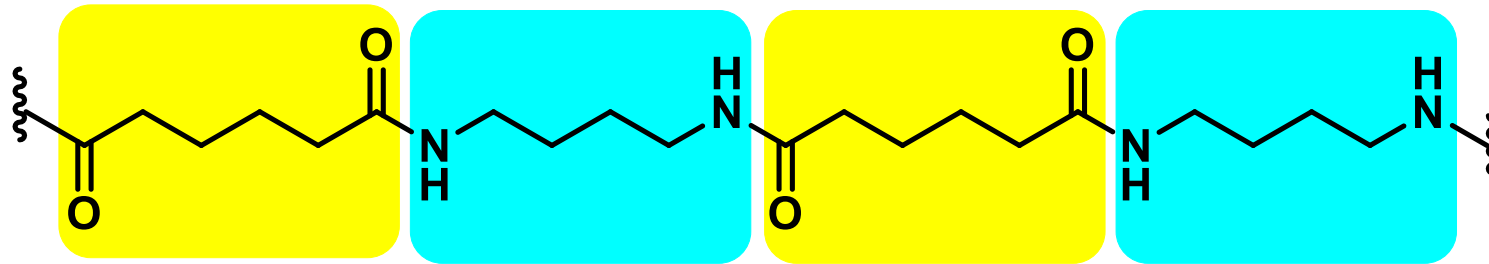


# KARBONSZAVAMIDOK

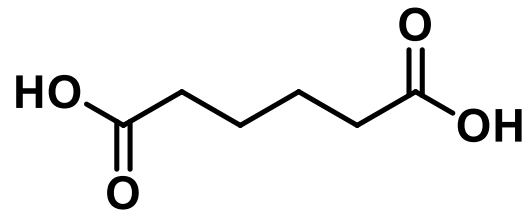
## • Karbonszavamidok előállítása:



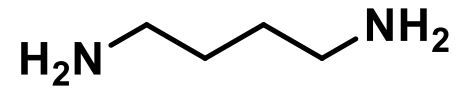
# POLIAMIDOK



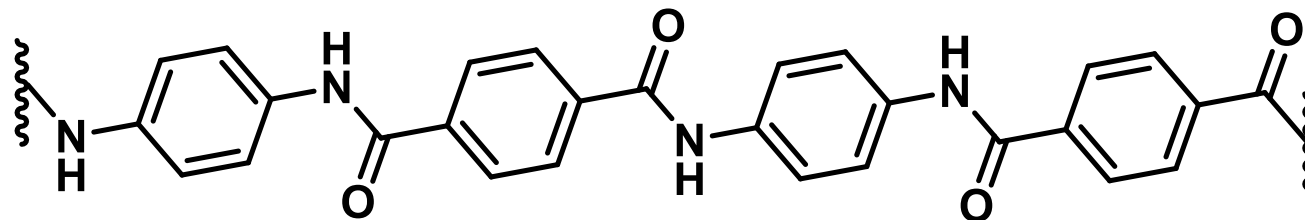
Nylon



hexándisav



hexán-1,6-diamin

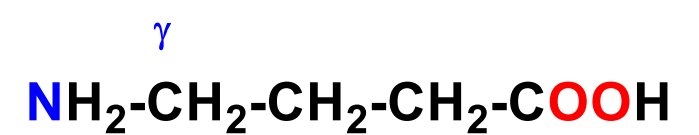
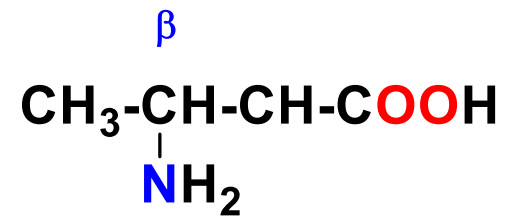
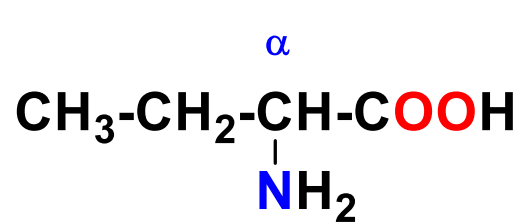
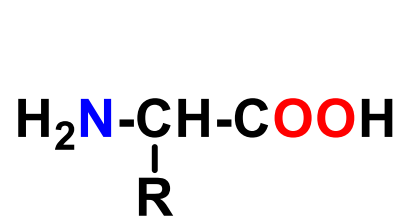


Kevlar

**AMINOSAVAK**

**4**

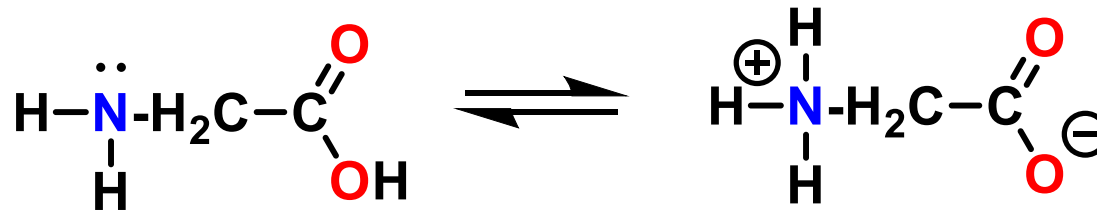
# AMINOSAVAK



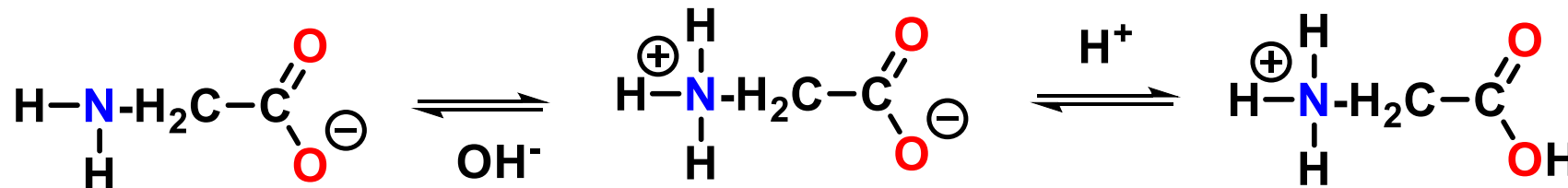
$\alpha$ -aminobutánsav

$\beta$ -aminobutánsav

$\gamma$ -aminobutánsav



ikerionos szerkezet  
amfoter jelleg



# AMINOSAVAK

- **Csoportosítás oldallánc szerint:**
  - apoláris oldalláncú**
  - poláris oldalláncú, semleges**
  - poláris oldalláncú, gyengén savas vagy bázikus**
  - poláris oldalláncú, savas vagy bázikus**

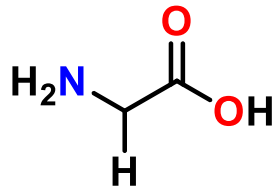




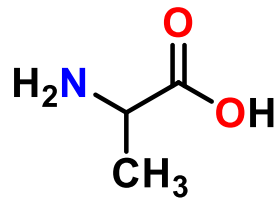
# AMINOSAVAK

## • Apoláris oldalláncú

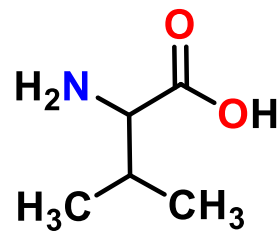
Glicin  
Gly G



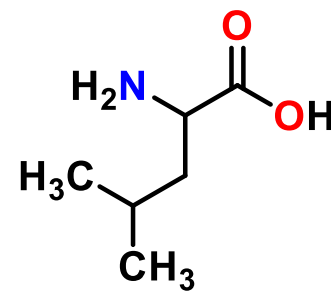
Alanin  
Ala A



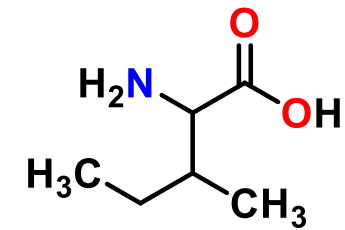
Valin  
Val V



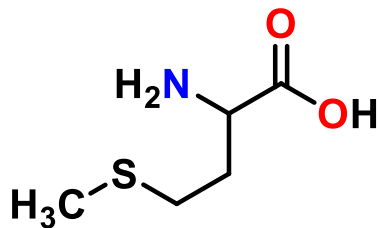
Leucin  
Leu L



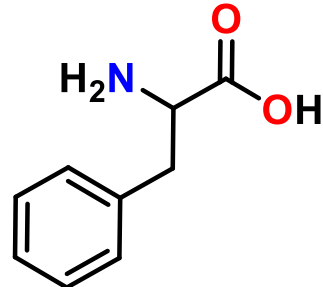
Izoleucin  
Ile I



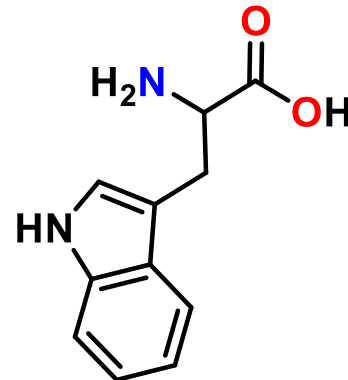
Metionin  
Met M



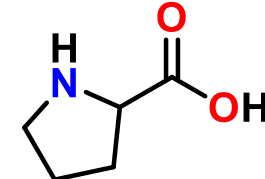
Fenilalanin  
Phe F



Triptofán  
Trp W



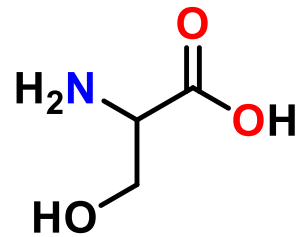
Prolin  
Pro P



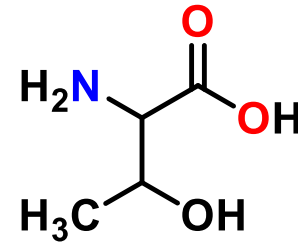
# AMINOSAVAK

- Poláris oldalláncú, semleges

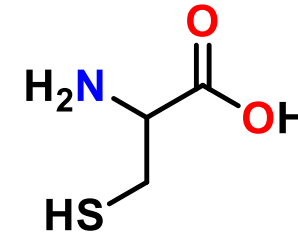
Szerin  
Ser S



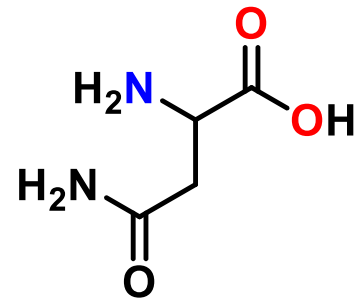
Treonin  
Thr T



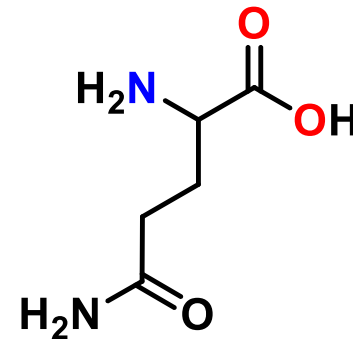
Cisztein  
Cys C



Aszparagin  
Asn N

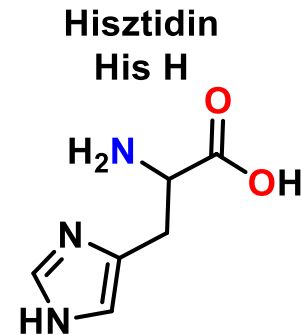
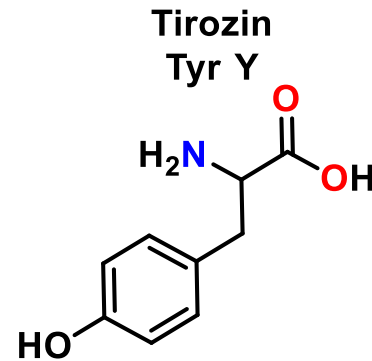


Glutamin  
Gln Q



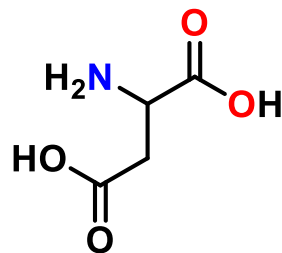
# AMINOSAVAK

- Poláris oldalláncú, gyengén savas vagy bázikus

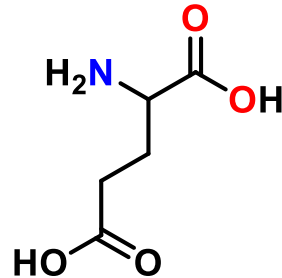


- Poláris oldalláncú, erősen savas vagy bázikus

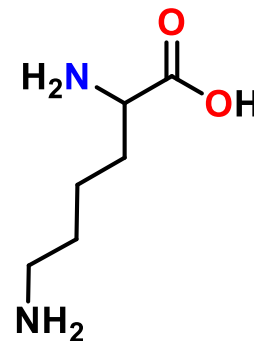
Aszparaginsav  
Asp D



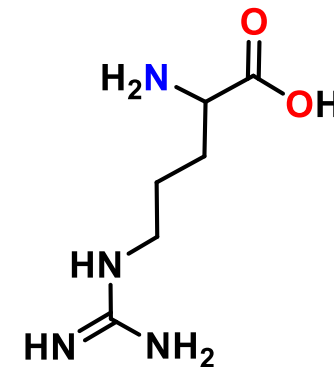
Glutaminsav  
Glu E



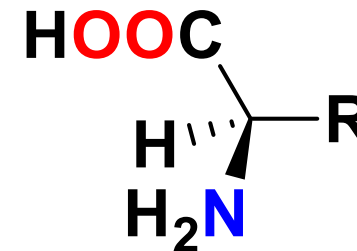
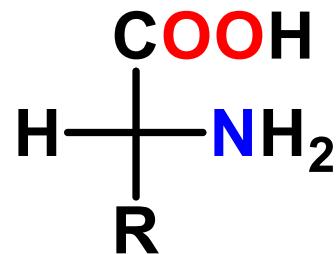
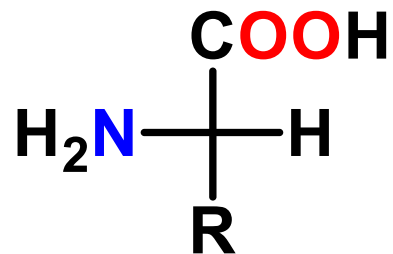
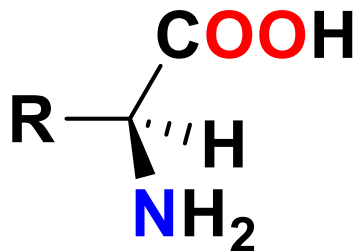
Lizin  
Lys K



Arginin  
Arg R

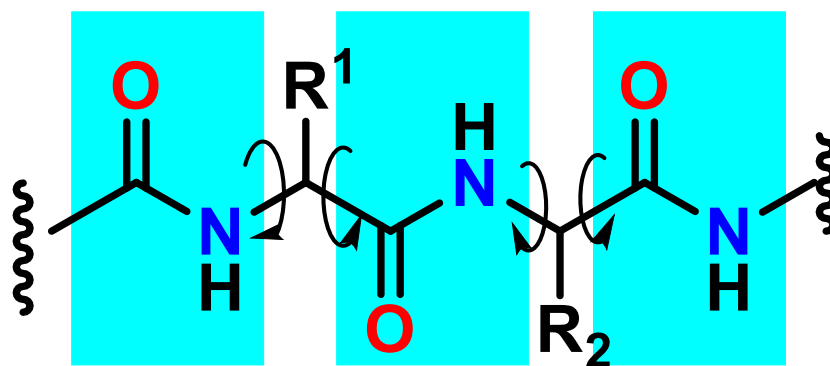


# FEHÉRJÉK - TÉRSZERKEZET



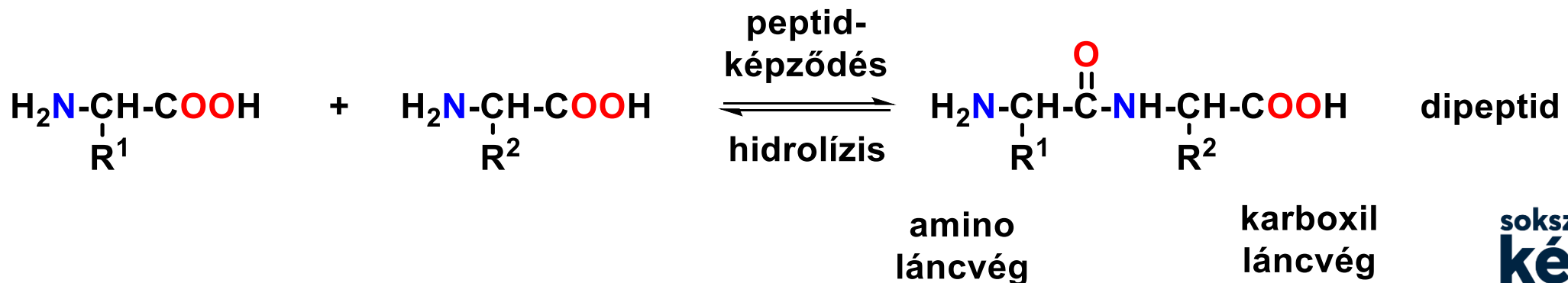
*L*-aminosavak

*D*-aminosavak



# PEPTIDEK, FEHÉRJÉK

- **Fehérjék elsődleges szerkezete: aminosav-szekvencia**
- Fehérjék másodlagos szerkezete: hidrogénkötések révén kialakult szerkezet ( $\alpha$ -hélix,  $\beta$ -redő)
- Fehérjék harmadlagos szerkezete: egyéb kötések kialakulásával létrejött szerkezet (teljes térszerkezet)
- Fehérjék negyedleges szerkezete: további rendeződés fehérjemolekulán belül (több polipeptidlánc)

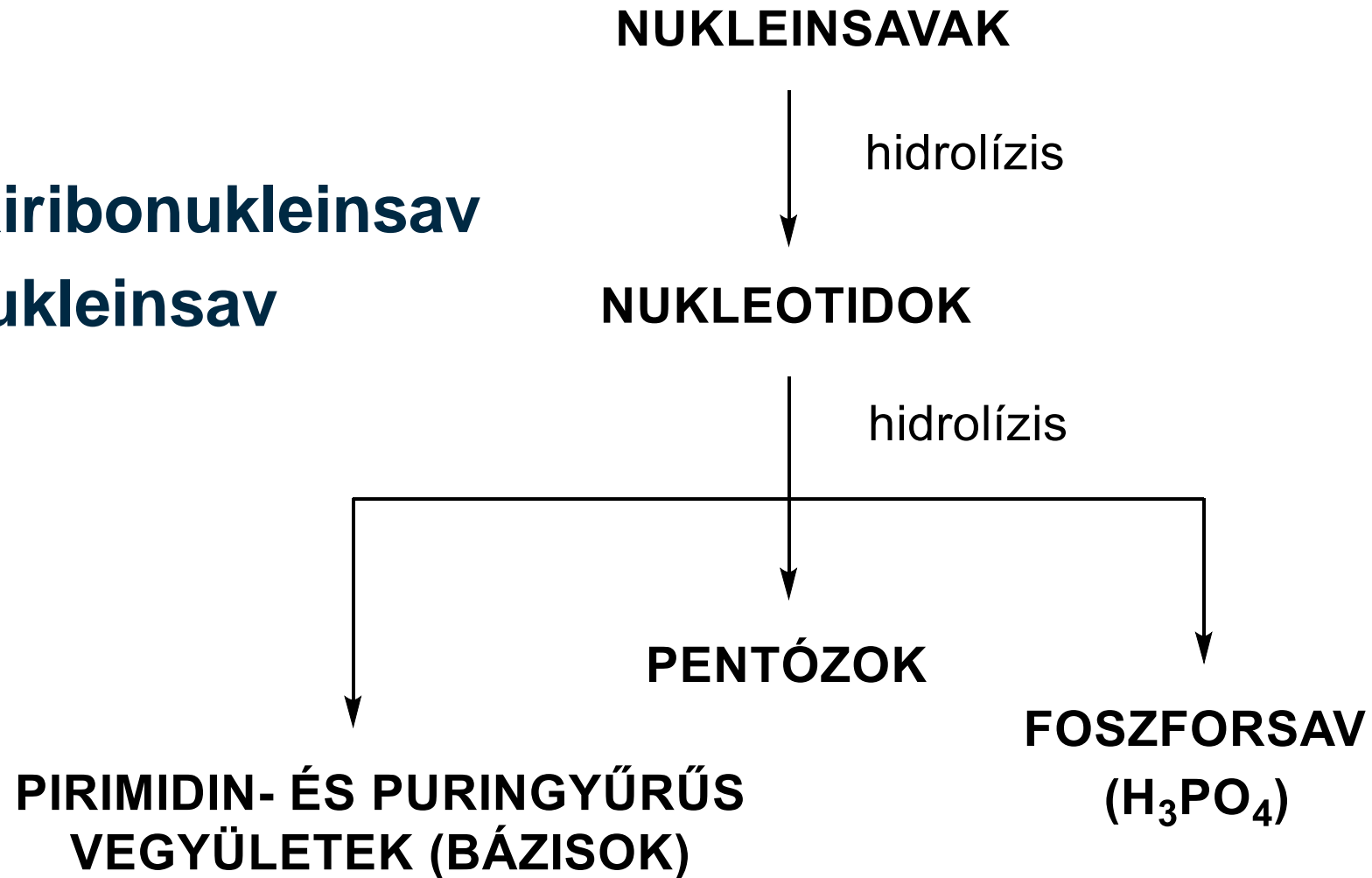


**NUKLEOTIDOK, NUKLEINSAVAK**

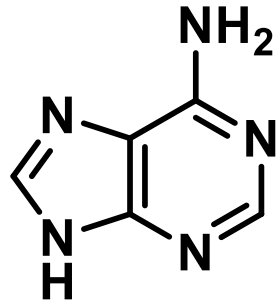
**5**

# NUKLEINSAVAK, NUKLEOTIDOK

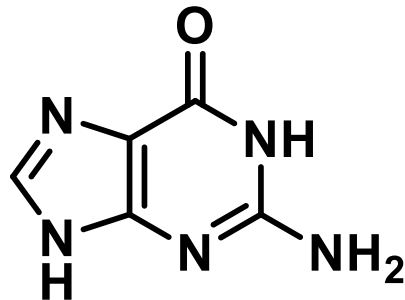
- **DNS: dezoxiribonukleinsav**
- **RNS: ribonukleinsav**



# NUKLEINSAVAK, NUKLEOTIDOK

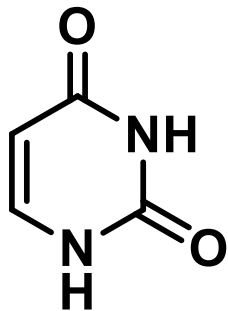


adenin (A)

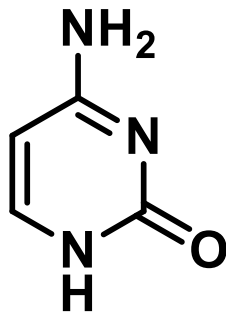


guanin (G)

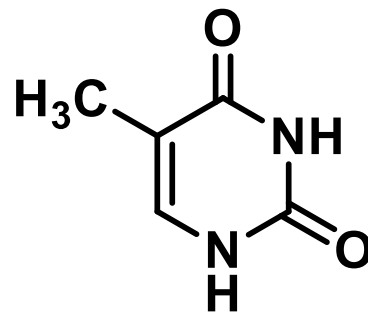
purinbázisok



uracil (U)



citozin (C)

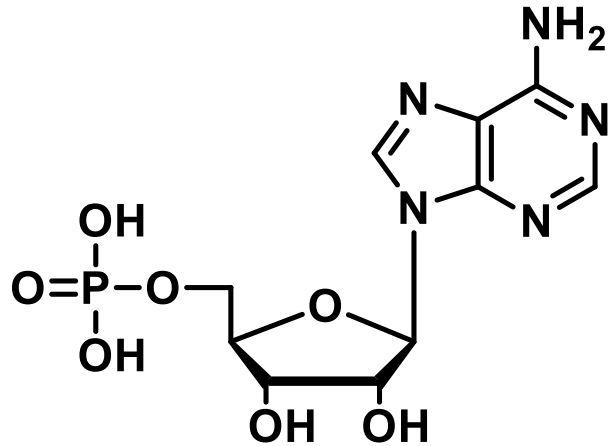


timin (T)

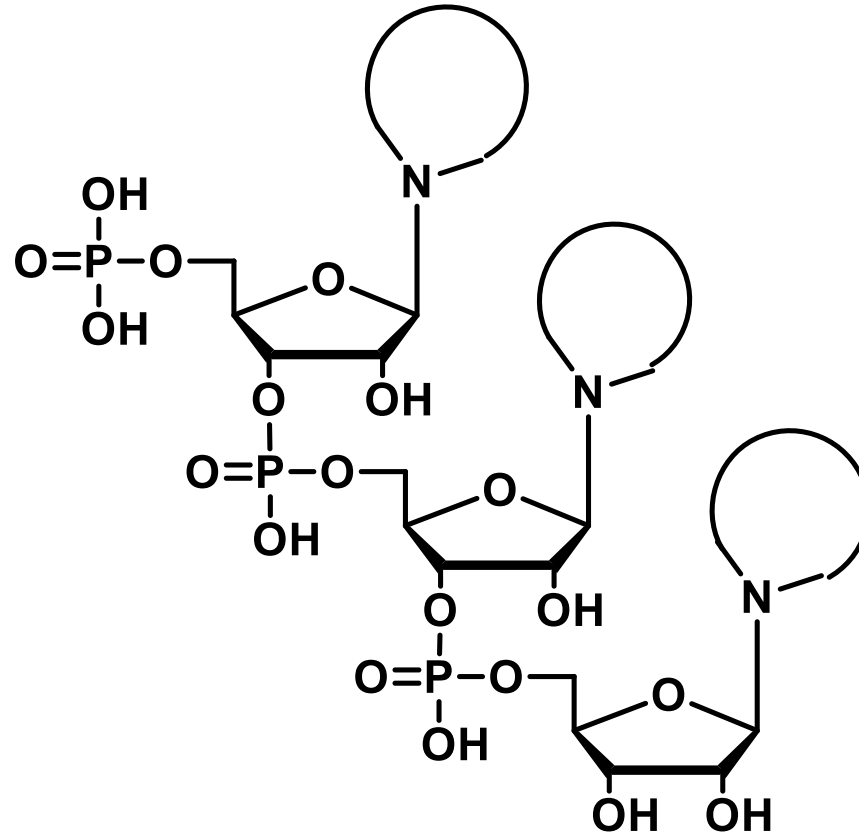
pirimidinbázisok



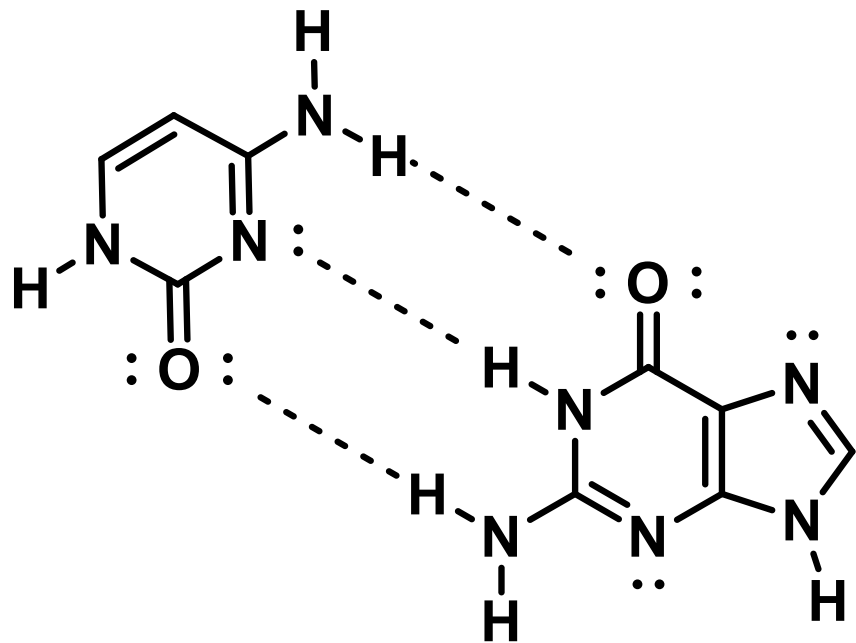
# NUKLEINSAVAK, NUKLEOTIDOK



adenozin-5'-foszfát

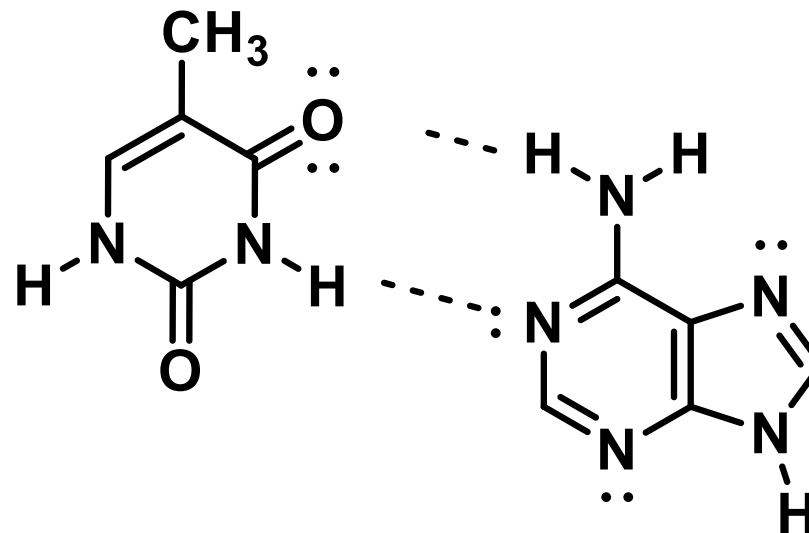


# NUKLEINSAVAK, NUKLEOTIDOK



citozin (C)

guanin (G)



timin (T)

adenin (A)

**KÖSZÖNÖM A FIGYELMET!**