

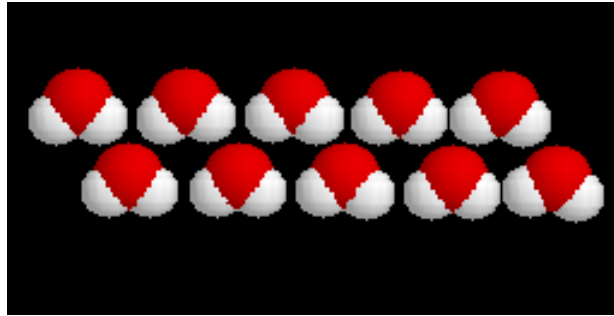


Biológiai makromolekulák

Láng Orsolya

Semmelweis Egyetem, Genetikai, Sejt- és
Immunbiológiai Intézet

Mi a makromolekula?



H híd „hálózat” H_2O

DNS

RNS

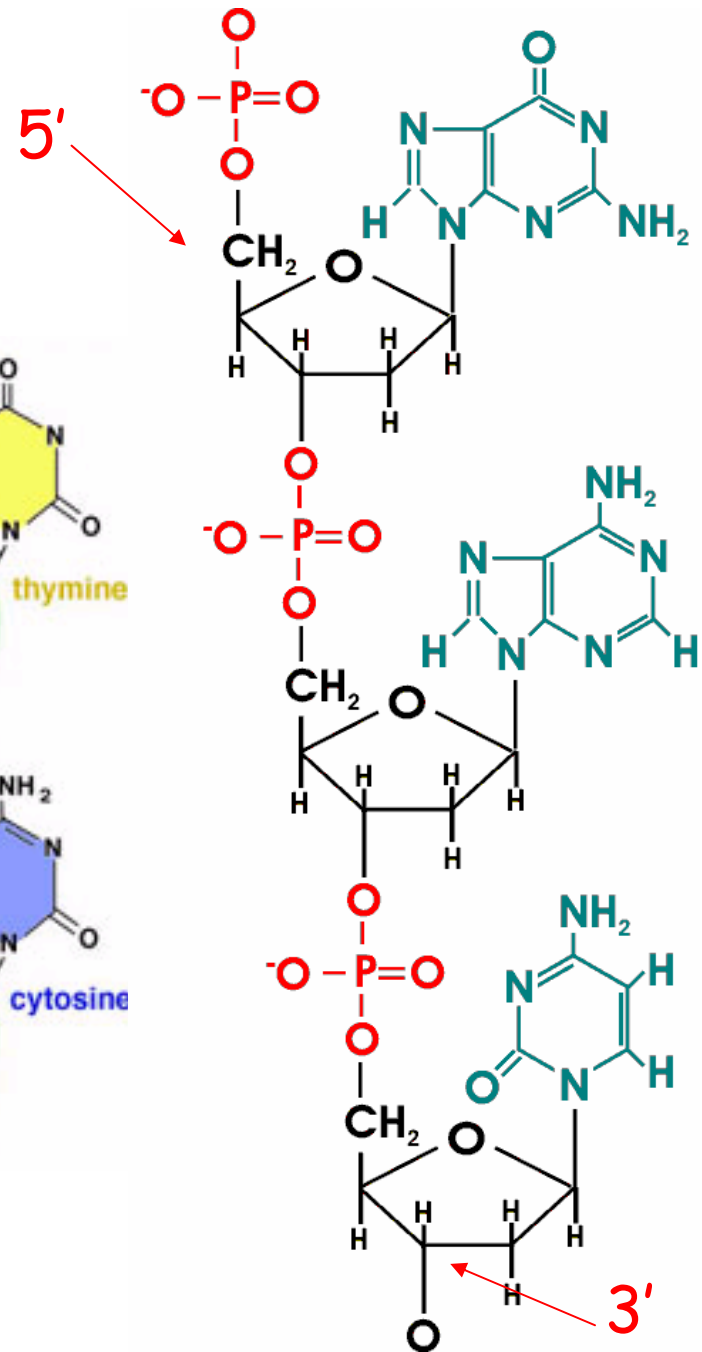
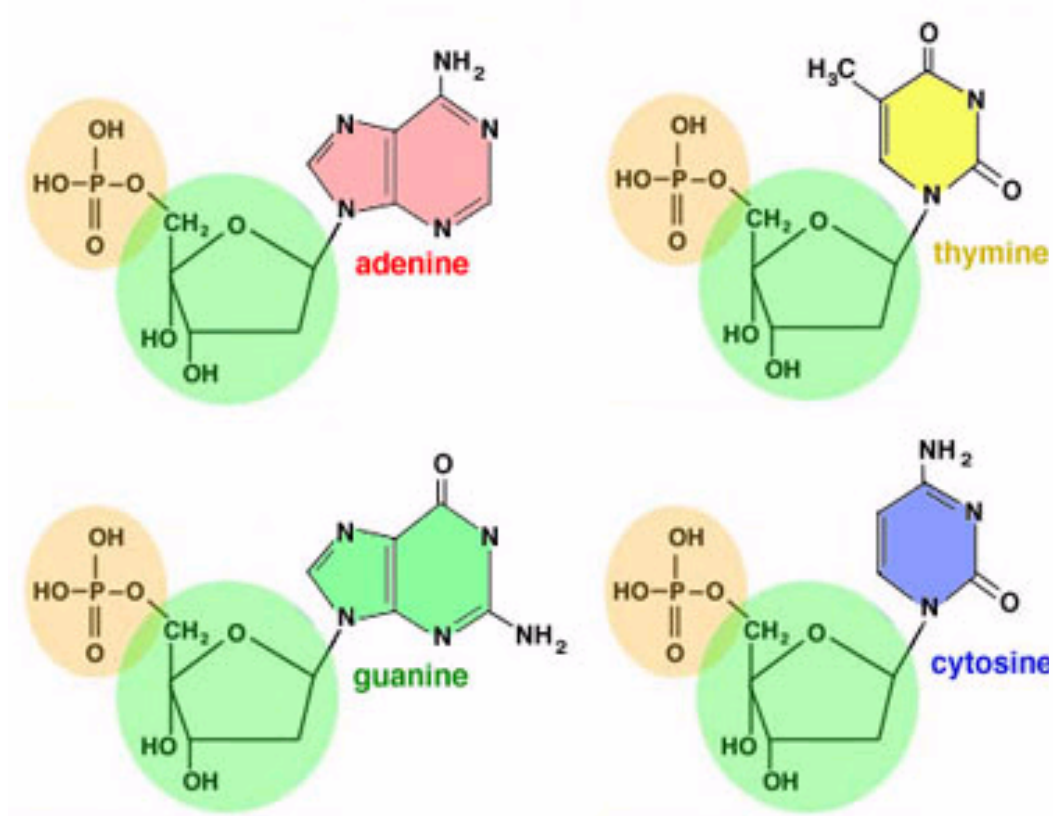
nukleinsavak

Fehérjék

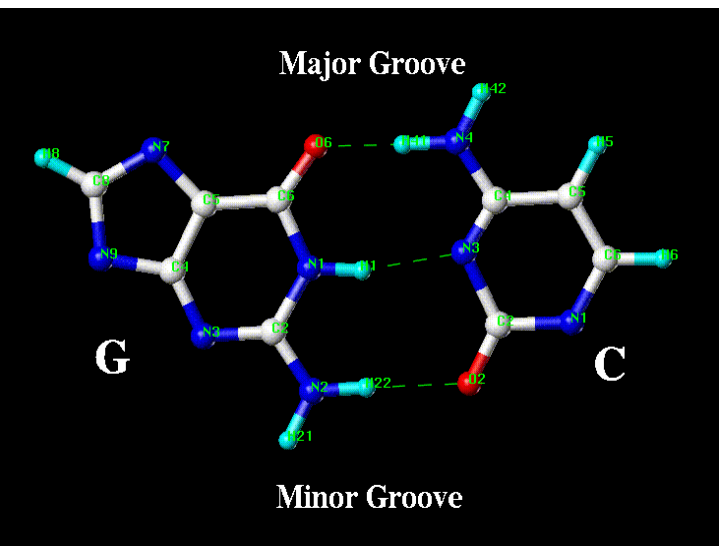
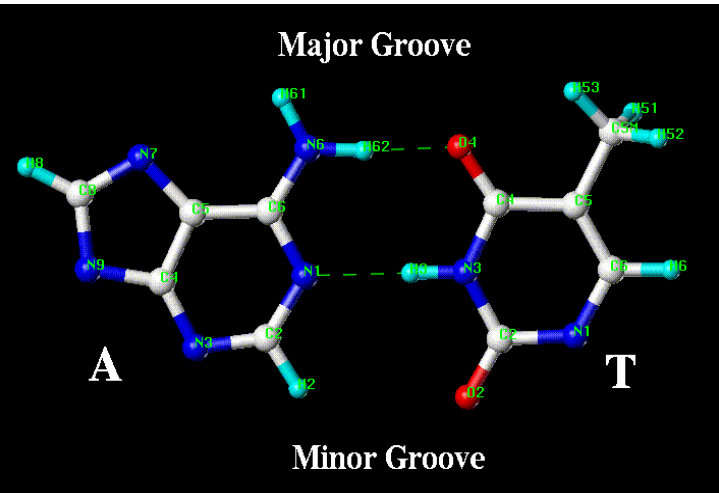
Membrán alkotóelemei

Szénhidrátok

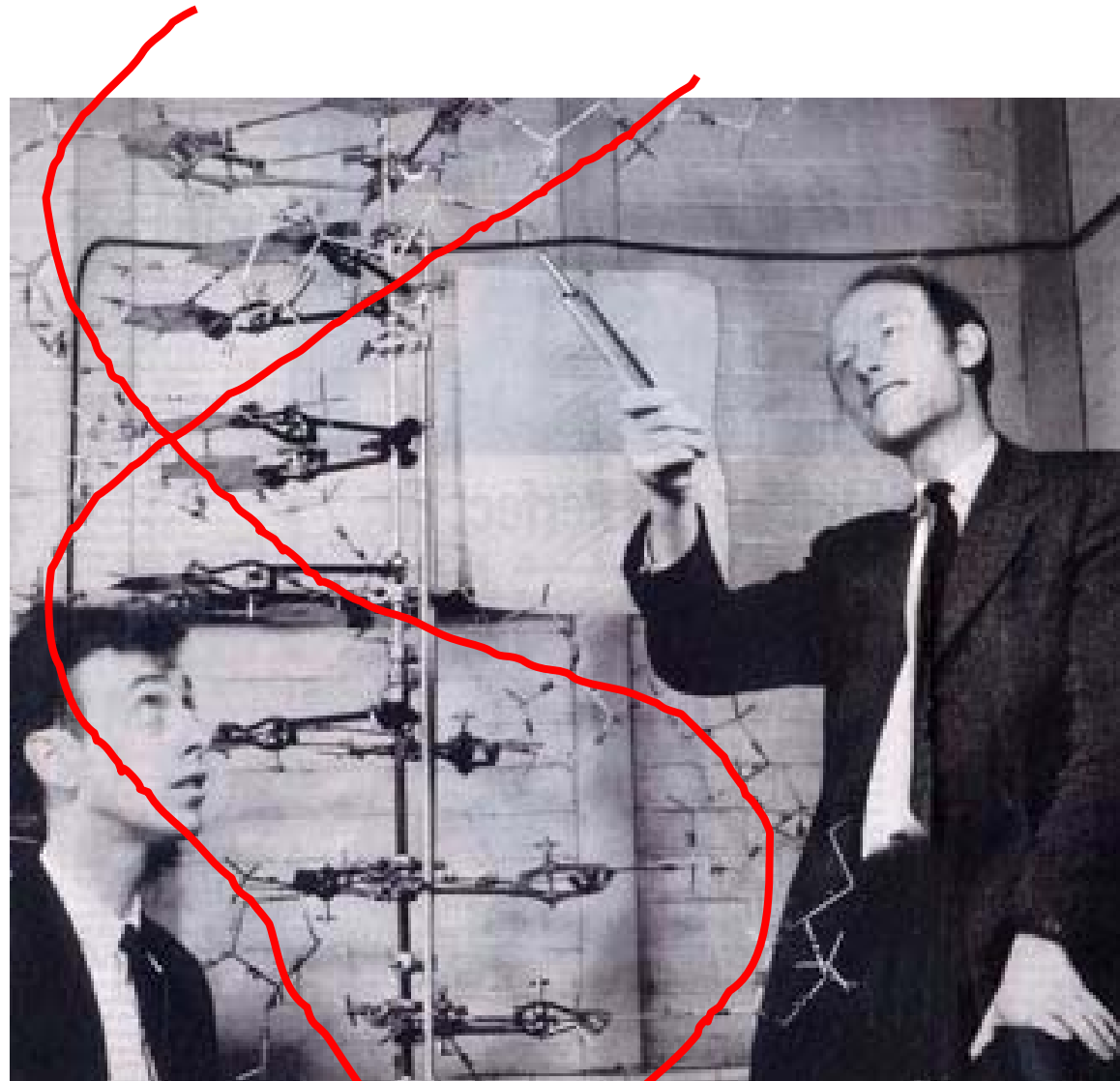
DNS építőelemei- nukleotidok



DNS szerkezet

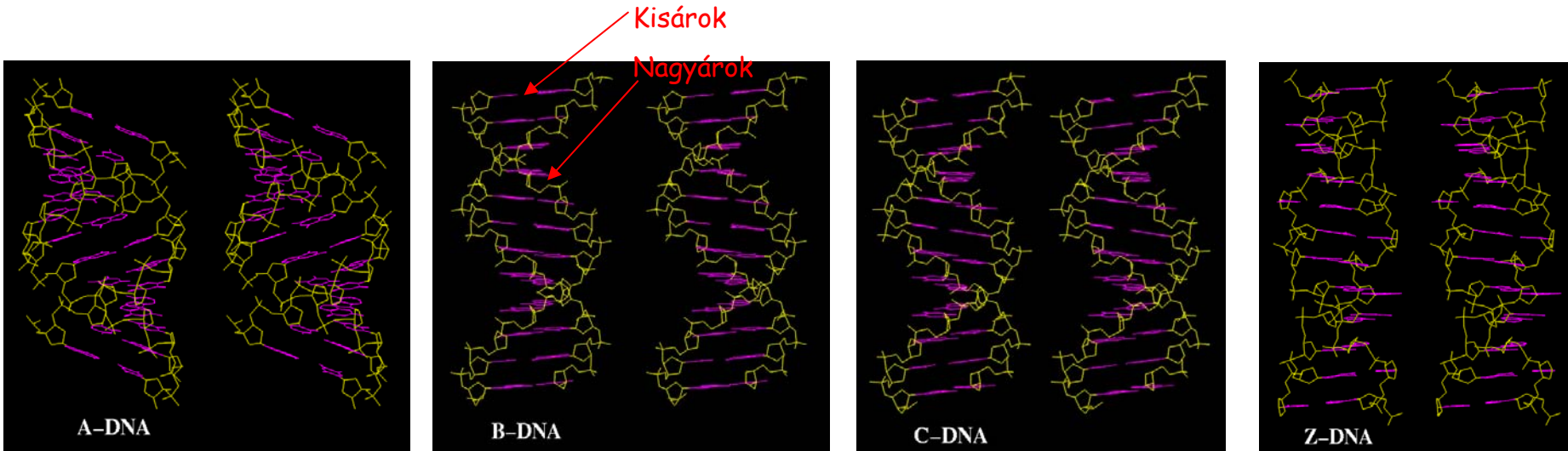


Watson- Crick bázispárok



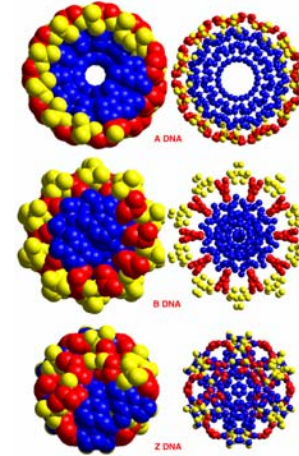
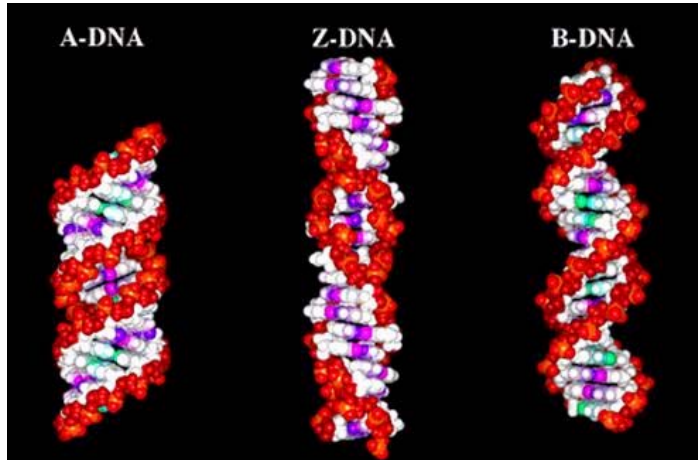
Watson- Crick modell

DNS lánc szerkezete (másodlagos szerkezet)



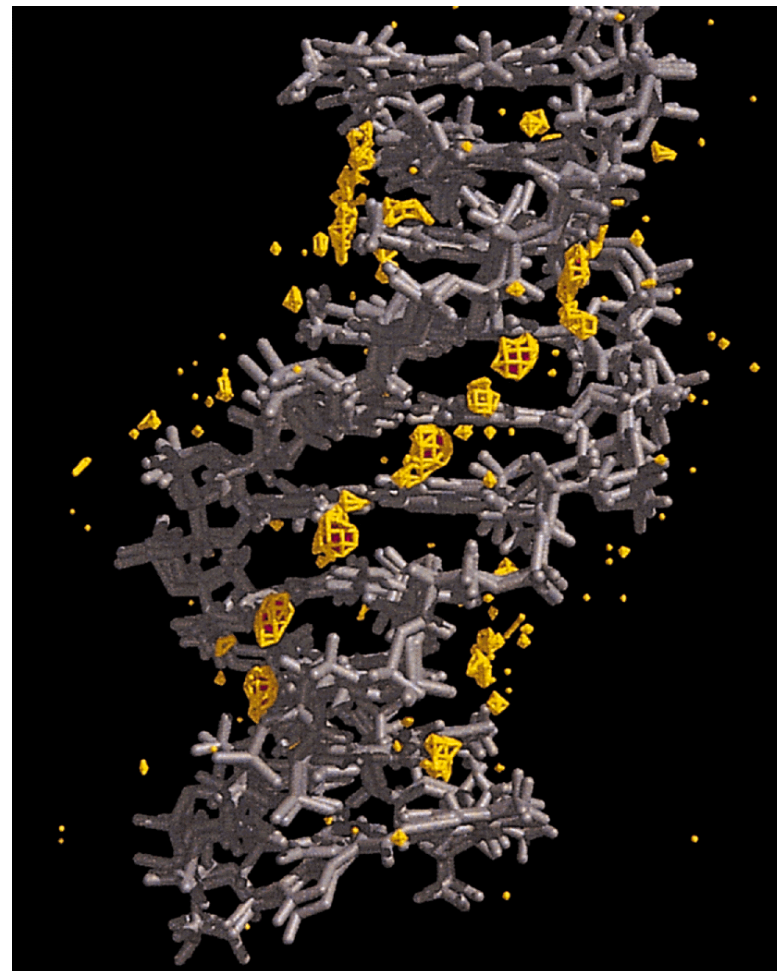
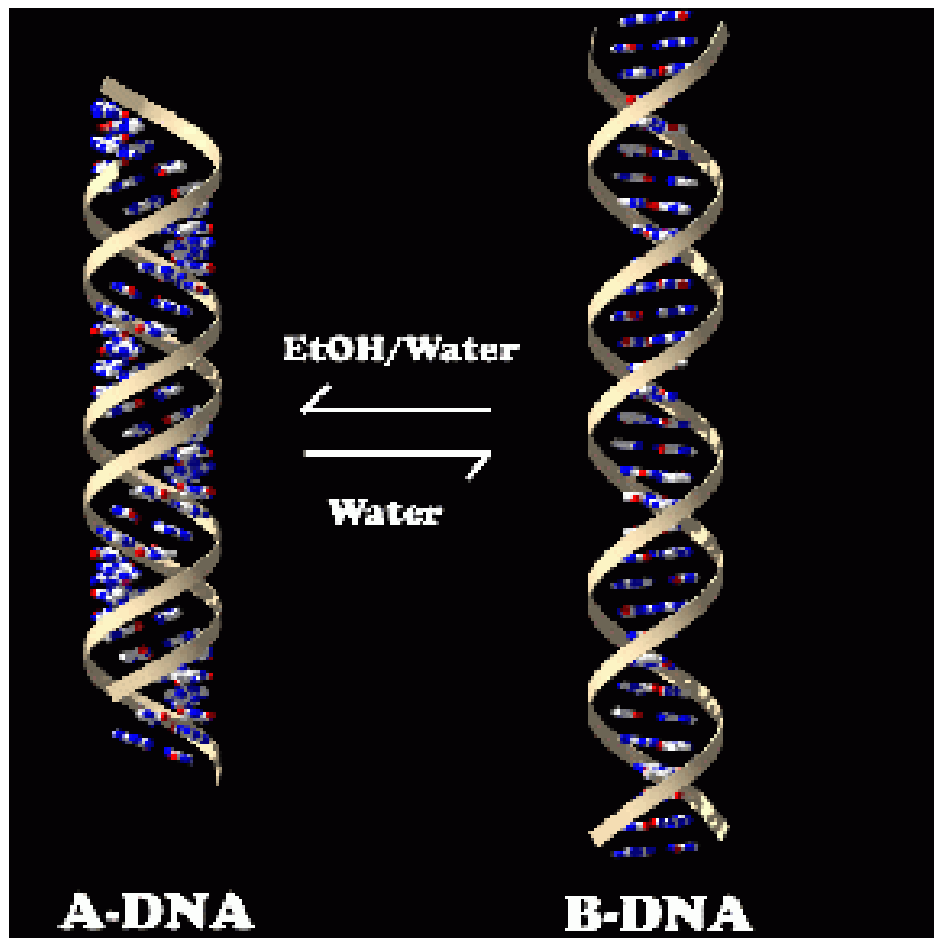
	A-DNA	B-DNA	C-DNA	Z-DNA Zig-zag
Csavarulat iránya	jobb	jobb	jobb	balmenet
Menetemelkedés	2,8 nm	3,4 nm		4,5 nm
bp/ fordulat	11	10,4	9	12
Szögelfordulás/b p	33,6	35,9		30
Átmérő	2,6 nm	2 nm		1,8 nm

Másodlagos szerkezet biológiai jelentősége



	A-DNA	B-DNA	C-DNA	Z-DNA
Előfordulási helye	Alacsony só ill.nedvességtartalom mellett	Természetben Watson-Crick		Szabályozó régiókban
Szerkezet	dsRNS RNS-DNS hybridek			12 bp szakaszon Purin, pirimidin bázis váltva
Egyéb	Neomycin és tumorelleses szerek előidézhetik			Antitestek is bekötődhetnek-műtermék

A-B lánc átalakulása - hidratáltság



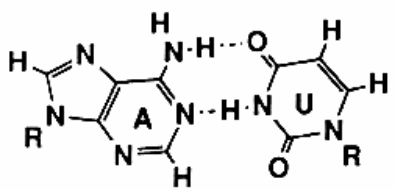
Piros- valószínű

Sárga-elképzelhető

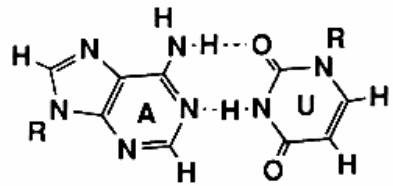
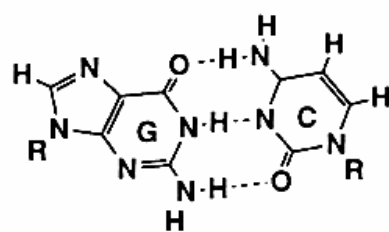
Bázispárok másként

Szerep:

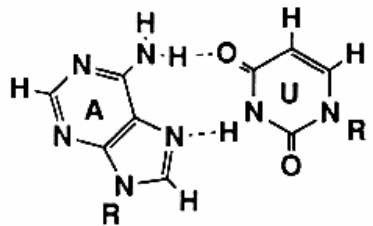
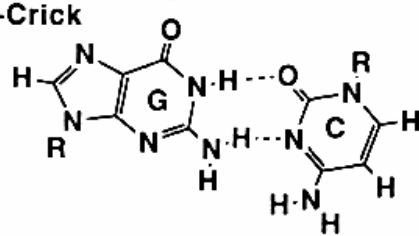
Mutációk



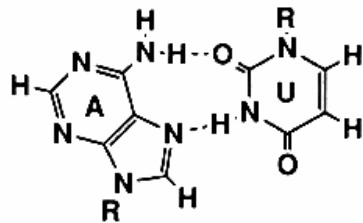
Watson-Crick



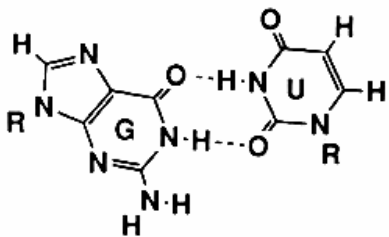
Reverse Watson-Crick



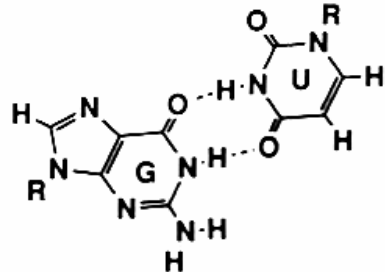
A-U Hoogsteen



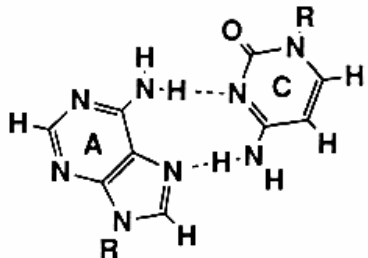
A-U Reverse Hoogsteen



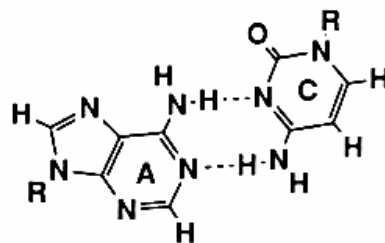
G-U Wobble



G-U Reverse Wobble

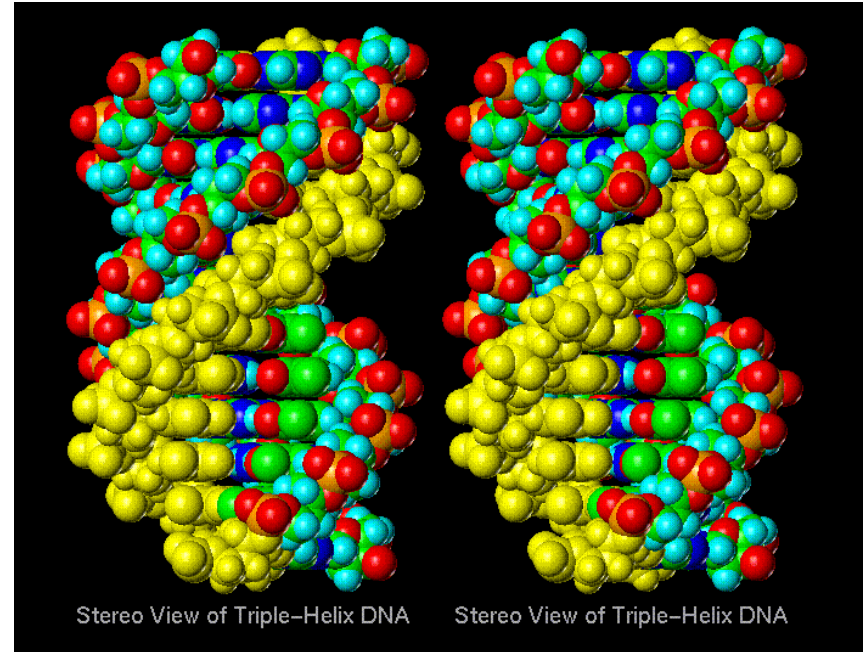
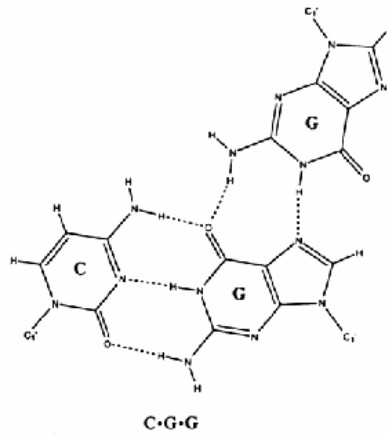
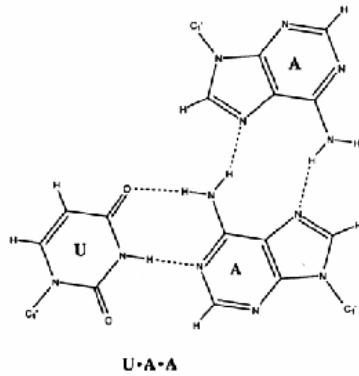
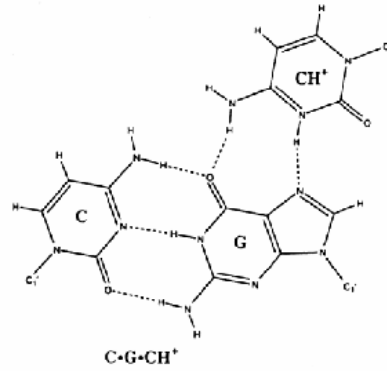
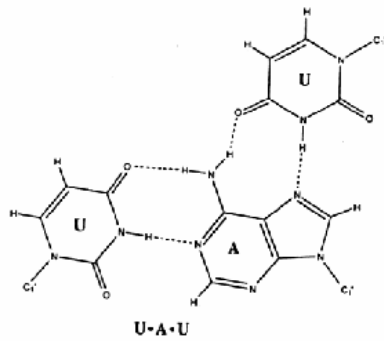


A-C Reverse Hoogsteen



A-C Reverse Wobble

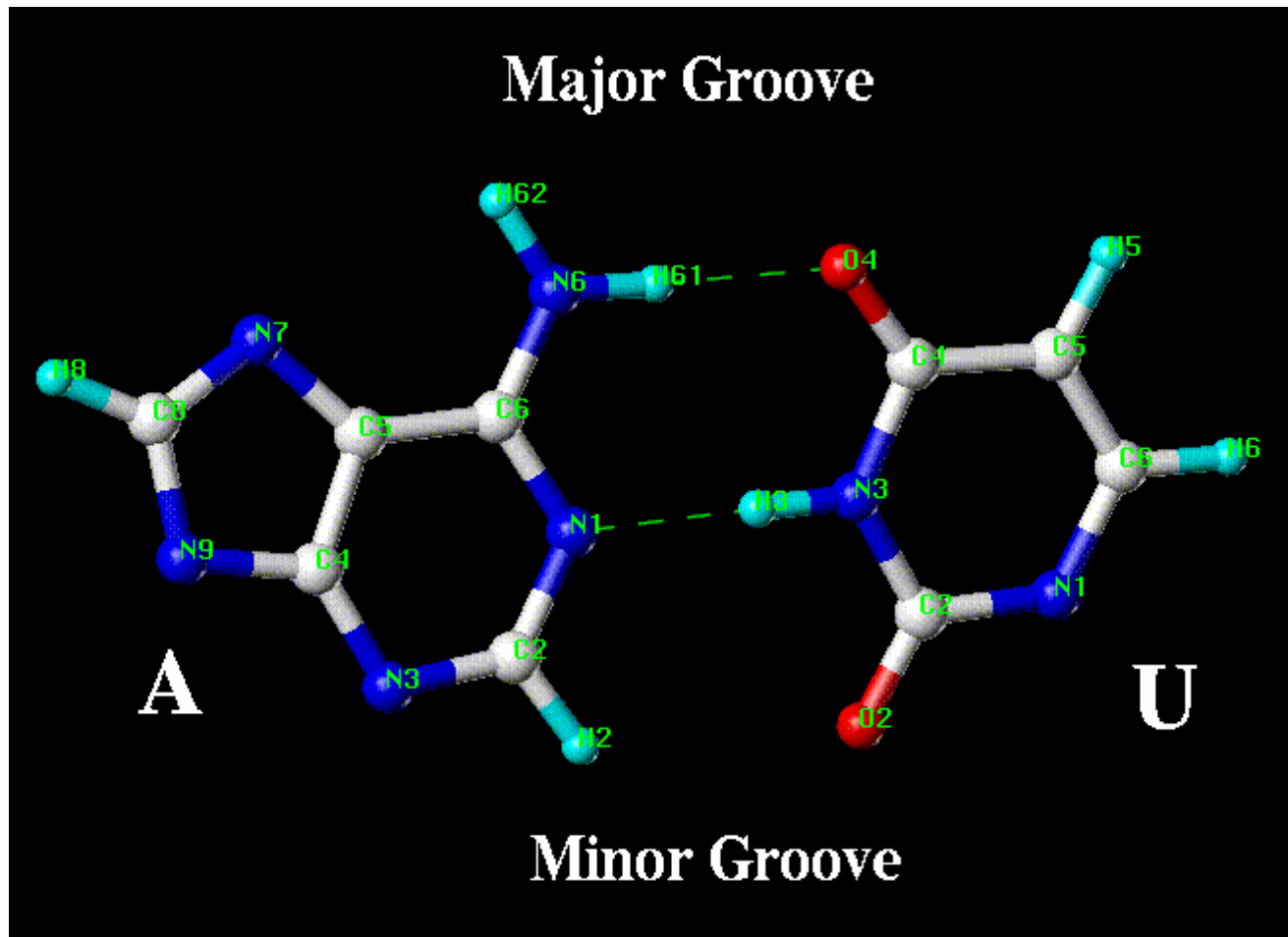
DNS tripletek



Lokalizáció: nagy árok

siRNS: 2 DNS lánc + 1 RNS

RNS

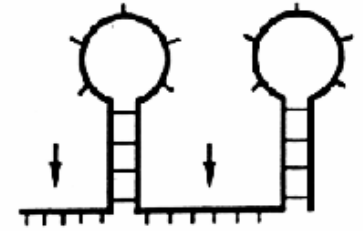


RNS másodlagos szerkezet

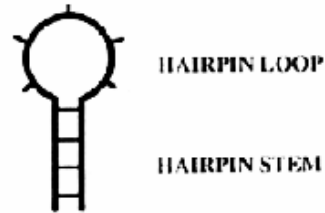
a. DUPLEXES



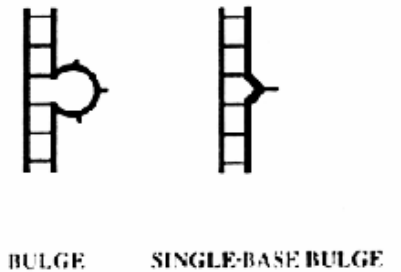
b. SINGLE STRANDED REGIONS



c. HAIRPINS

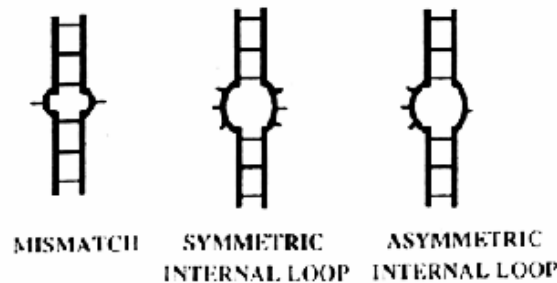


d. BULGES

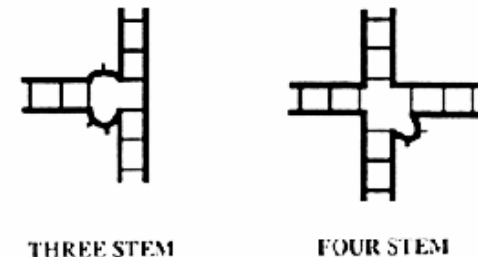


Kettős szál
Egyszálú régiók
Hajtű
Kiboltosulás
Belső hurok
Kapcsolatok

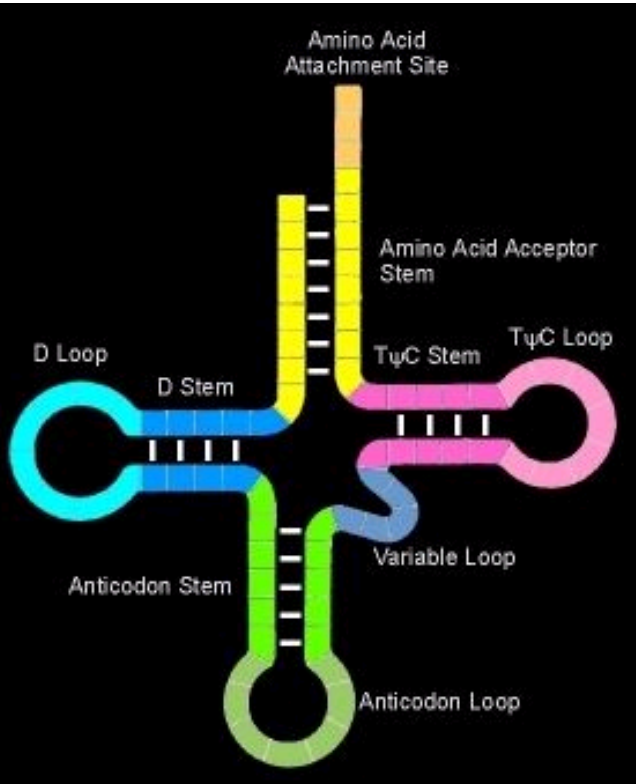
e. INTERNAL LOOPS



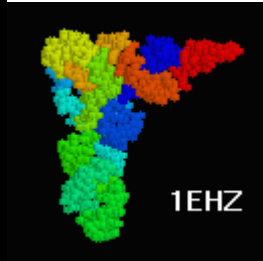
f. JUNCTIONS



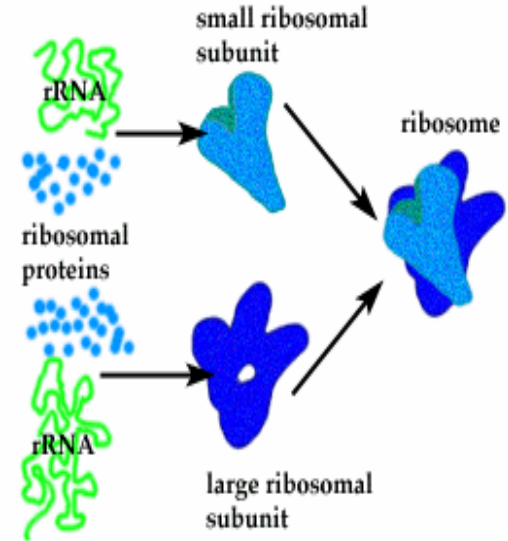
RNS molekulák



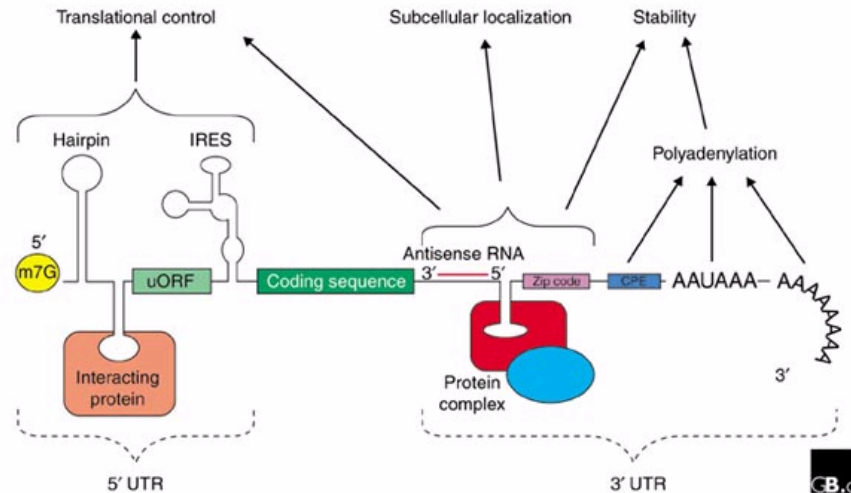
tRNS



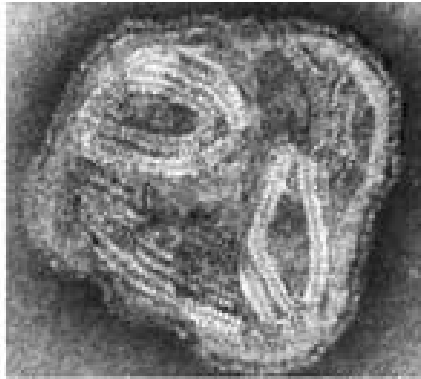
rRNS-riboszóma



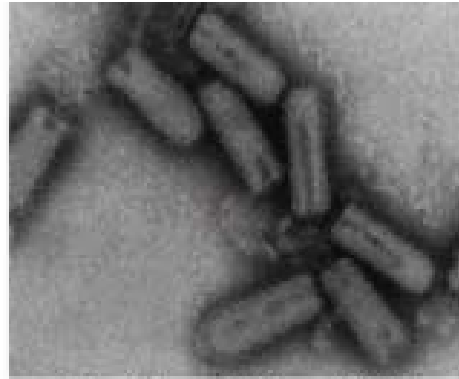
mRNS



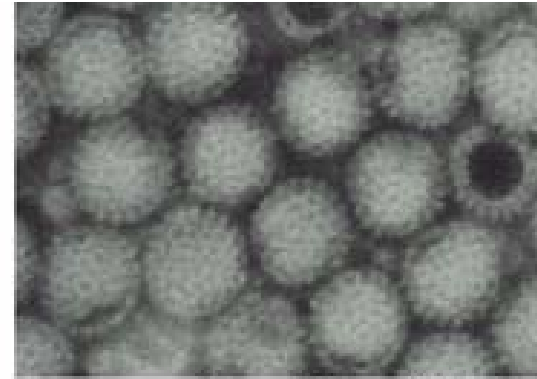
RNS mint örökítő anyag



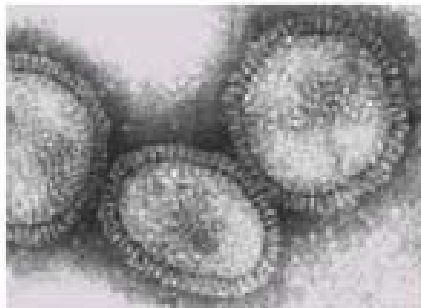
Paramyxoviridae (NS-)



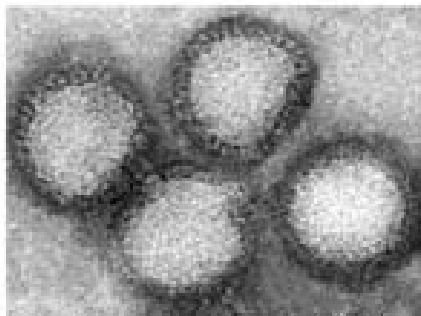
Rhabdoviridae (NS-)



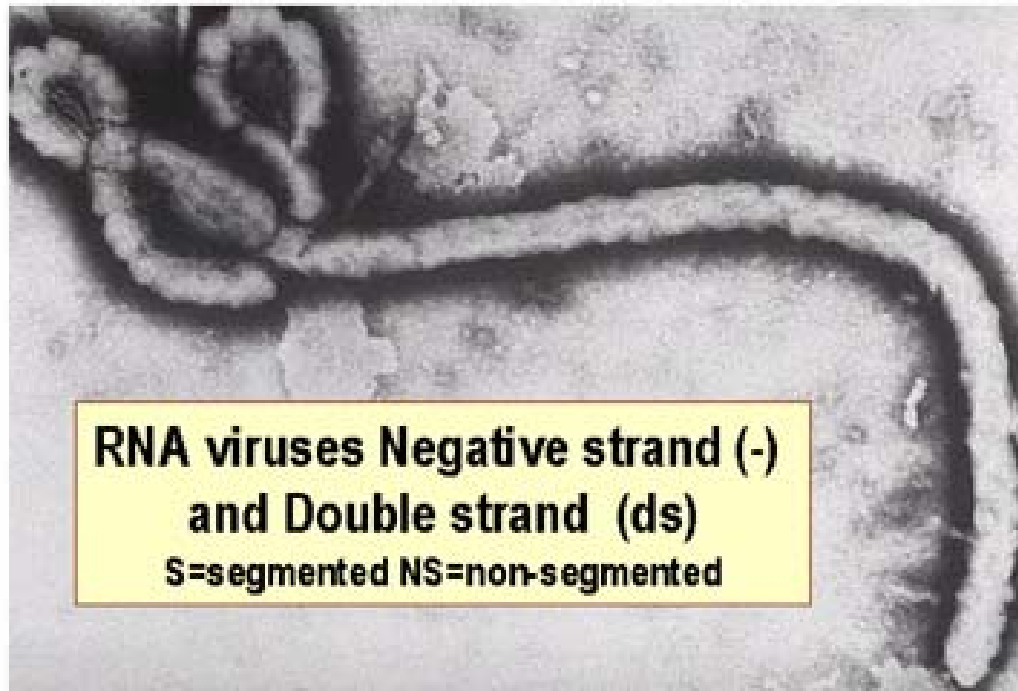
Reoviridae (S,ds)



Orthomyxoviridae (S-)



Bunyaviridae (S-)



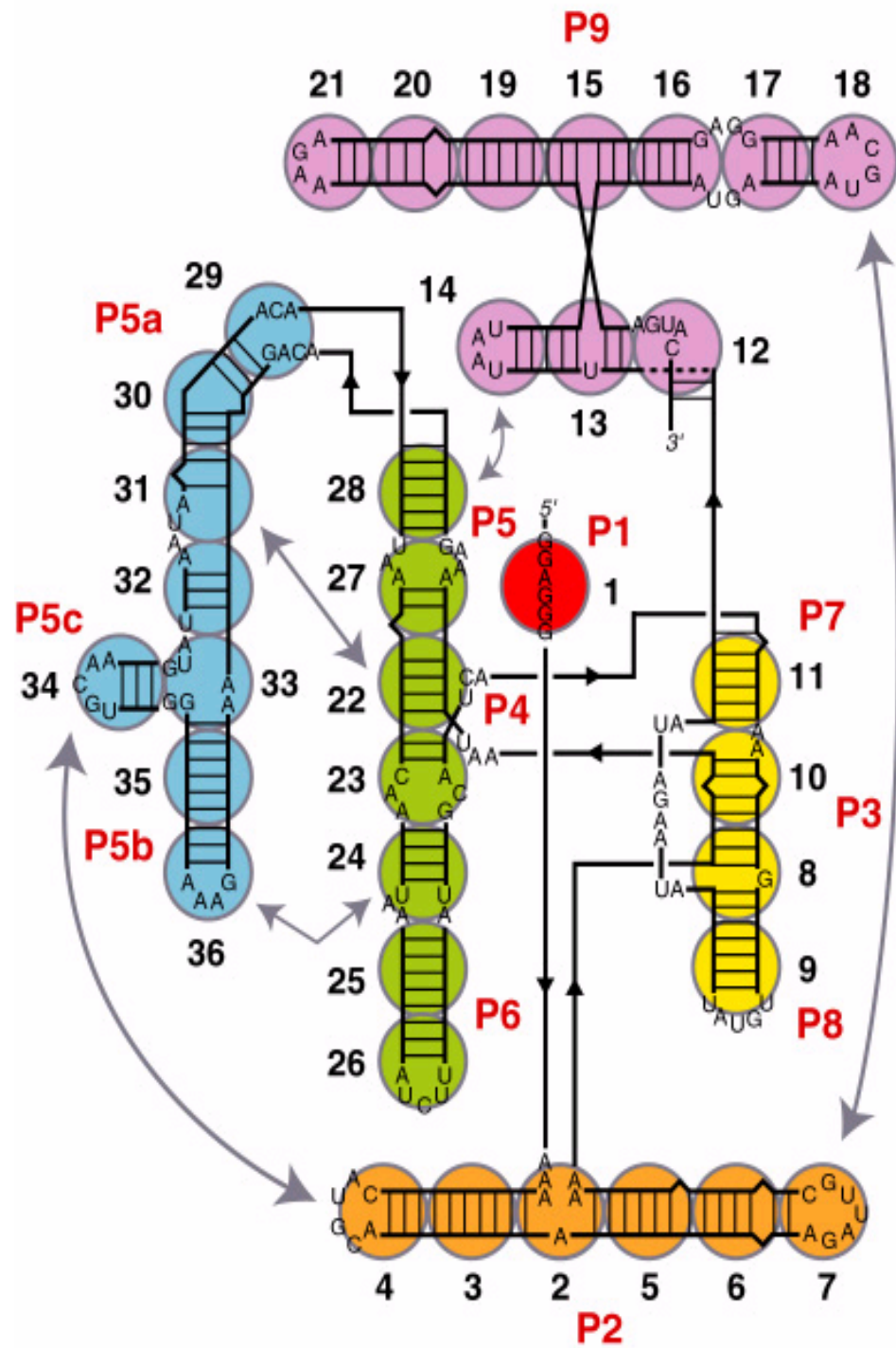
100nm

**RNA viruses Negative strand (-)
and Double strand (ds)
S=segmented NS=non-segmented**

Filoviridae (NS-)

RNS mint „enzim“

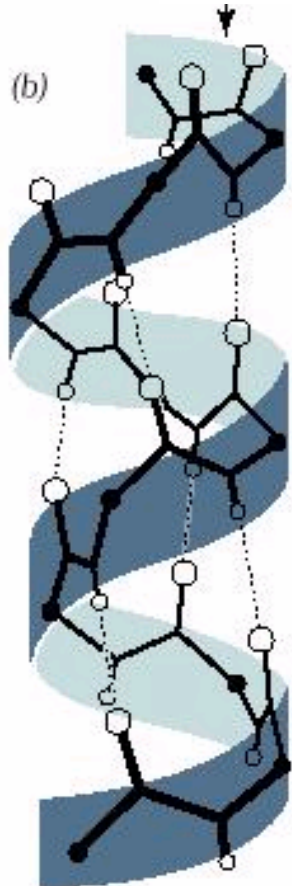
Tetrahymena ribozim



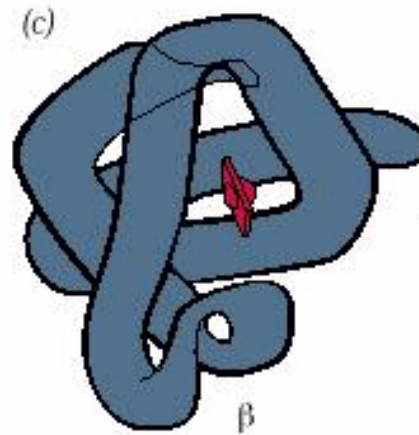
Fehérjék szerkezete - hemoglobin

(a) \pm Lys \pm Ala \pm His \pm Gly \pm Lys \pm Lys \pm Val \pm Leu \pm Gly - Ala \pm

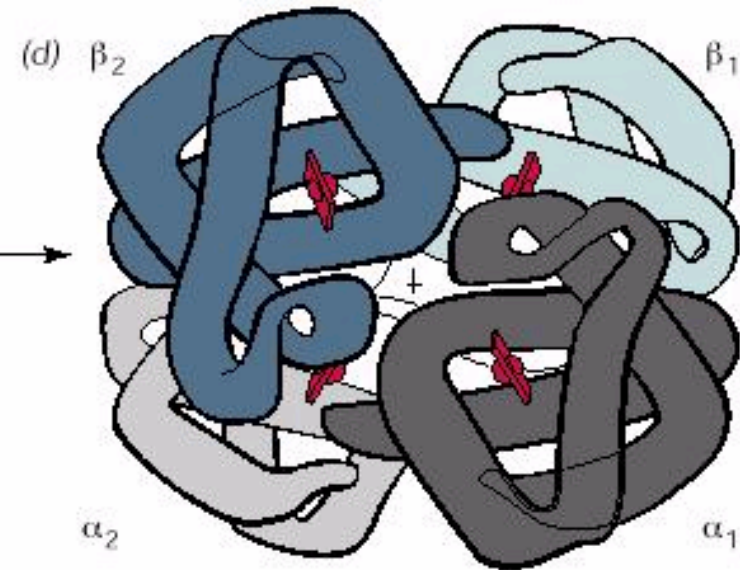
Elsődleges szerkezet



Másodlagos szerkezet



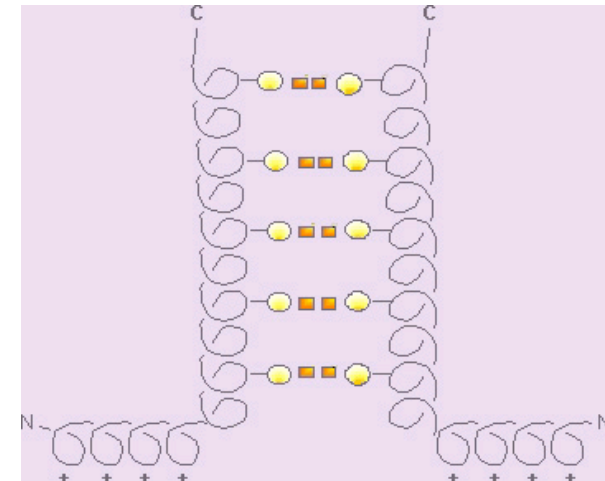
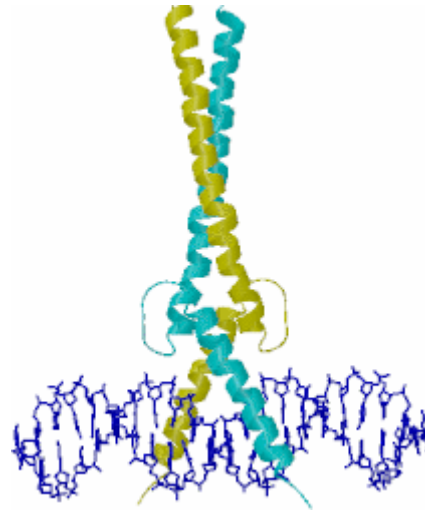
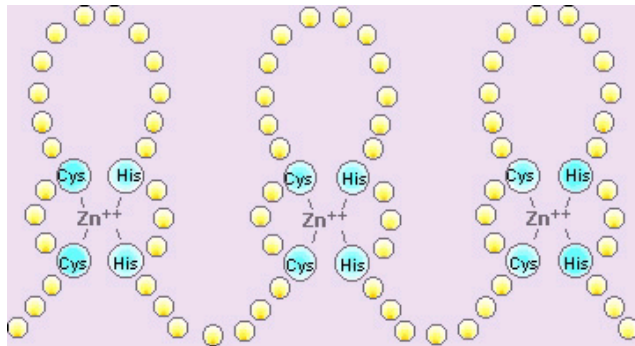
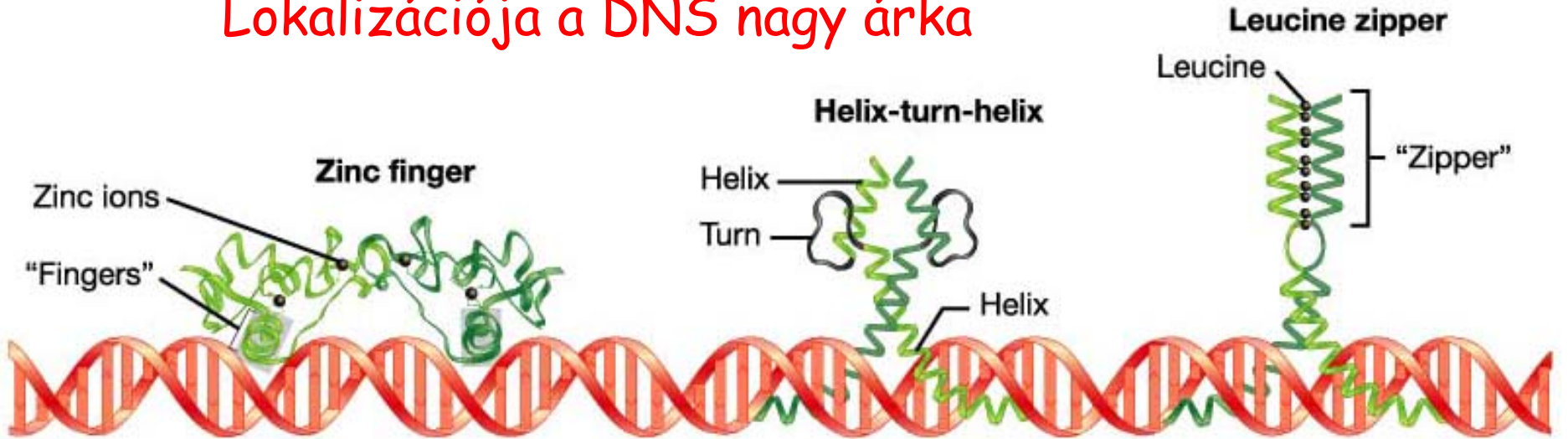
Harmadlagos szerkezet



Negyedleges szerkezet

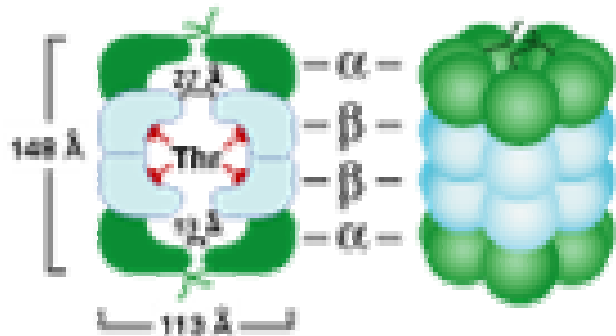
Fehérje - DNS interakció

Lokalizációja a DNS nagy árka

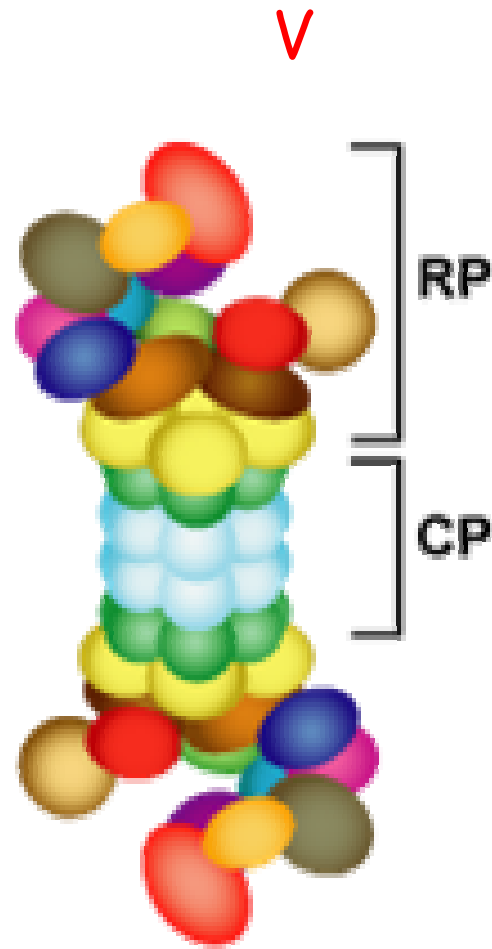
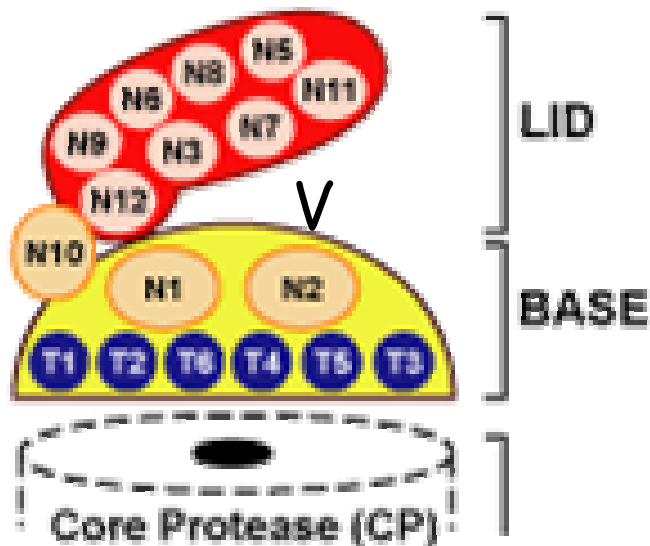


Fehérje bontás - proteoszoma

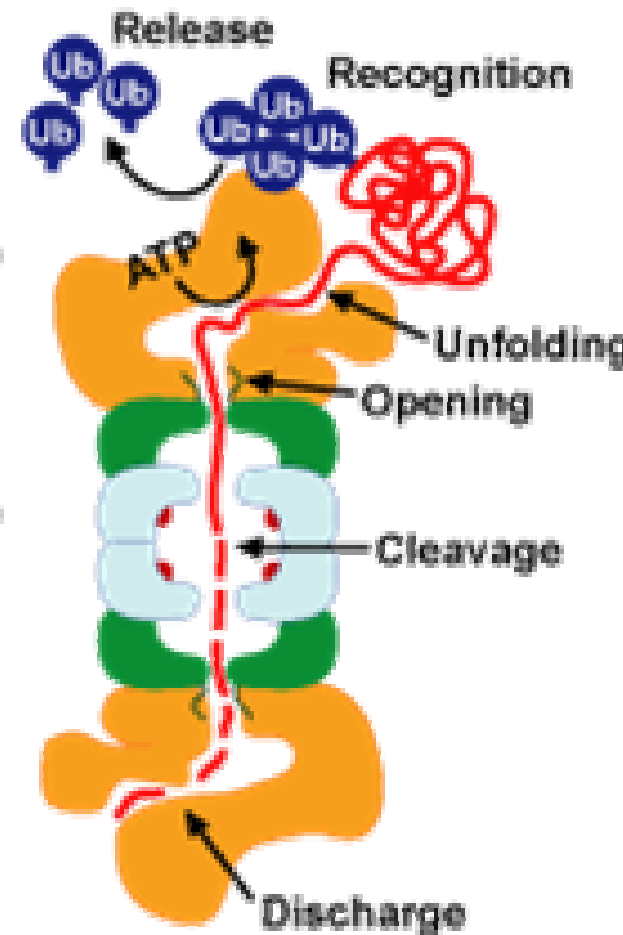
20S Core Protease (CP)



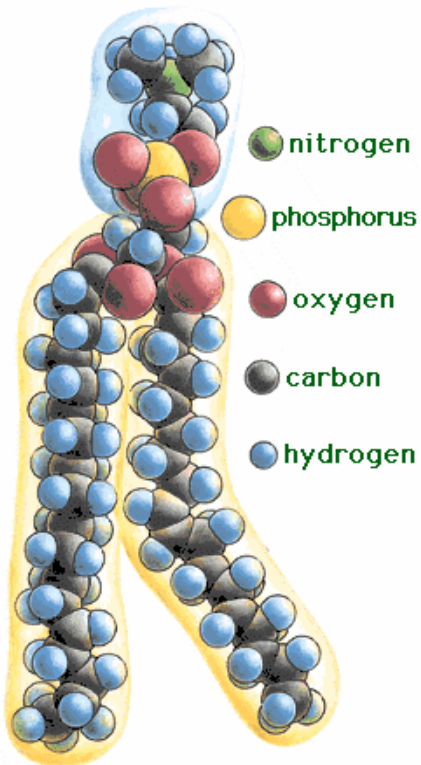
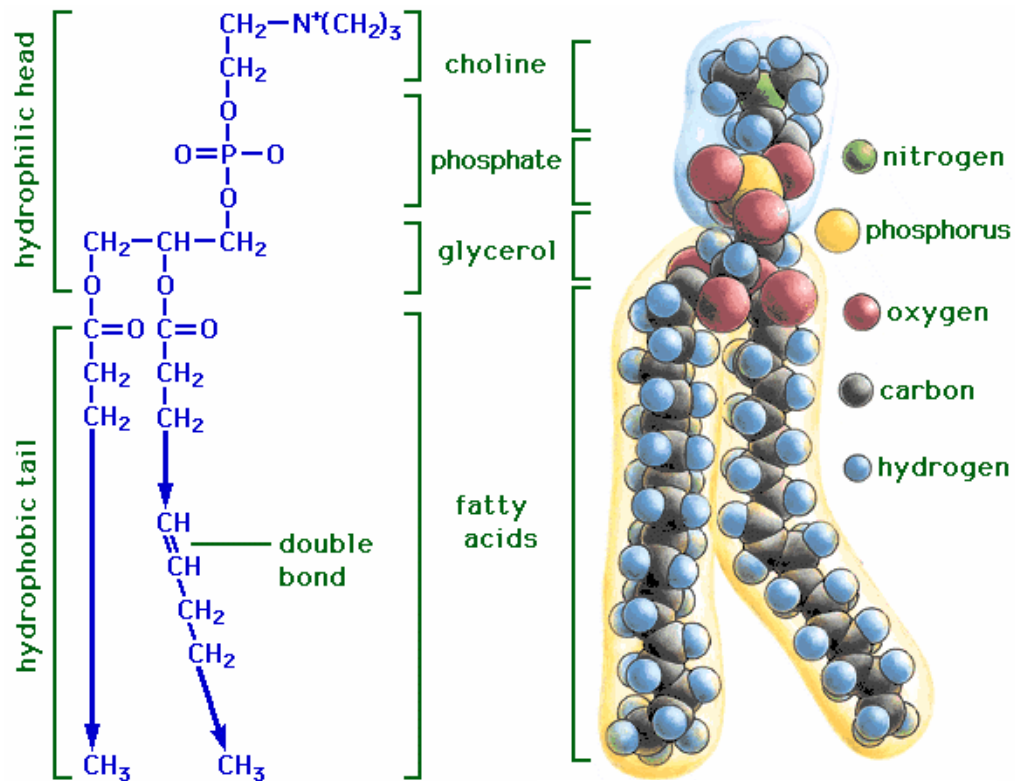
19S Regulatory Particle (RP)



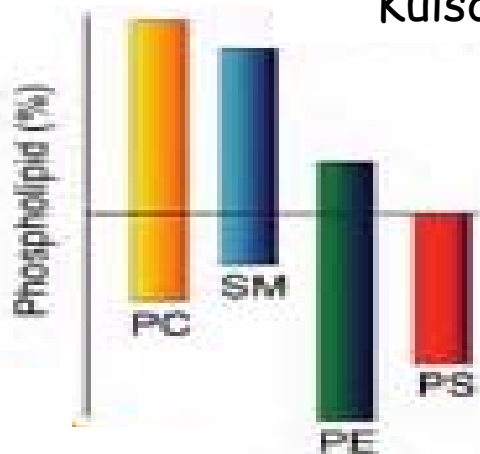
26S Proteasome



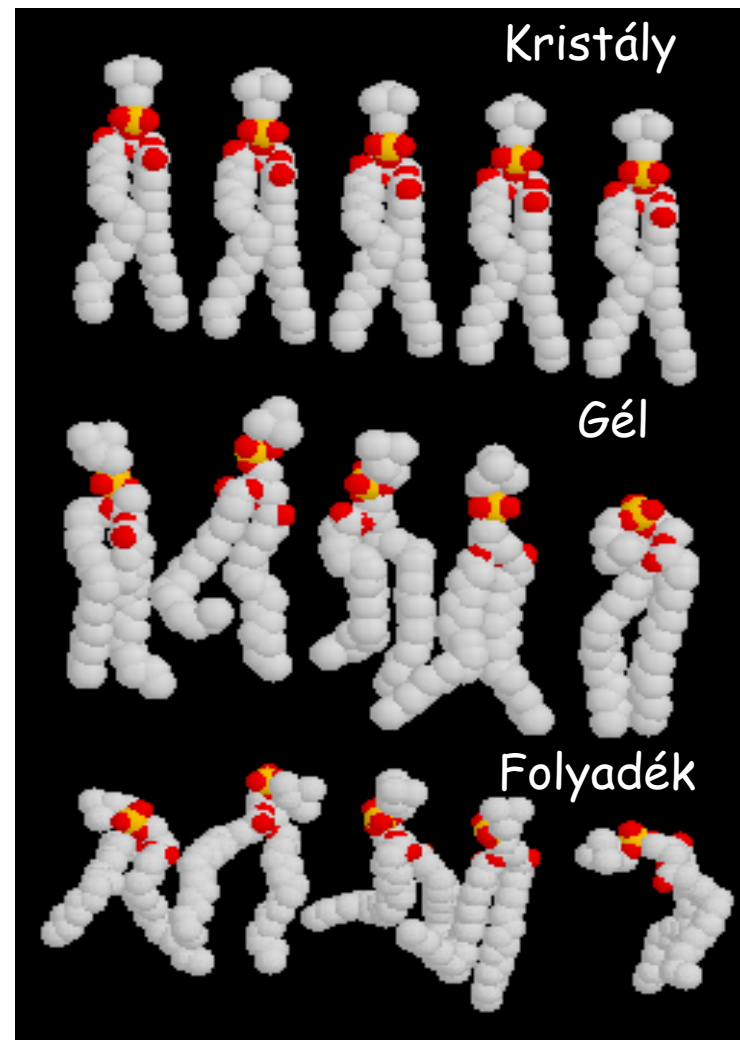
Membránalkotók- foszfolipidek



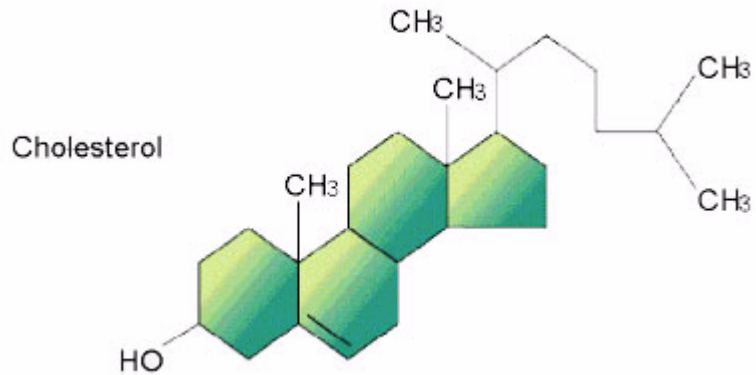
Külső réteg



Belső réteg

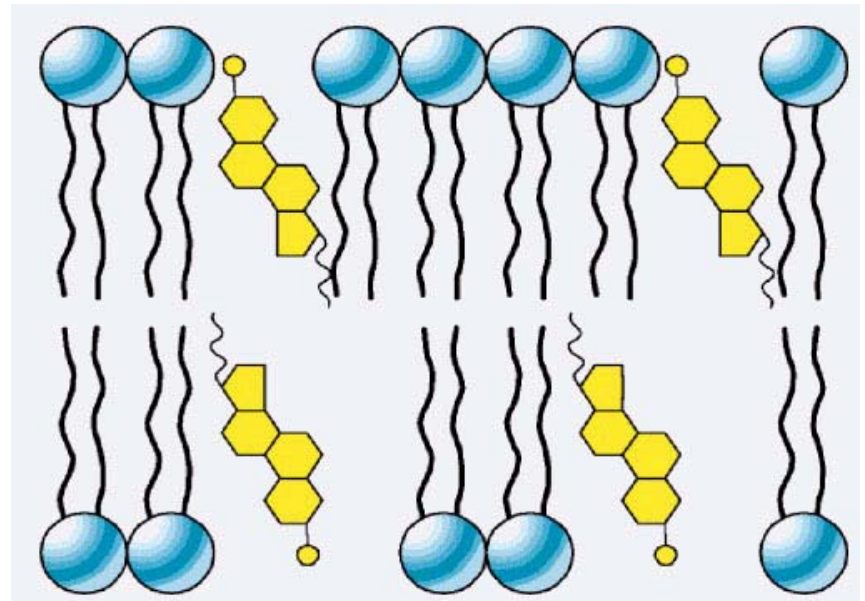


Membránalkotók- koleszterol



Fluiditást befolyásolja

Magas koleszterol
koncentráció -> csökkent
fluiditás



Membránalkotók- fehérjék

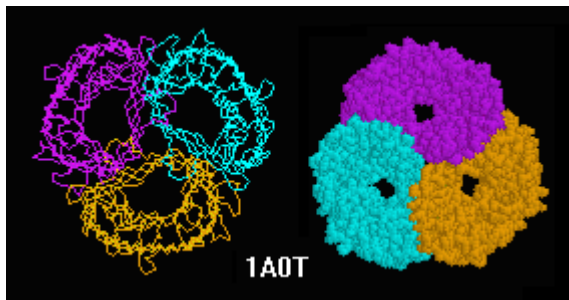
Különböző funkció:

transzport- csatorna, carrier, pumpa
szignál közvetítése -receptorok
kapcsolat- sejt, ECM

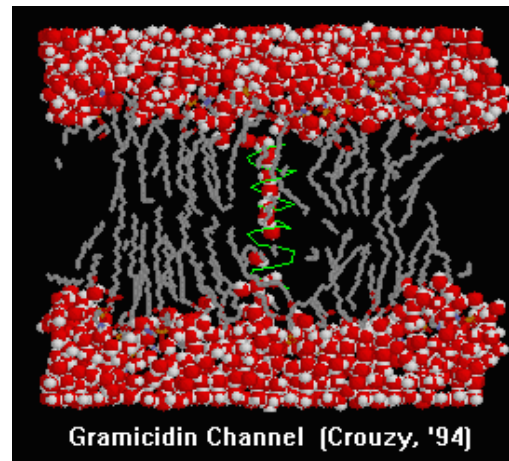
Membránban 20-25 As α -helikális szerkezetet alkot

Belül: C=O, NH csoportok

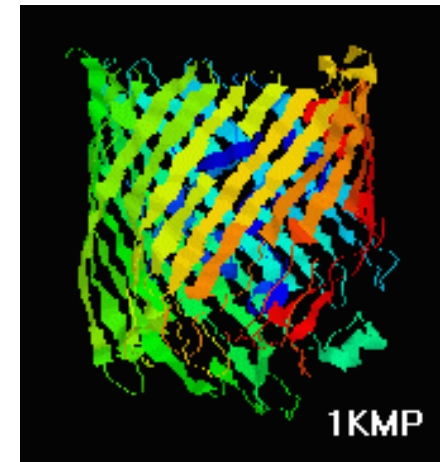
Kívül: hidrofób oldalláncok



Porin - trimer



Gramicidin Channel [Crouzy, '94]



7 transzmembrán receptorok

Szénhidrátok

Biológiai funkció:

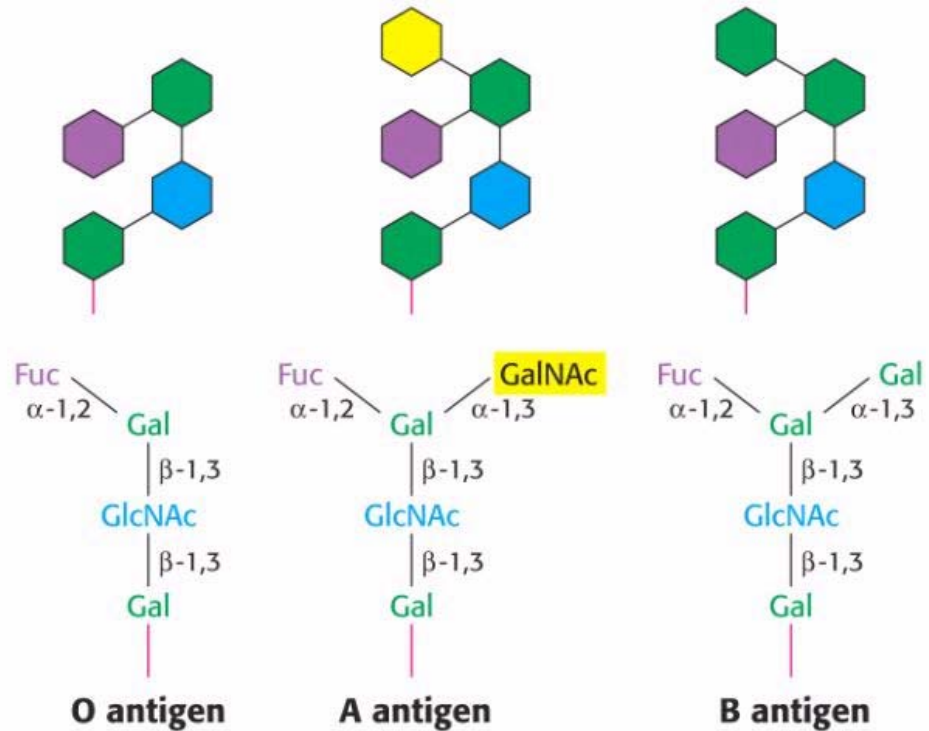
- Szignalizáció - glikolizált peptidek
- ExtraCelluláris - Mátrix elemei
- Energia

Gliko - proteinek
-lipidek

Oligoszacharidok

Peptidekhez és lipidekhez egyaránt kapcsolódnak

Variabilitást fokozza



Vércsoport antigének

LPS

/E. Coli külső membránja/

