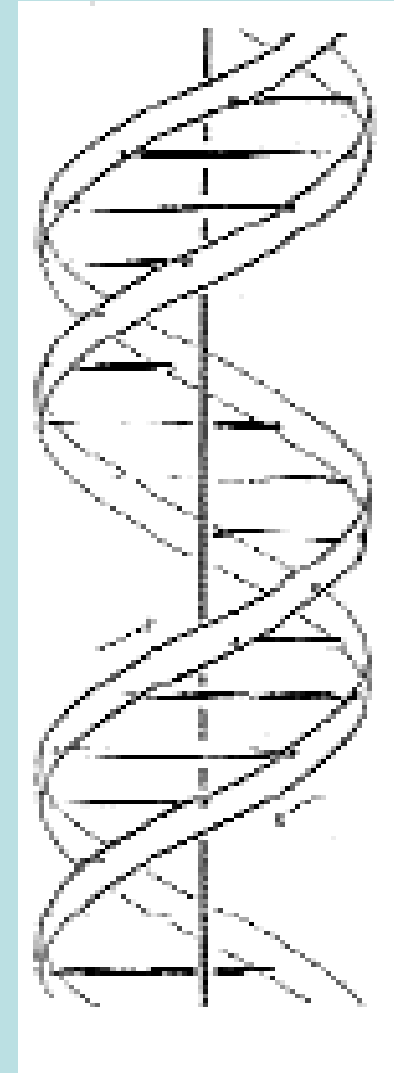
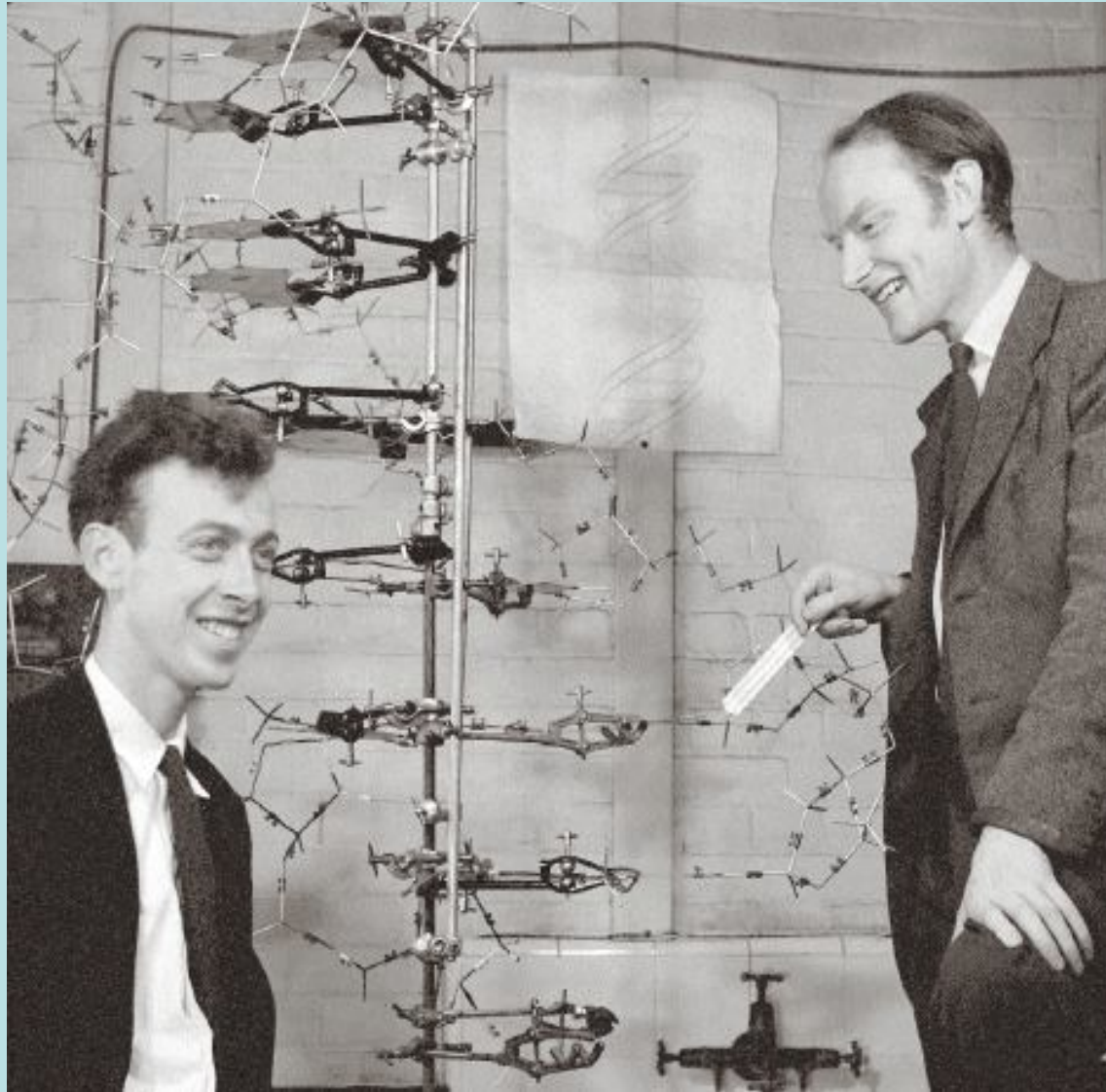


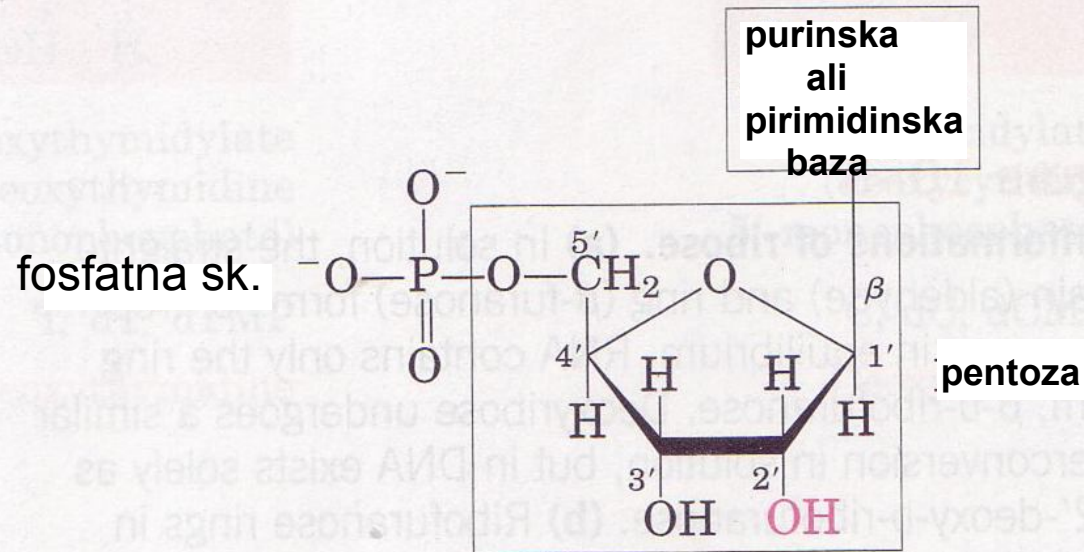
## **Nukleotidi in zgradba nukleinskih kislin**



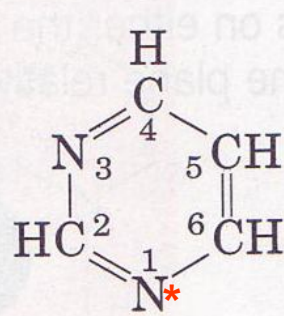
**James Watson in Francis Crick, odkritelja vijačne dvoverižne zgradbe DNA, leta 1953. Bistven prispevek k temu odkritju sta dala tudi Maurice Wilkins in Rosalind Franklin.**

**Gradniki  
DNA so  
nukleotidi**

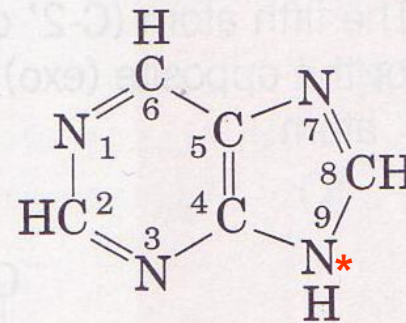
**Nukleozid =  
N-baza + pentoza**



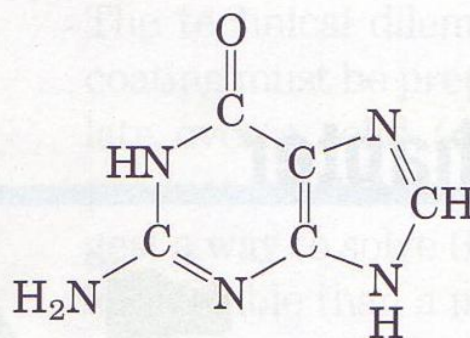
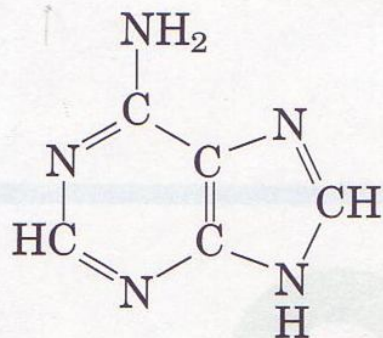
**Nukleotid =  
nukleozid-5' - fosfat**



purin



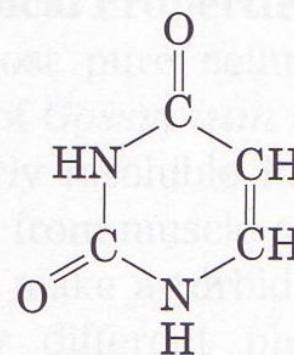
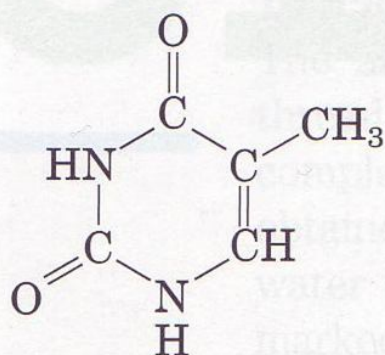
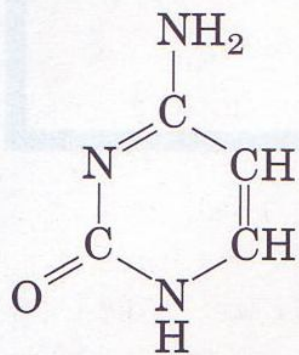
pirimidin



**purinski bazi**

**adenin**

**gvanin**

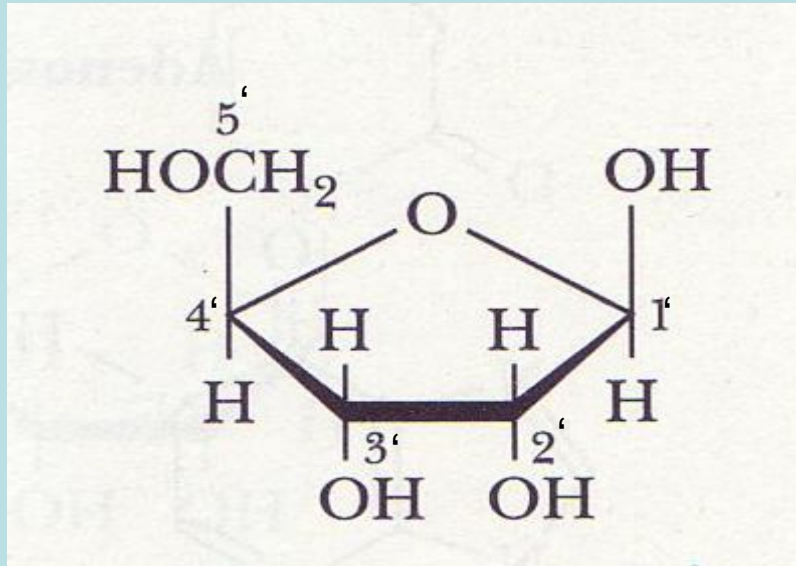


**citozin**

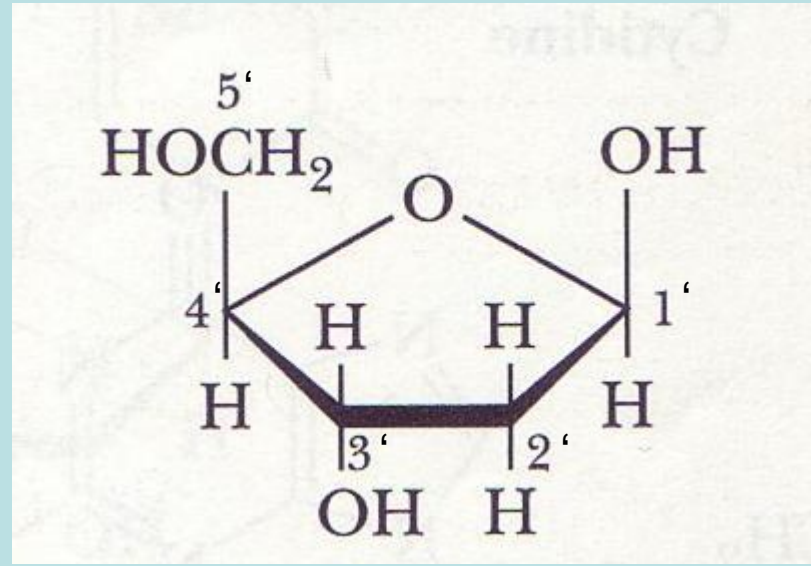
**timin (v DNA)**

**uracil (v RNA)**

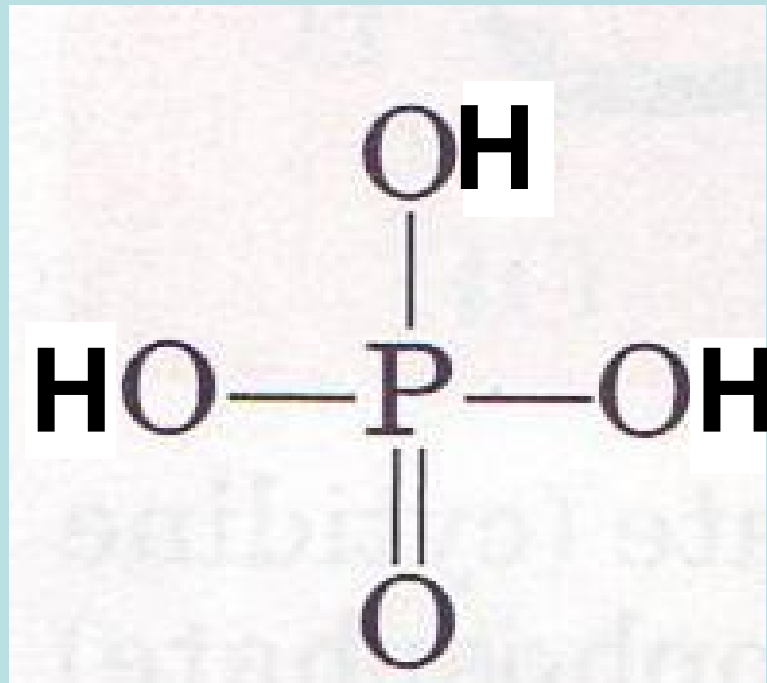
**pirimidinske baze**



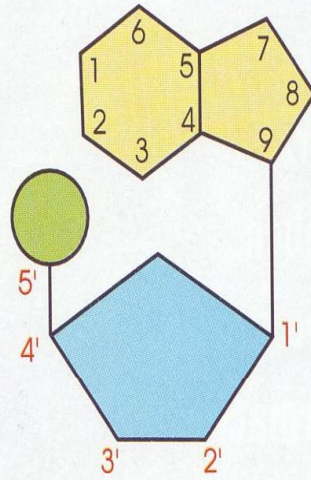
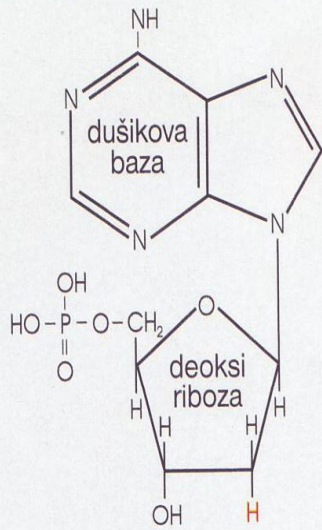
**riboza**



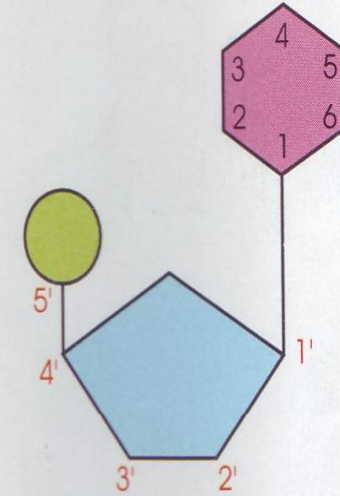
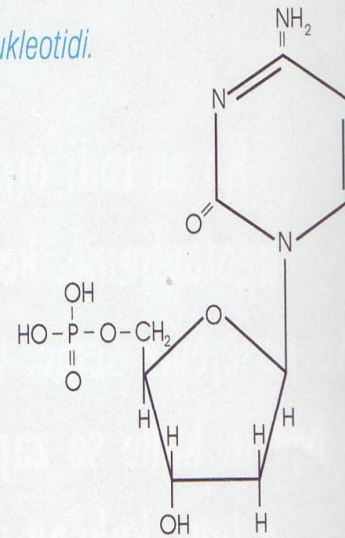
**2'- deoksi-riboza**



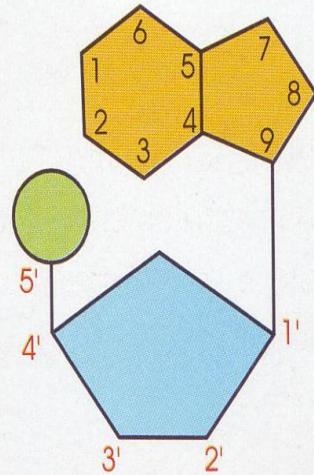
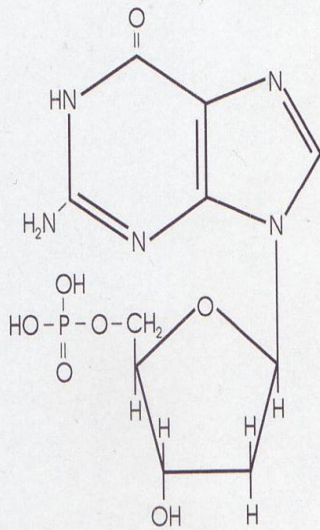
Posamezni nukleotidi.



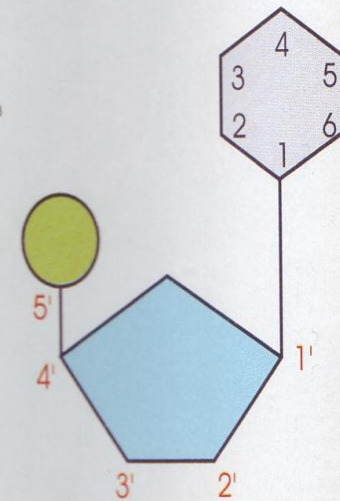
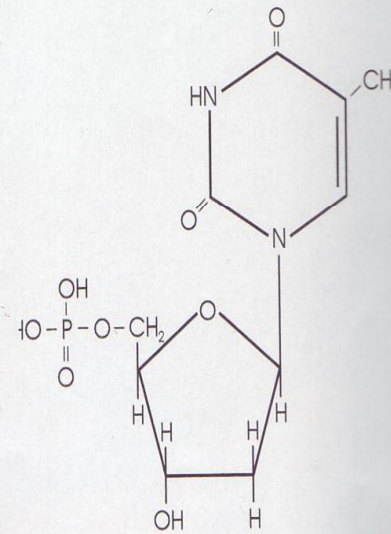
deoksiadenozin – fosfat



deoksicitidin – fosfat

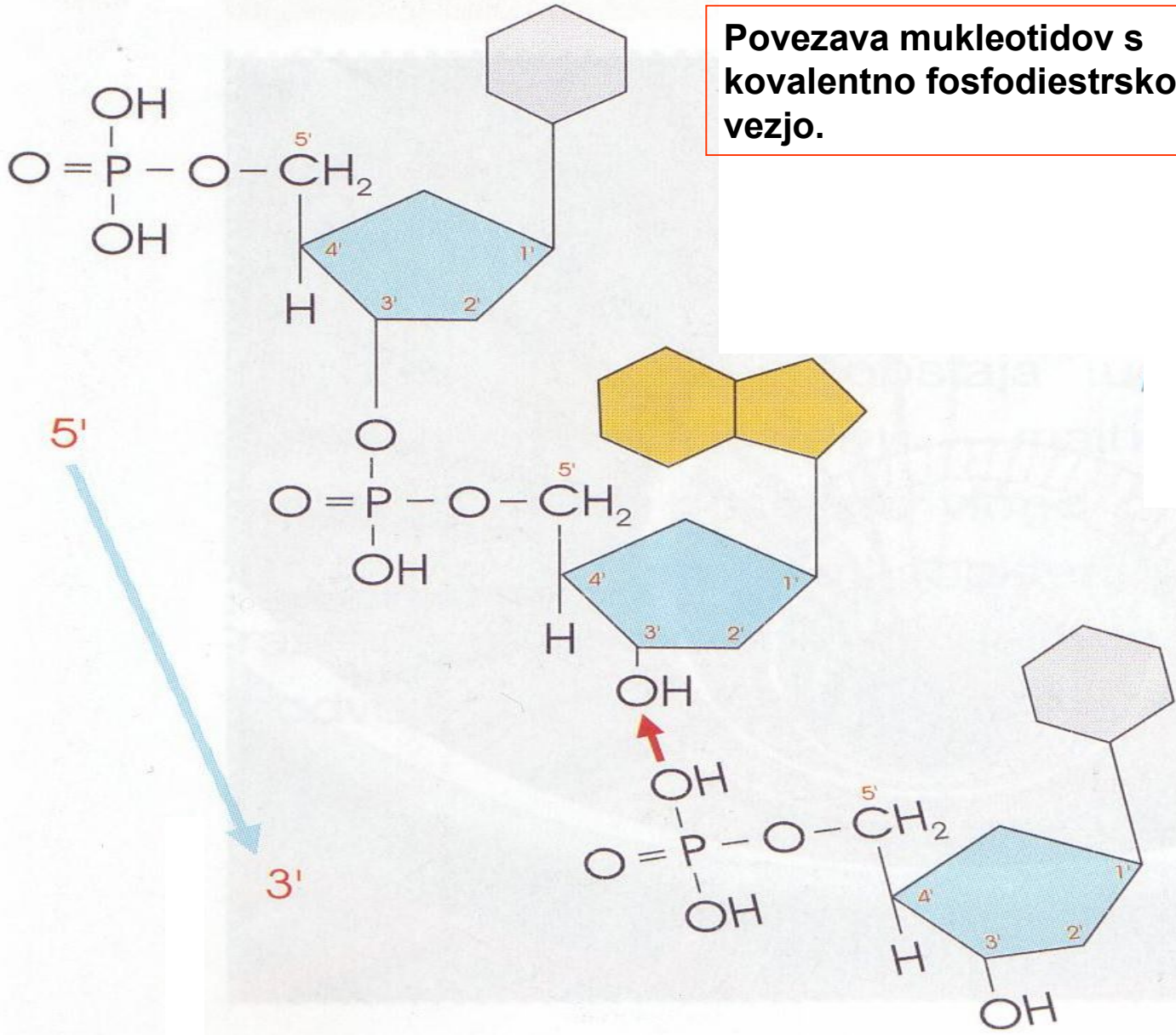


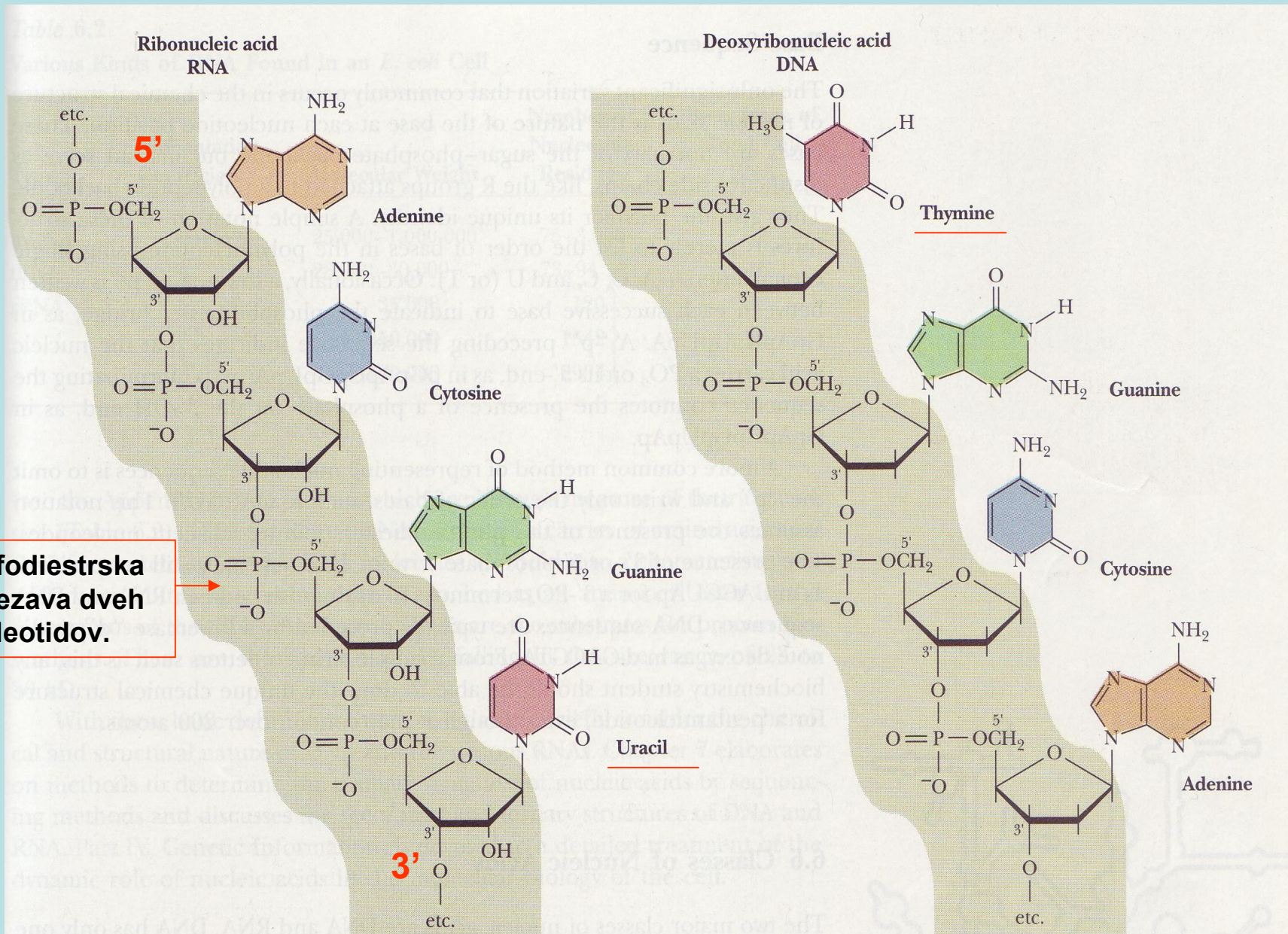
deoksigvanozin – fosfat



deoksitimidin – fosfat

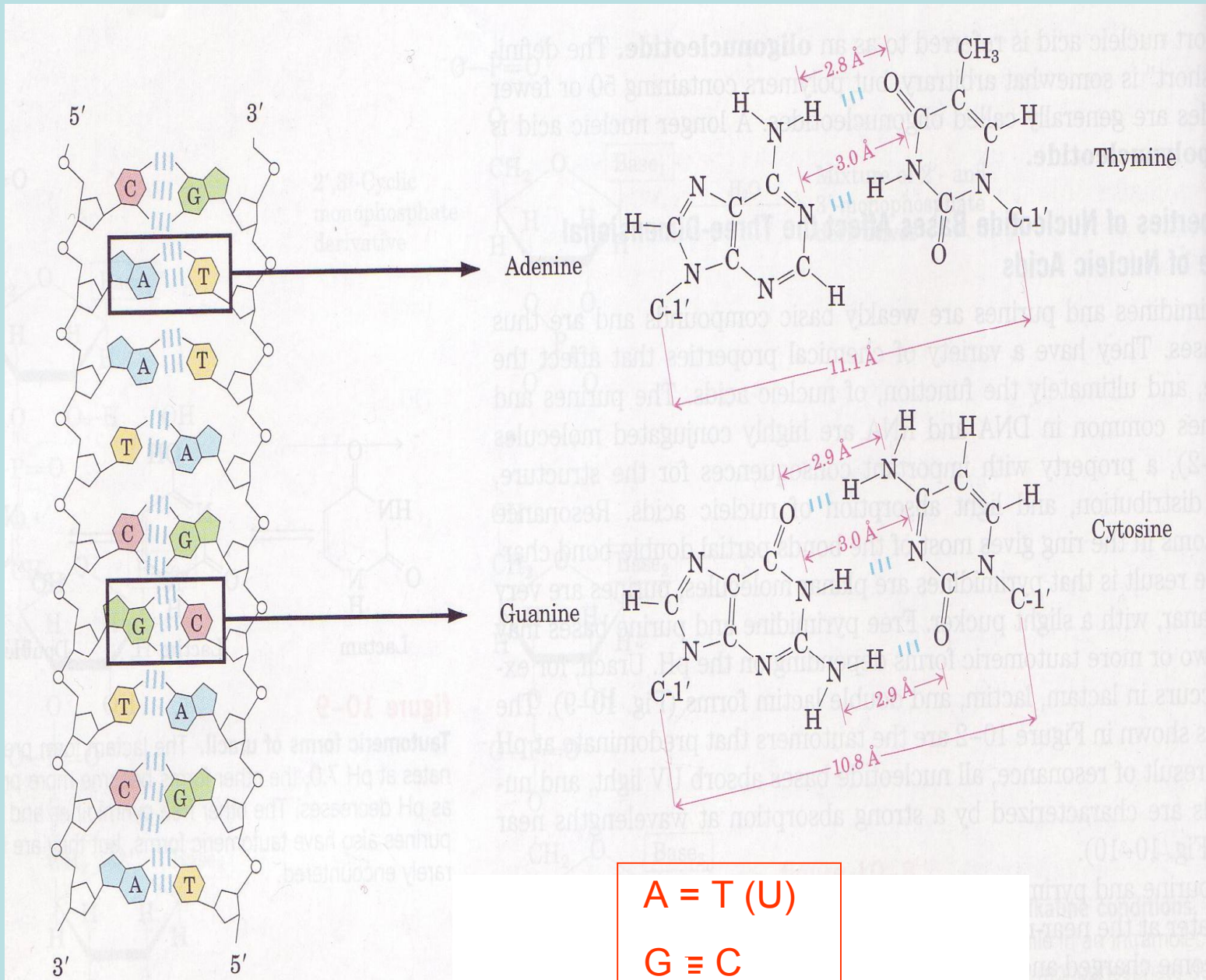
**Povezava nukleotidov s kovalentno fosfodiestrsko vezjo.**





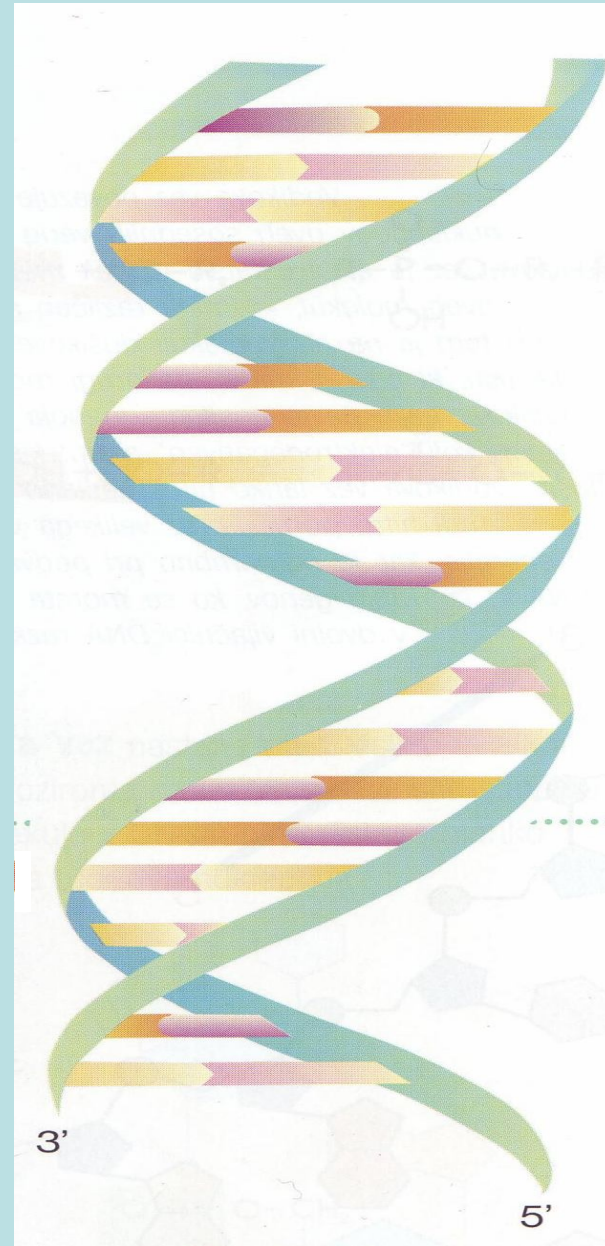
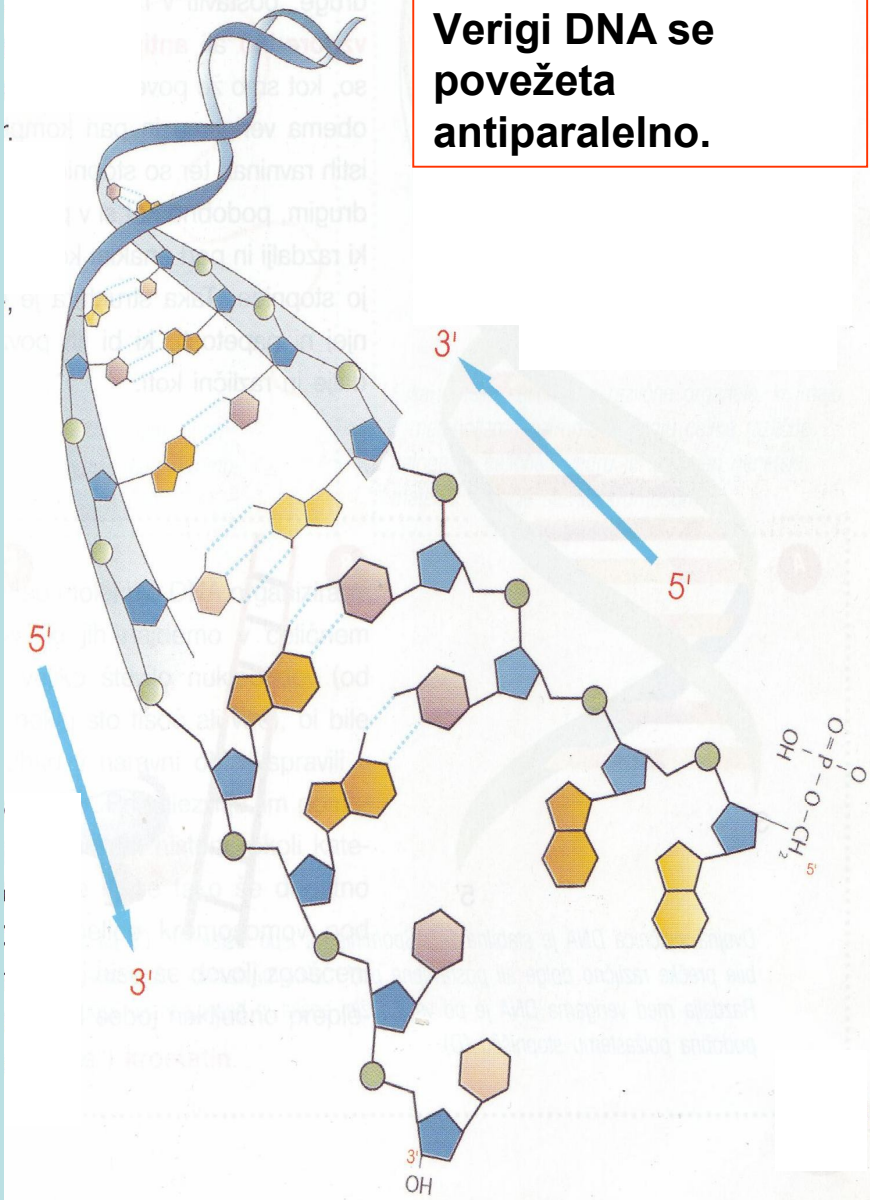
Fosfodiestrna povezava dveh nukleotidov.

**RNA** enojna veriga DNA  
**Primarna zgradba DNA/RNA (zaporedje nukleotidov oz. baz).**



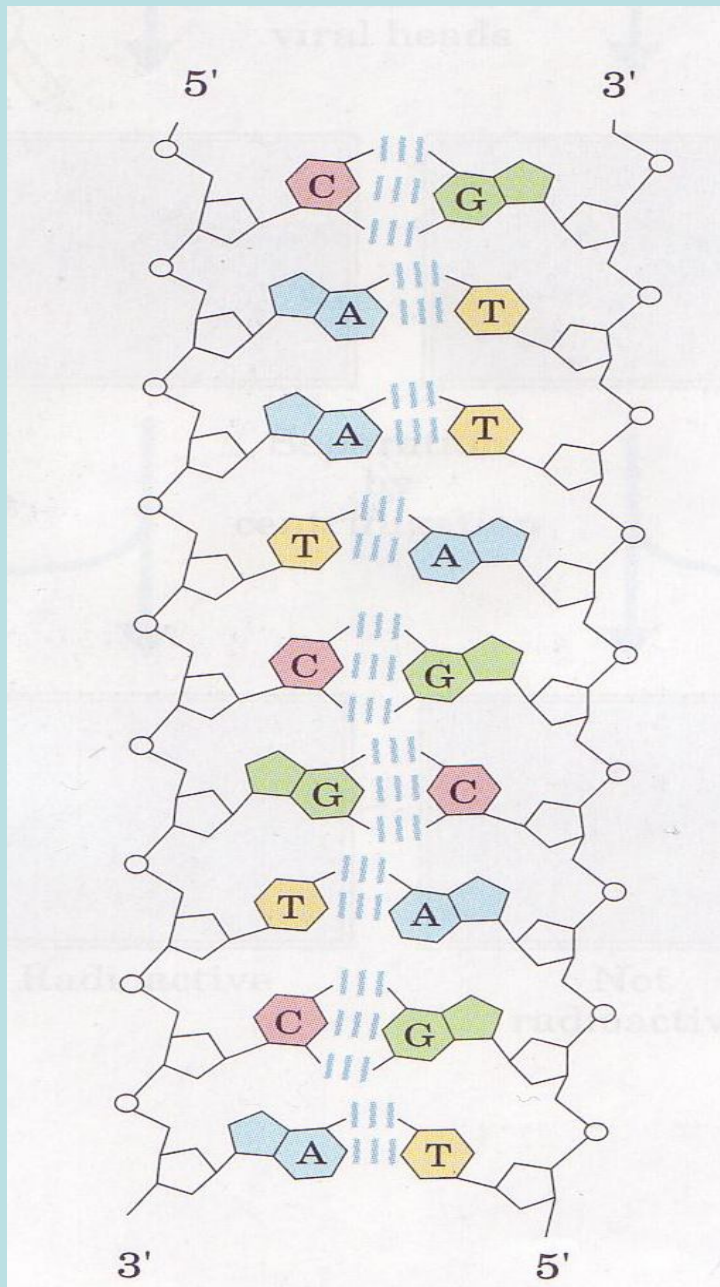
**Komplementarno parjenje baz dveh enojnih verig DNA.**

**Verigi DNA se  
povežeta  
antiparalelno.**

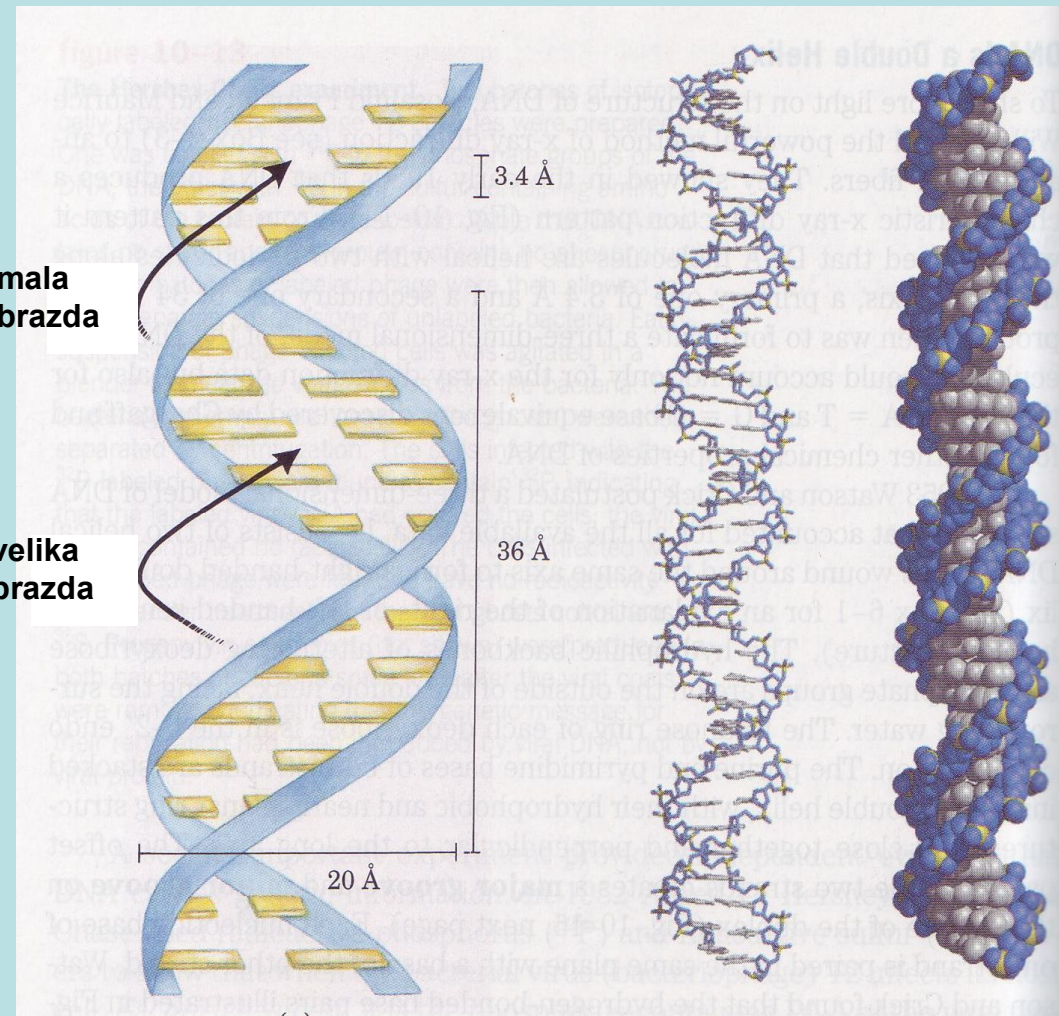




**Komplementarno parjenje baz (purin-pirimidin) omogoča enakomernost razdalj in kotov med dvema verigama DNA = najbolj stabilna zgradba = energijski minimum (ni napetosti).**

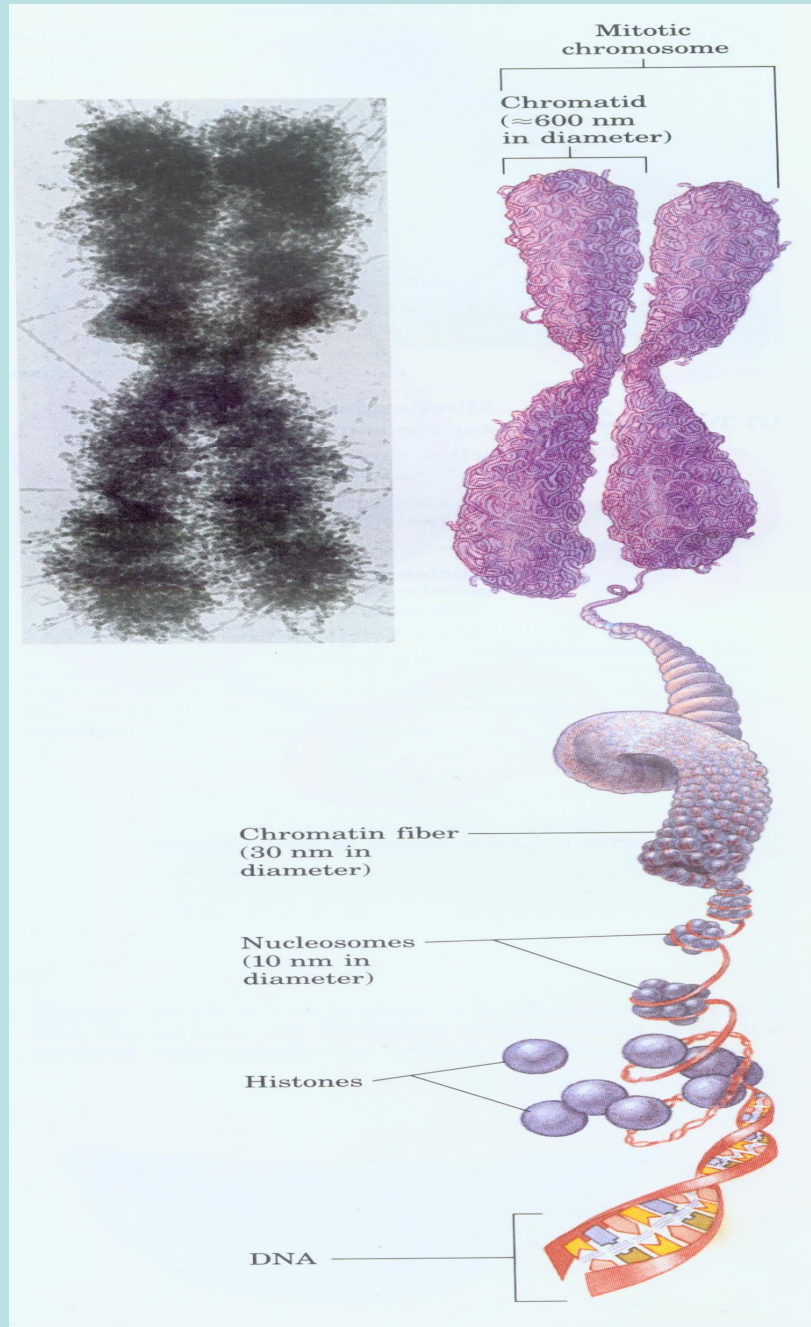


Antiparalelnost verig DNA

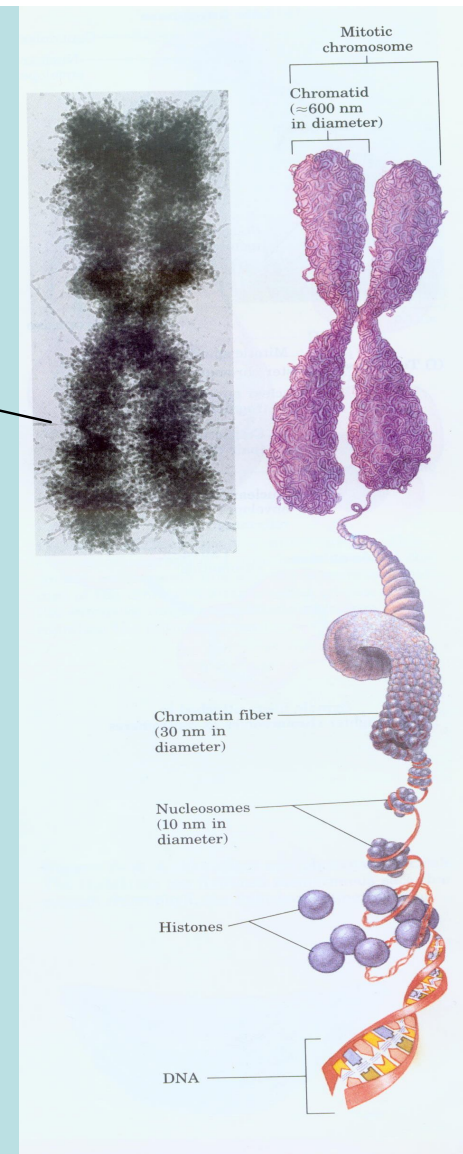
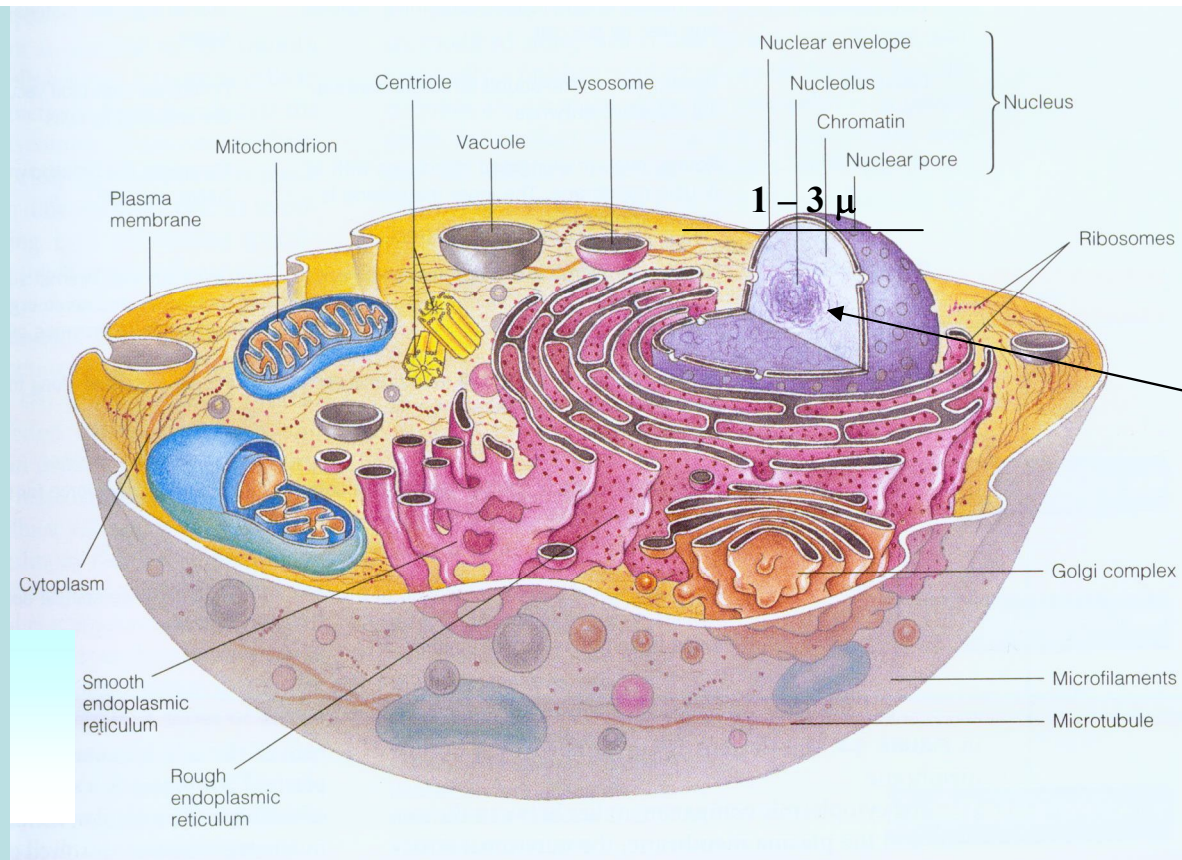


10,5 bp / zavoje = 36 Å (3,6 nm)

Dvojna vijačnica = sekundarna zgradba DNA.



**Molekula DNA je skupaj s histonskimi proteini velevzita v kromosom = terciarna zgradba DNA.**



**10 – 30  $\mu$   
(5 – 100  $\mu$ )**

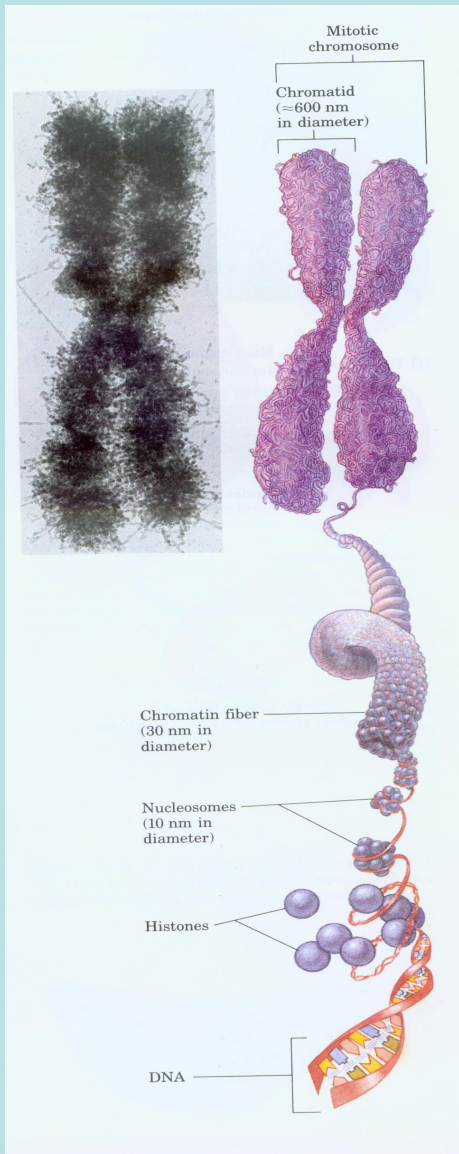
**Človeško telo:  $10^{14}$  celic**

**Celica: 46 kromosomov – skupna dolžina 0,200  $\mu$**

**Dolžina DNA najmanjšega kromosoma: 30 mm**

**Dolžina DNA 1 celice: 1,7 m**

**Vezvitje DNA je potrebno, da tako velike molekule lahko skupaj obstajajo v majhnem celičnem jedru.**



Short region of DNA double helix



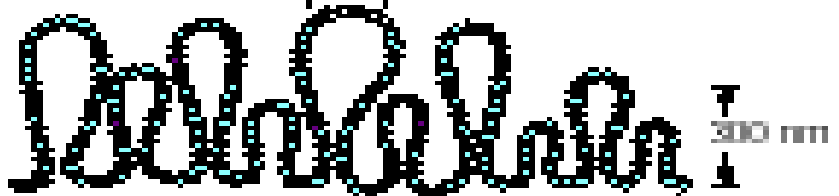
"Beads on a string" form of chromatin



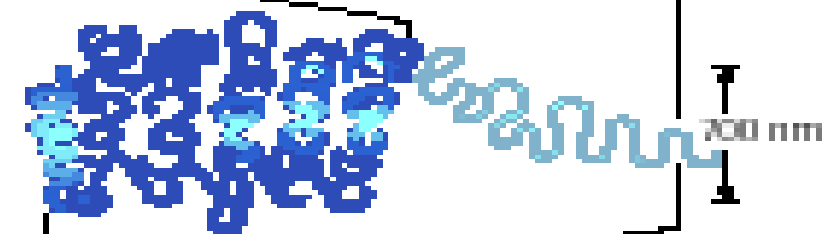
30-nm chromatin fibre of packed nucleosomes



Section of chromosome in an extended form



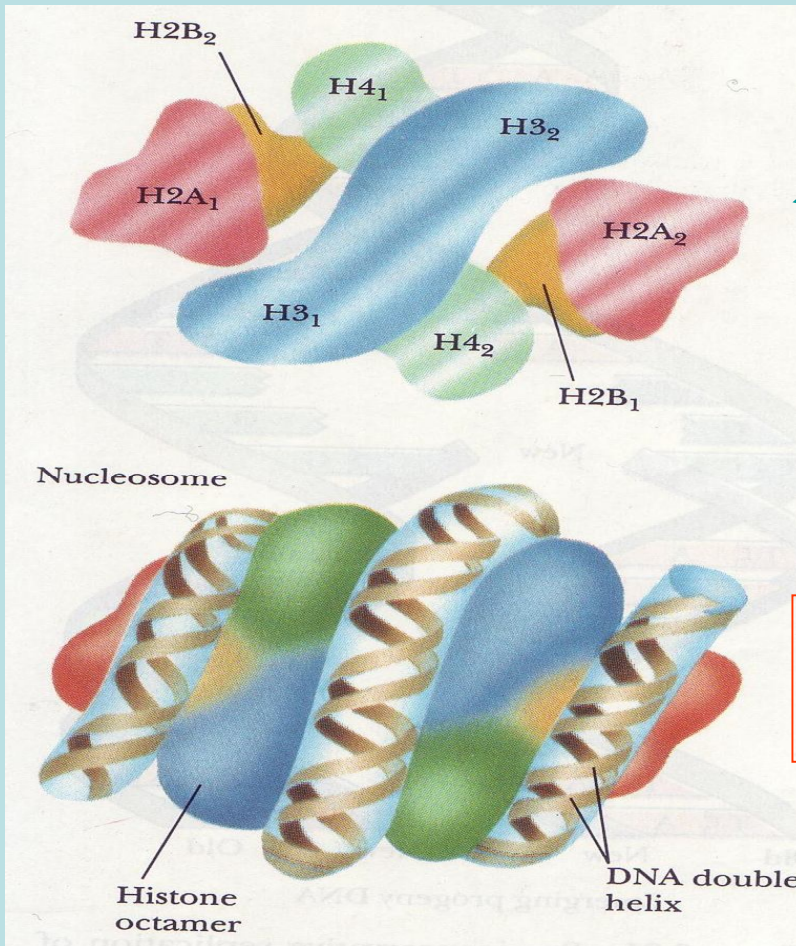
Condensed section of chromosome



Entire mitotic chromosome

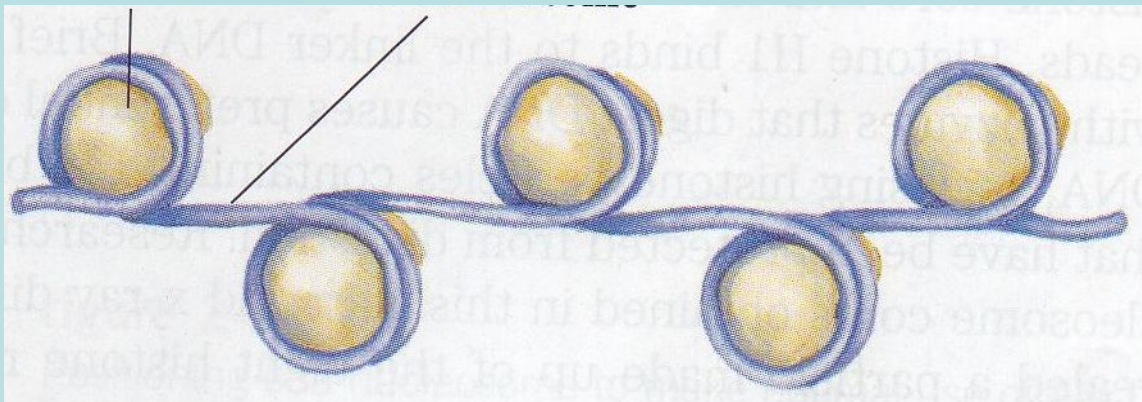


**Velezvitje dvojne vijačnice DNA.**



Pari 4 različnih bazičnih histonskih proteinov.

Nukleosom = 2 zavoja DNA okrog histonskega oktamera





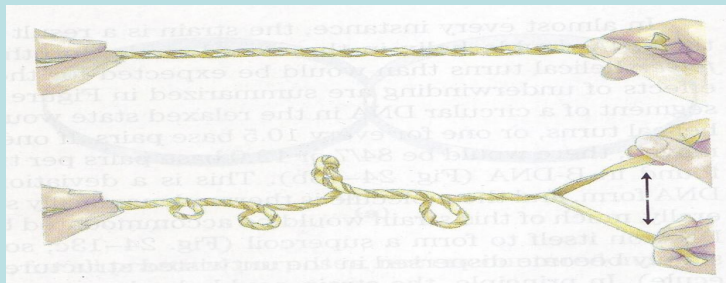
2 kromatidi  
(vsaka 10 zavojev)

1 zavoj  
(30 rozet)

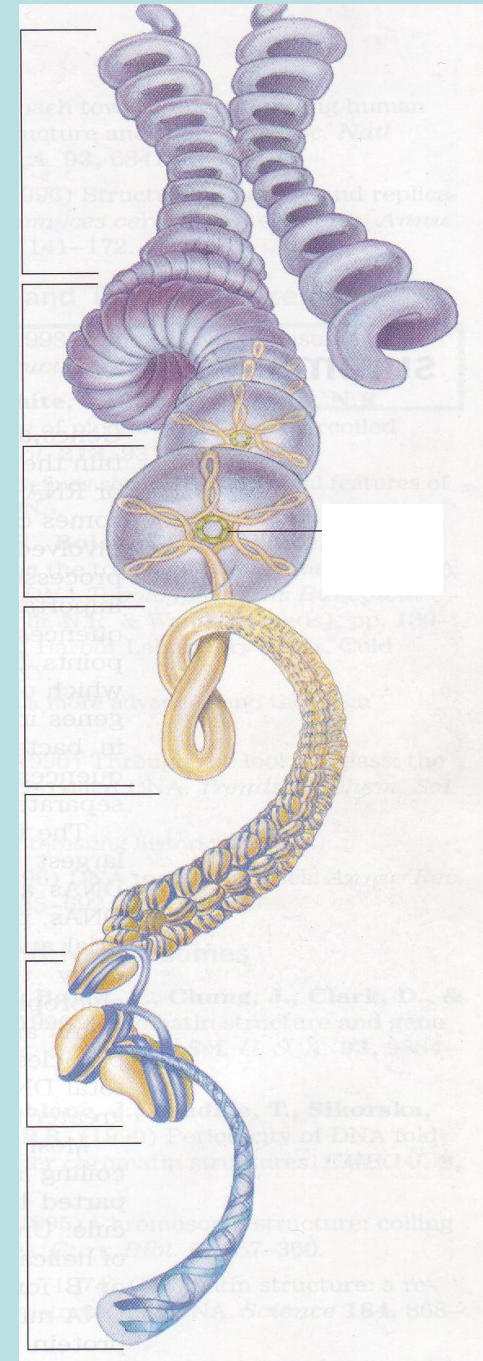
1 rozeta  
(6 zank)

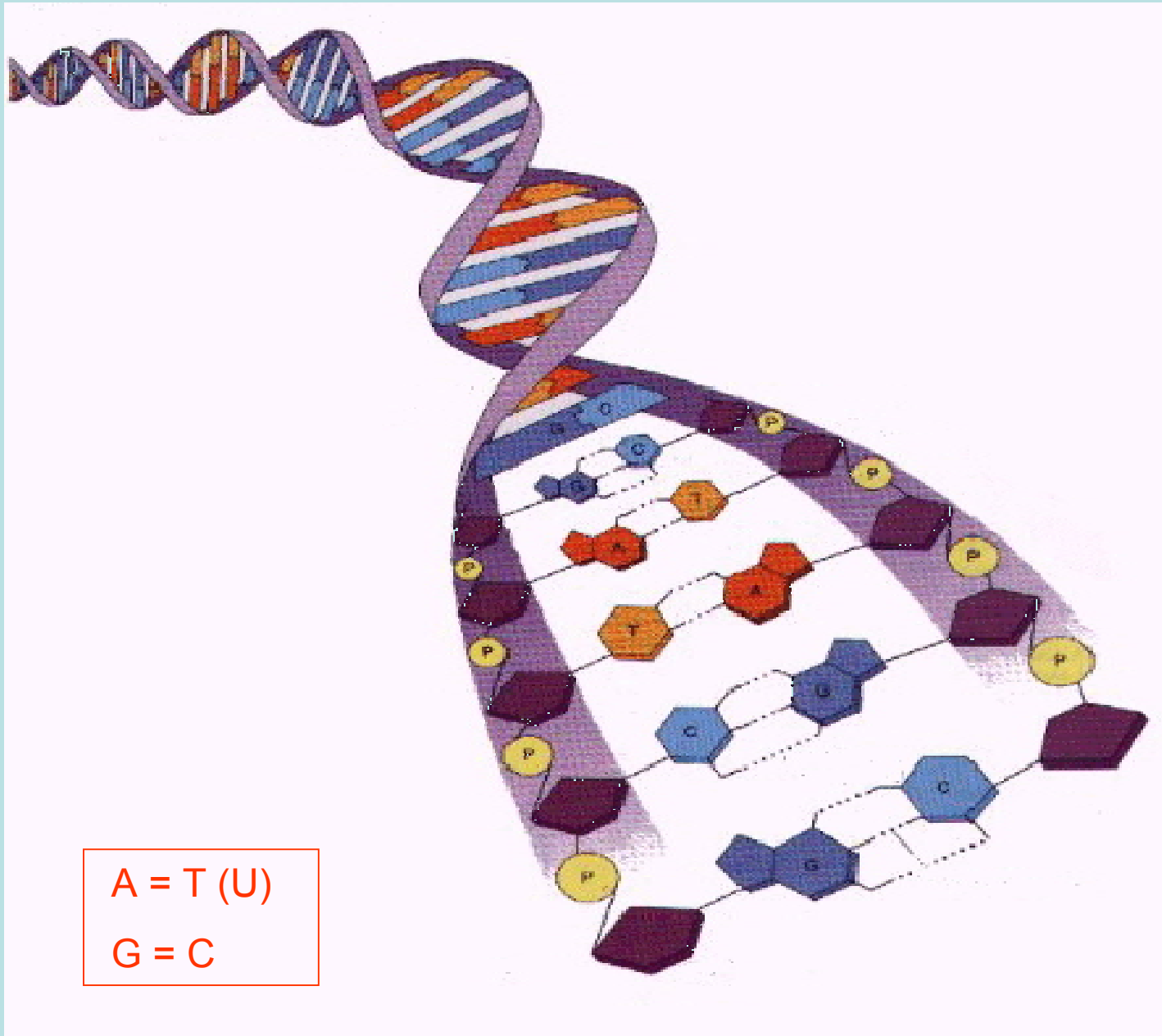
1 zanka  
(75.000 bp)

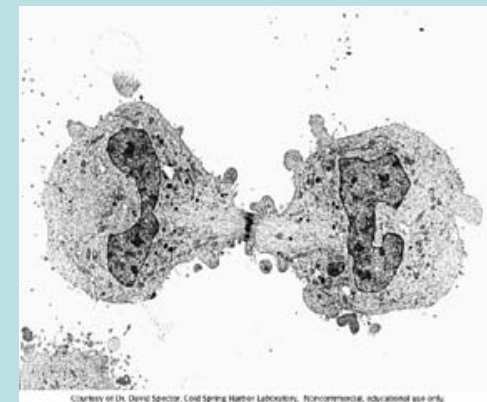
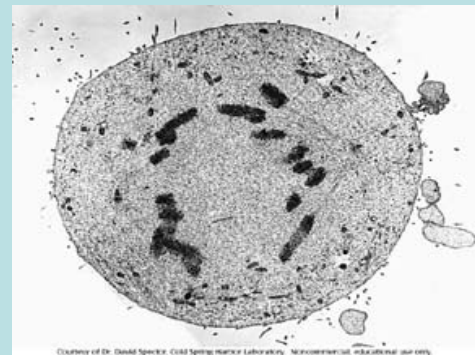
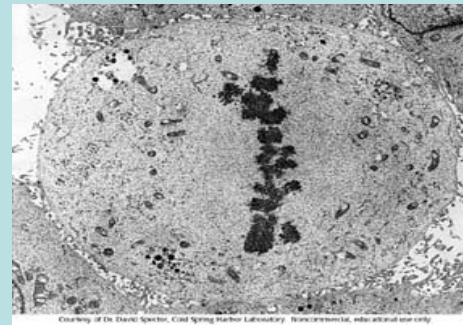
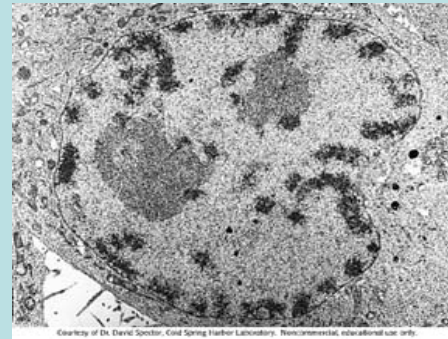
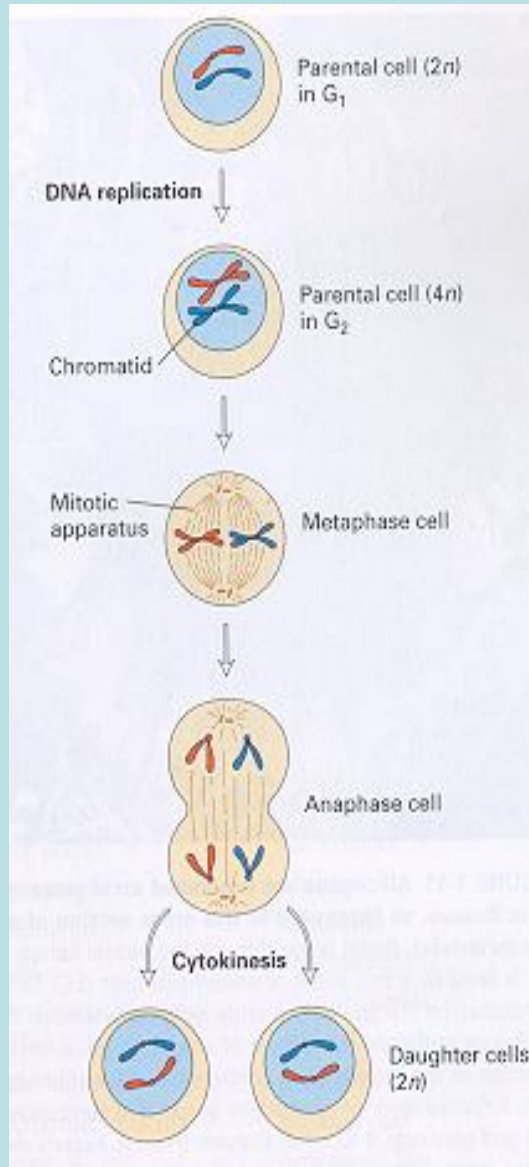
30 nm fibril



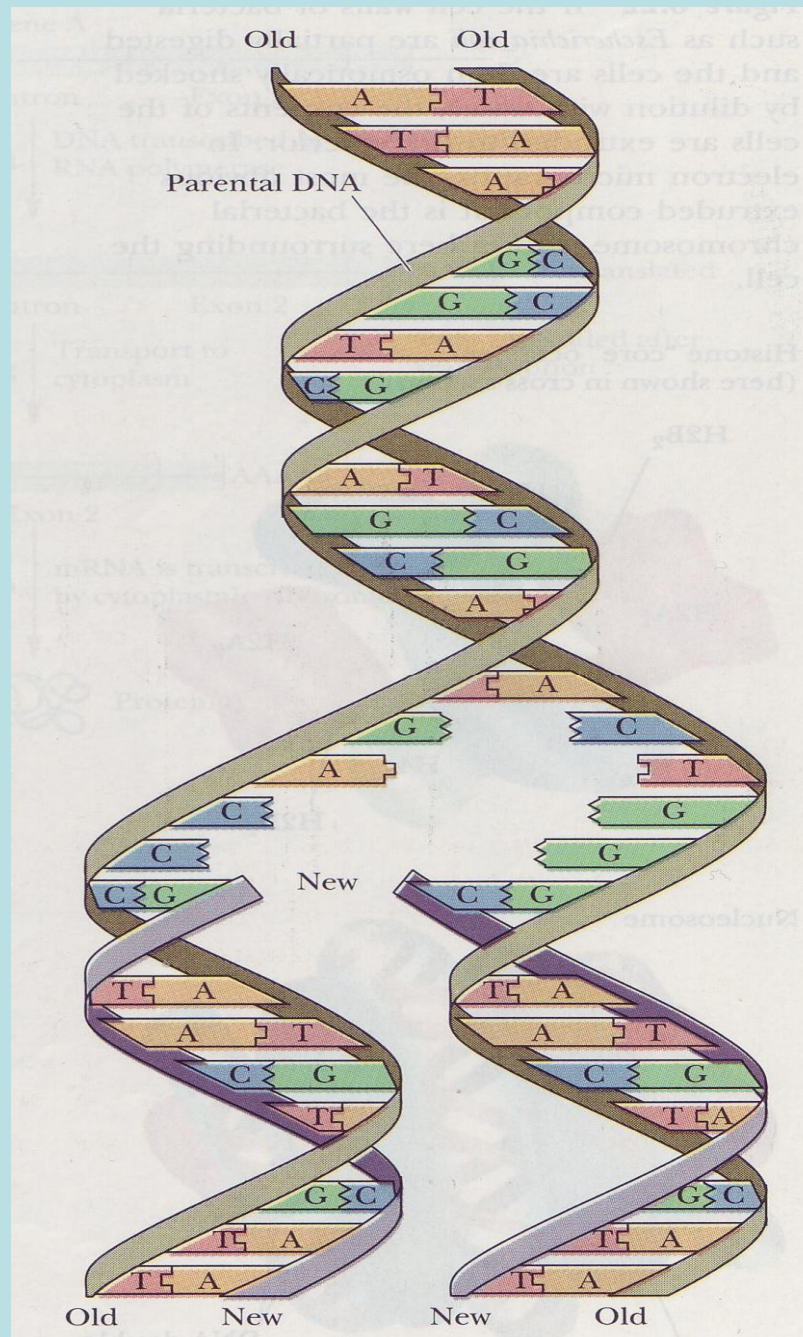
DNA







**Pred delitvijo celice se molekule DNA (kromosomi) podvojijo. To omogoči prenos enakih DNA v celici potomki.**



**Podvajanje DNA  
(replikacija) je  
semikonzervativno =  
nastaneta dve enaki  
dvojni vijačnici.**



5' ...A T G G C C T G G A C T T C A... 3' Sense strand of DNA

3' ...T A C C G G A C C T G A A G T... 5' Antisense strand of DNA



Transcription of antisense strand

5' ...A U G G C C U G G A C U U C A... 3' mRNA



Translation of mRNA

Met — Ala — Trp — Thr — Ser — Peptide