Mavzu: Nuklein kislotalarning fazoviy tuzilishlari

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Reja:

1.Nuklein kislotalarning konformatsion komponentlari.

2. Nuklein kislotalar konformatsiyasi

Nuklein kislotalarning konformatsion komponentlari

DNK asosan A,G,S,T saqlovchi dezoksiribonukleotidlardan tashkil topgan.

1951 yilda M.Uilkins DNK ning rentgen struktur analizini amalga oshirdi. DNK tarkibidagi nukleotidlarning o‘zaro munosobatini esa Chargaff aniqladi, ya’ni DNK dagi nukleotidlar tartibsiz jaylashmasdan ma’lum qonuniyatlarga buysunadi. Bu qonuniyatlarni dastlab amerikalik olim Chargaff aniqlagan bo‘lib, Chargaff qoidasi deb ataladi.

1. DNK dagi purin asoslari yig‘indisi (A+G) pirimidin asoslari (T+S) yig‘indisiga teng bo‘ladi va ularning nisbati birga teng.

A + G = S + T A+G/S+T = 1 yoki purin/piridin = 1

Bu qonuniyat RNK uchun xos emas, chunki RNK da purin va pirimidinning o‘zaro nisbati o‘zgarib turadi.

2. Adeninning molyar miqdori timinning molyar miqdoriga teng va ularning nisbati birga teng.

A = T A/T = 1

3. Har qanday DNK dagi guaninning molyar miqdori sitozinning molyar miqdoriga teng va ularning nisbati birga teng.

S = G G/S = 1

4. Purin va pirimidin asoslarining oltinchi uglerod atomidagi amin va keto- guruhlarni 1-1iga teng.

G + T = S + A yoki G+T/A+S = 1

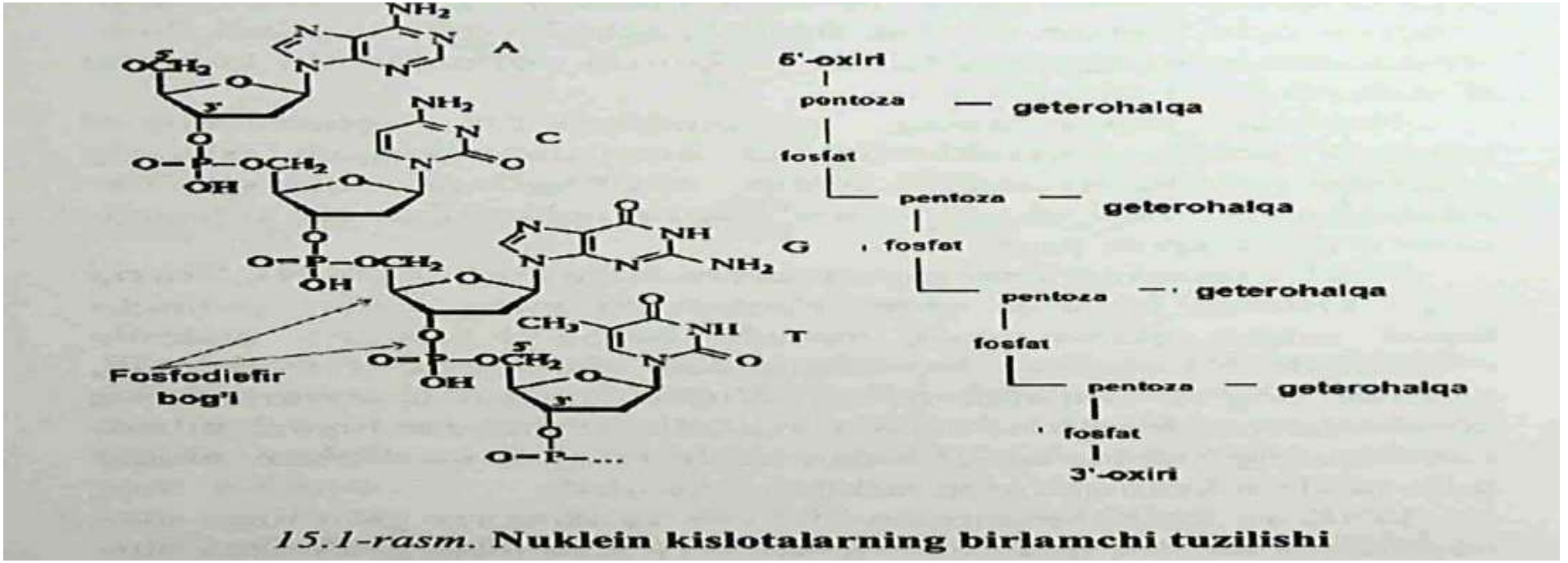
5. Guanin bilan sitozin molyar konsentratsiyalarini yig‘indisining adenin bilan timinning (DNK molekulasida yoki uratsil RNK molekulasida) molyar konsentratsiyalari yig‘indisiga nisbatan o‘zgaruvchan bo‘lib, ya’ni turli manbalardagi nuklein kislotalarda turlicha bo‘ladi. Bu spetsifiklik koeffitsiyenti deb ataladi. G+S/A+T(U) shaklida ifodalanadi.

Har xil organizmlardan olingan DNK ning nukleotid tarkibi har xil bo‘ladi.

Ba’zi turlar DNK sidagi adenin bilan timinning sig‘indisi guanin bilan sitozinning yig‘indisidan ortiq yoki kam bo‘ladi.

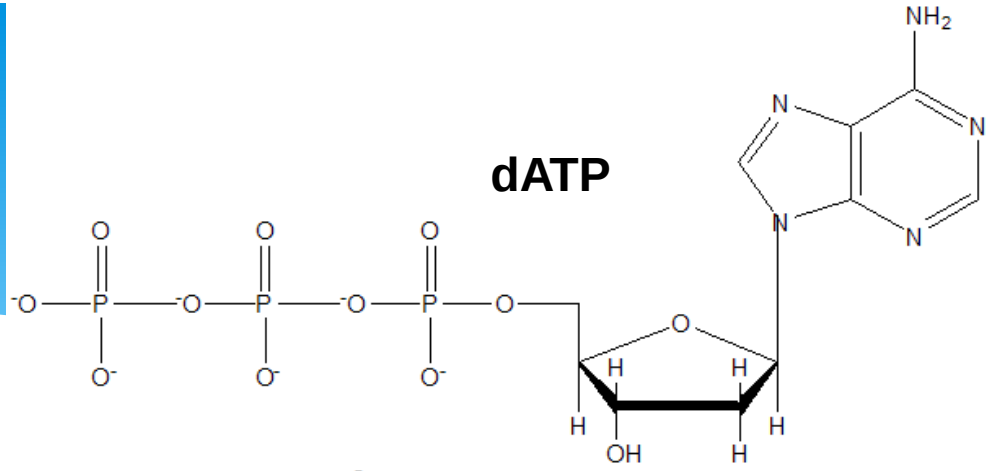
Agar G+S/A+T ning qiymati birdan kichik bo‘lsa, bunday DNK AT tipga, agar uning qiymati birdan katta bo‘lsa, GS tipga kiritiladi.

Yuqori o‘simliklar va hayvonlar DNK si AT tipga mansub, ya’ni ularda AT juftlarining miqdori GS juftlariga nisbatan ko‘p.

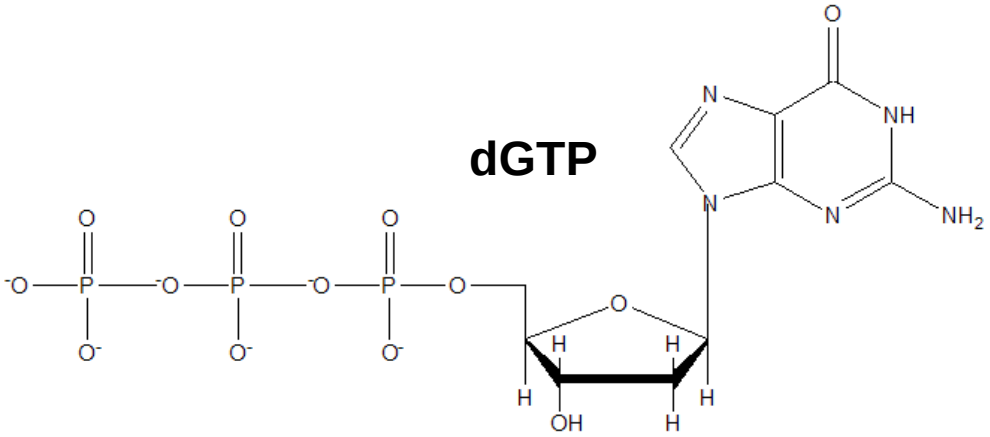


15.1-rasm. **Nuklein kislotalarning birlamchi tuzilishi**

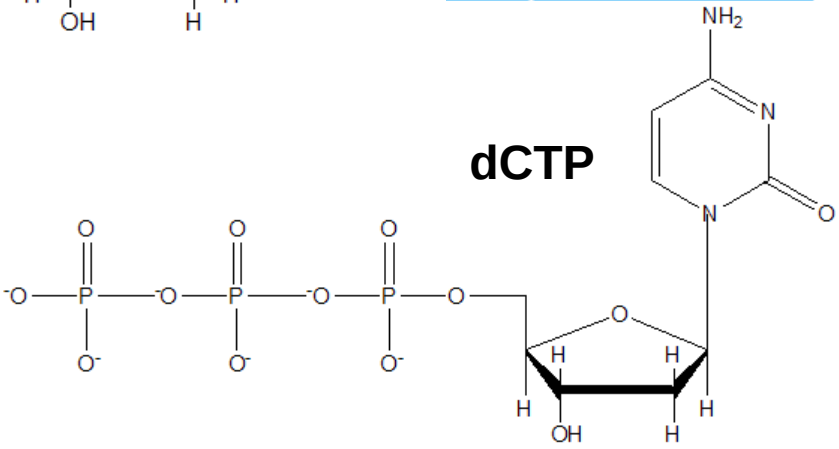
dATP



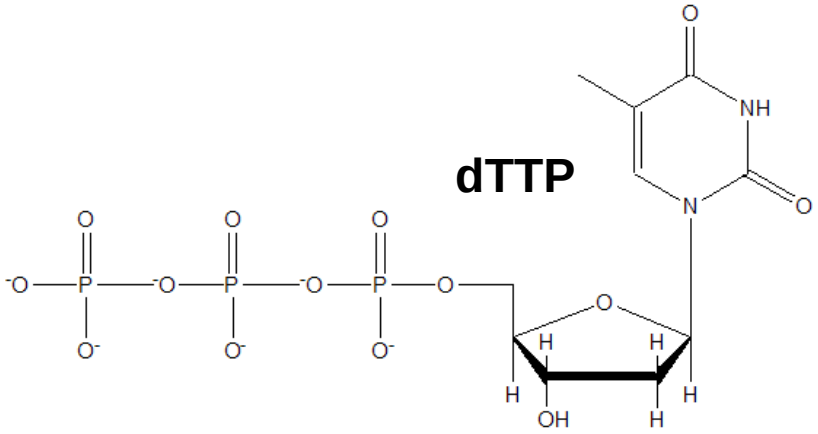
dGTP



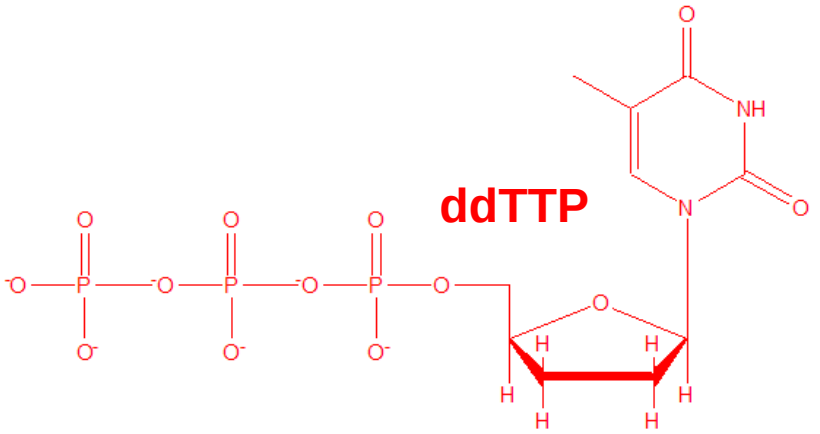
dCTP

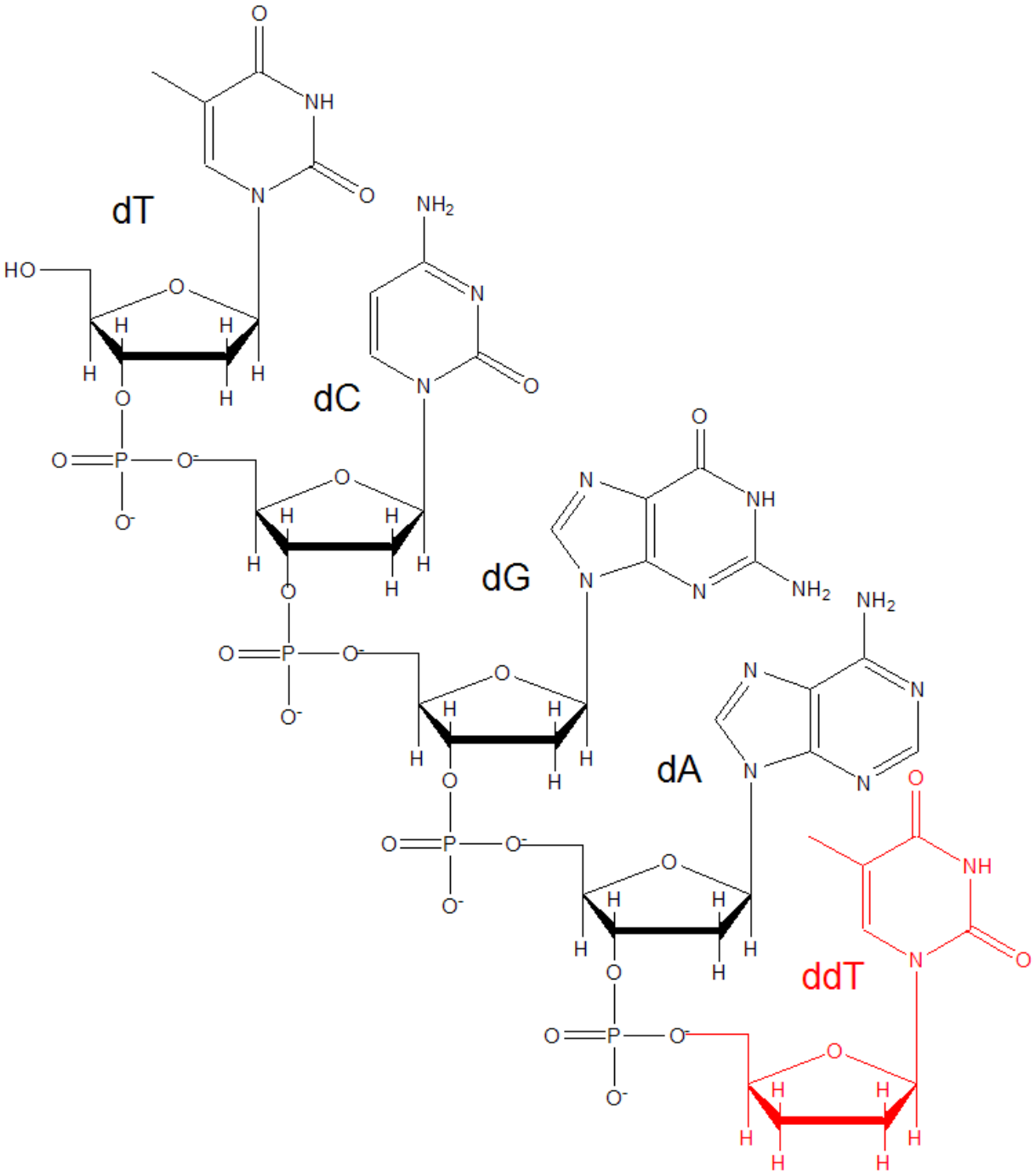


dTTP



ddTTP

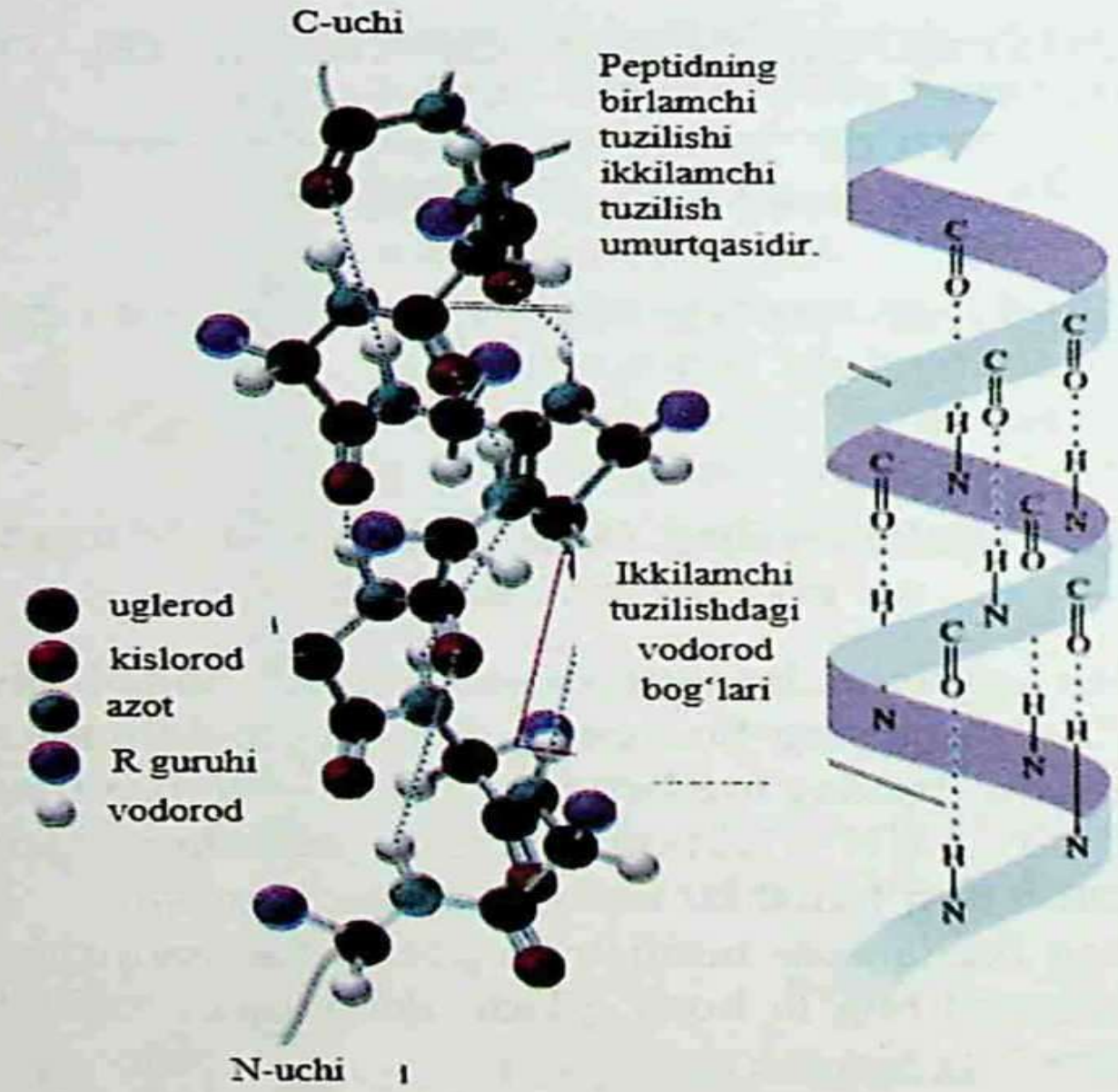



dT
dC
dG
dA
ddT

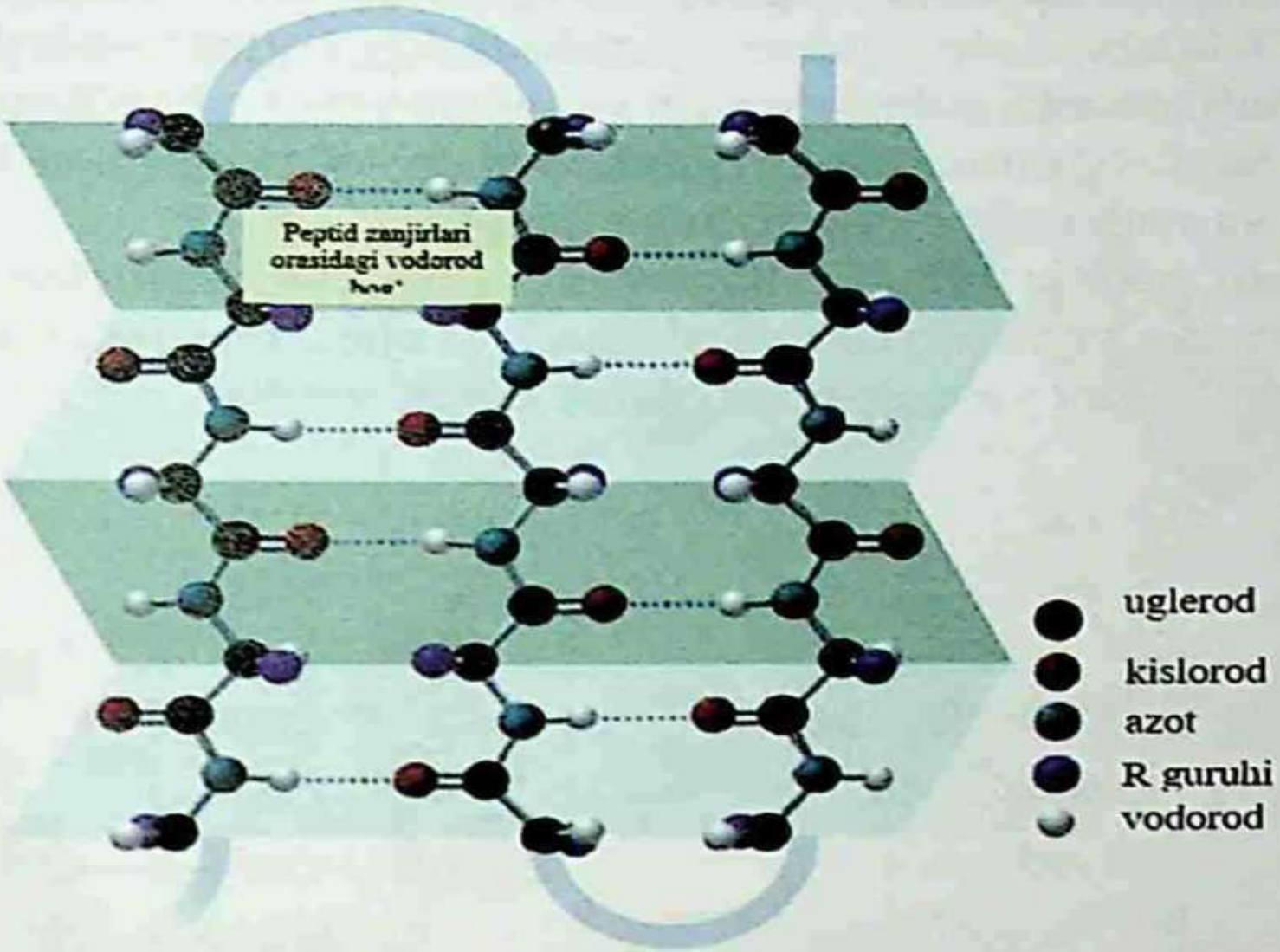
Nuklein kislotalar konformatsiyasi

Ular α-spiral va β -yig‘luvchan varaq α -spiralda amid bog‘dagi C=0 karbonil guruhining kislorod atomi N-H guruhidagi azot atomi bilan vodorod bog‘ni hosil qiladi. Polipeptid zanjirida kopchilik vodorod boglami shakllanishi xarakterli bo‘lgan spiralsimon shakilni yoki spiral-aylanma zina shaklni ushlab turiladi. Turli aminokislotalaming R radikallari spiralning tashqarisida joylashadi.

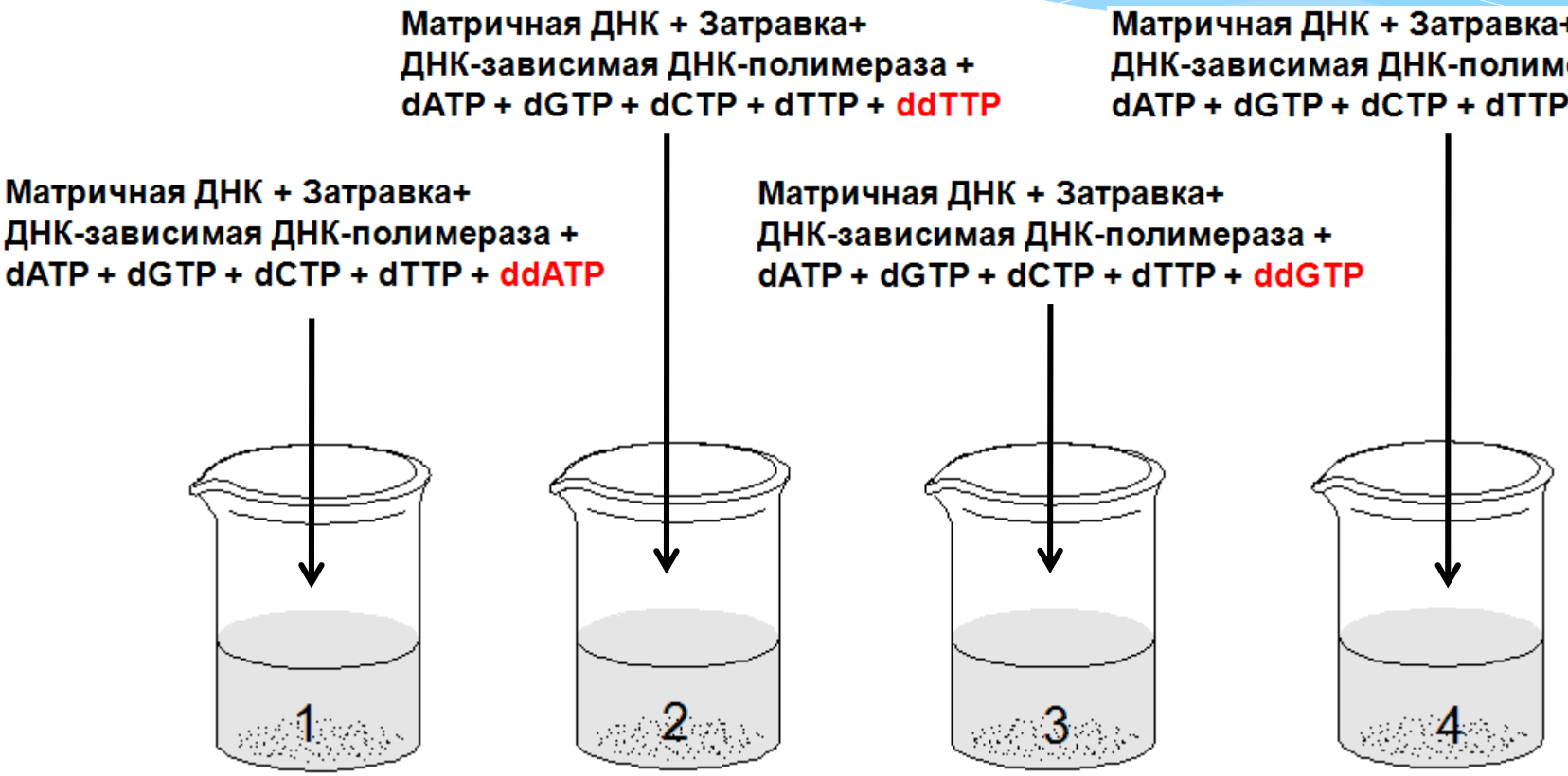
Oqsillarda topilgan boshqa turdagi ikkilamchi tuzilish 0-gofrilangan yoki β-yig‘iluvchan varaq shakli bitta polipeptid zanjimi amid guruhdagi C=0 karbonil gumhning kislorod atomi, ikkinchi boshqa polipeptid zanjiming amid guruhdagi N-H guruhni vodorod atomi bilan vodorod bog‘ini hosil qiladi. β -yig‘iluvchanlik qo‘shni polipeptid zanjirlar orasida yoki bir polipeptid zanjiri ichida hosil bo‘lishi mumkin. Turli xil ikkilamchi tuzilishlami hosil qilish tendensiyasi polipeptid zanjiridagi amino- kislotalarga bog‘liq bo‘ladi. Odatda, (3-yiguvchan varaq shaklini R radikali kichik bo‘lgan aminokislotalar - glisin, valin, alanin va serinlar hosil qiladi va ular β -yig‘iluvchan varaqning yuqori va pastki qismlarida bo[4]ladi. Oqsilning alfa spiralli joylarida R radikali katta aminokislotalar - gistidin, leysin va metioninlar ishtirok etadi. Vodorod bog‘lar β -yigiluvchan varaq shaklining mustahkamligini 'a oqsillaming barqarorligini belgilaydi.



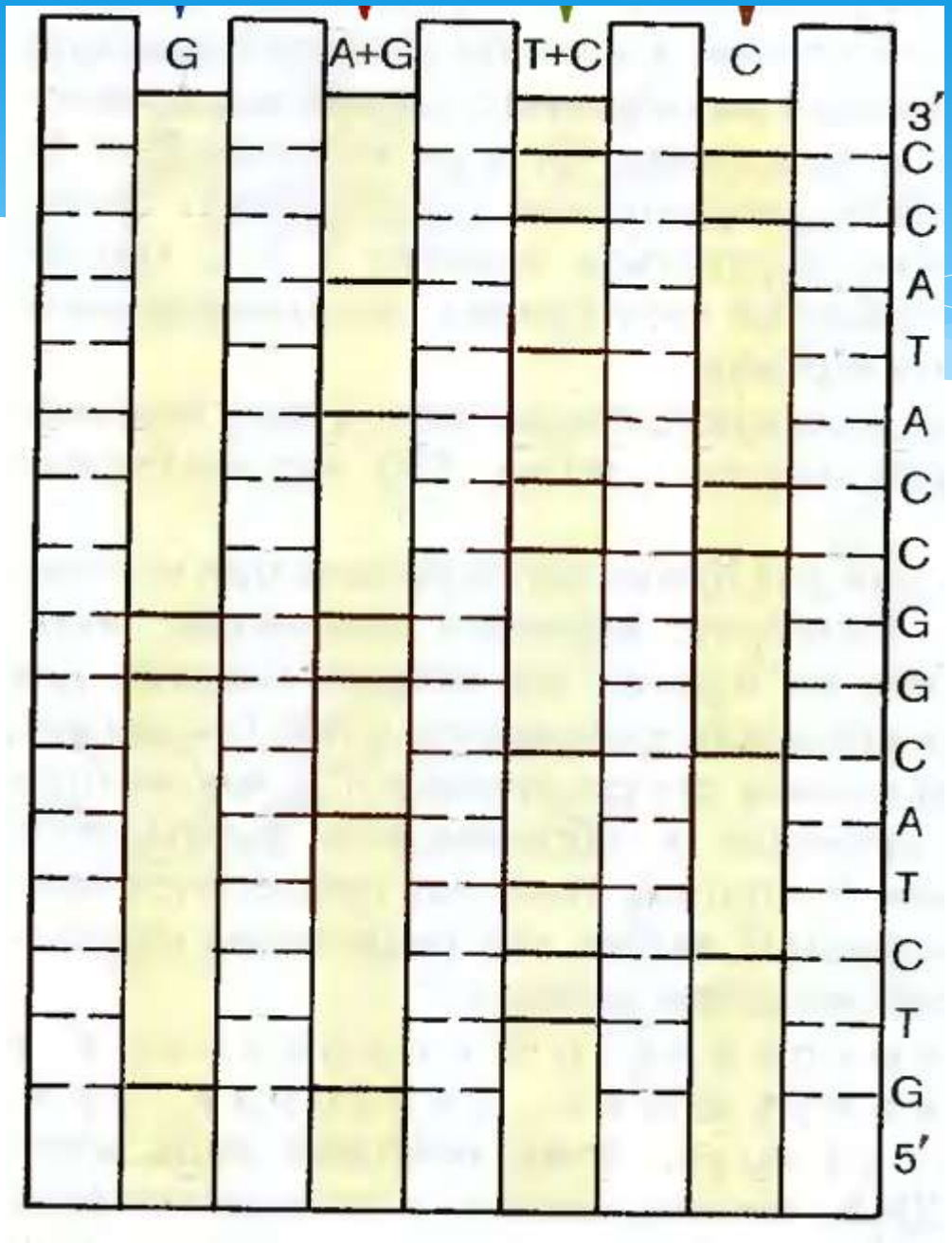
12.3-rasm. **C=O karbonil guruhning kislorod atomi N–H guruhidagi vodorod atomi bilan vodorod bog‘ini va silindr atrofida o‘raglan α–spiral shaklini hosil qiladi.**



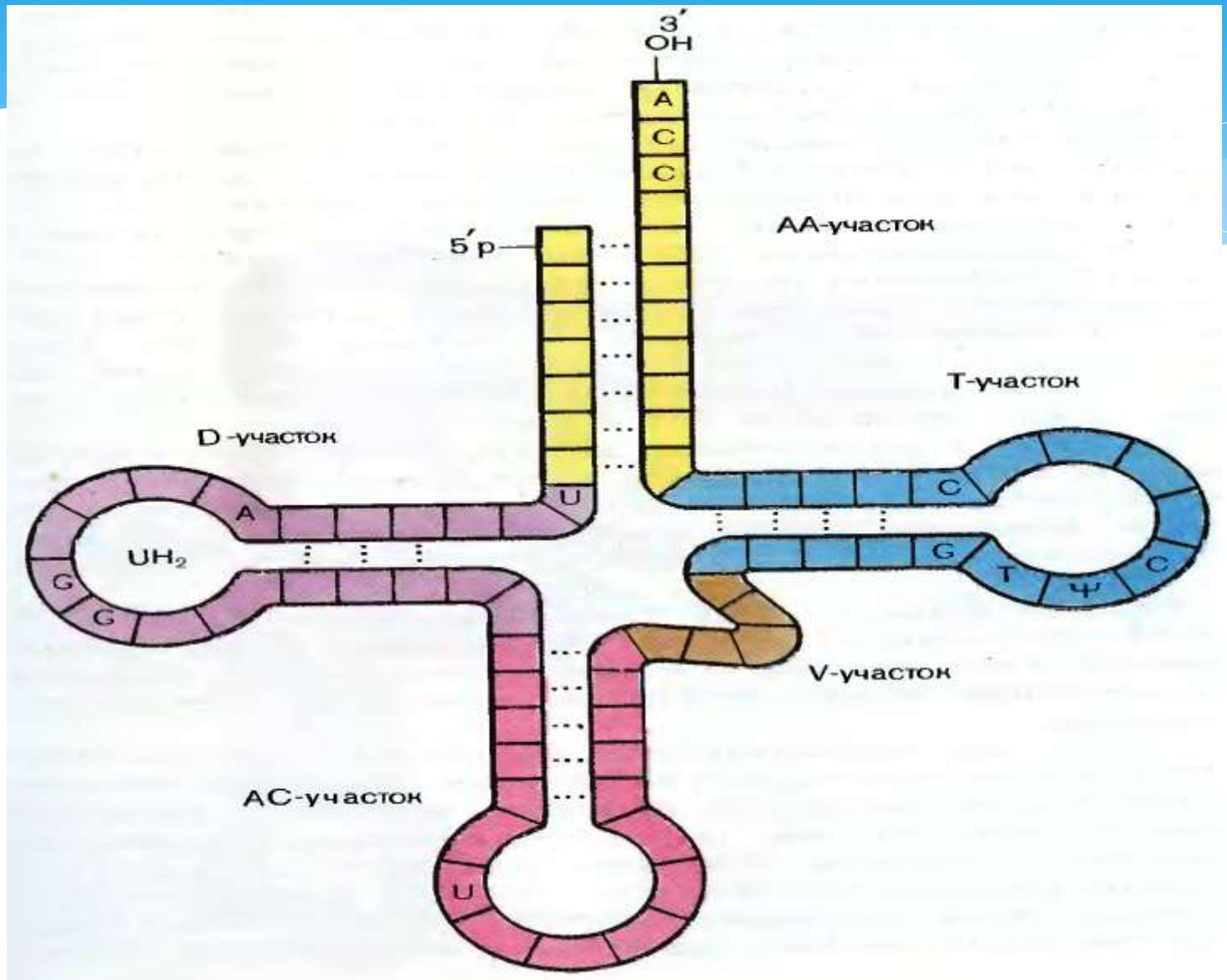
2.4-rasm. **Oqsilning β–yig‘iluvchan varaqli ikkilamchi tuzilishida, ikkita qo‘shni polipeptidlar orasida vodorod bog‘lar hosil bo‘ladi.**

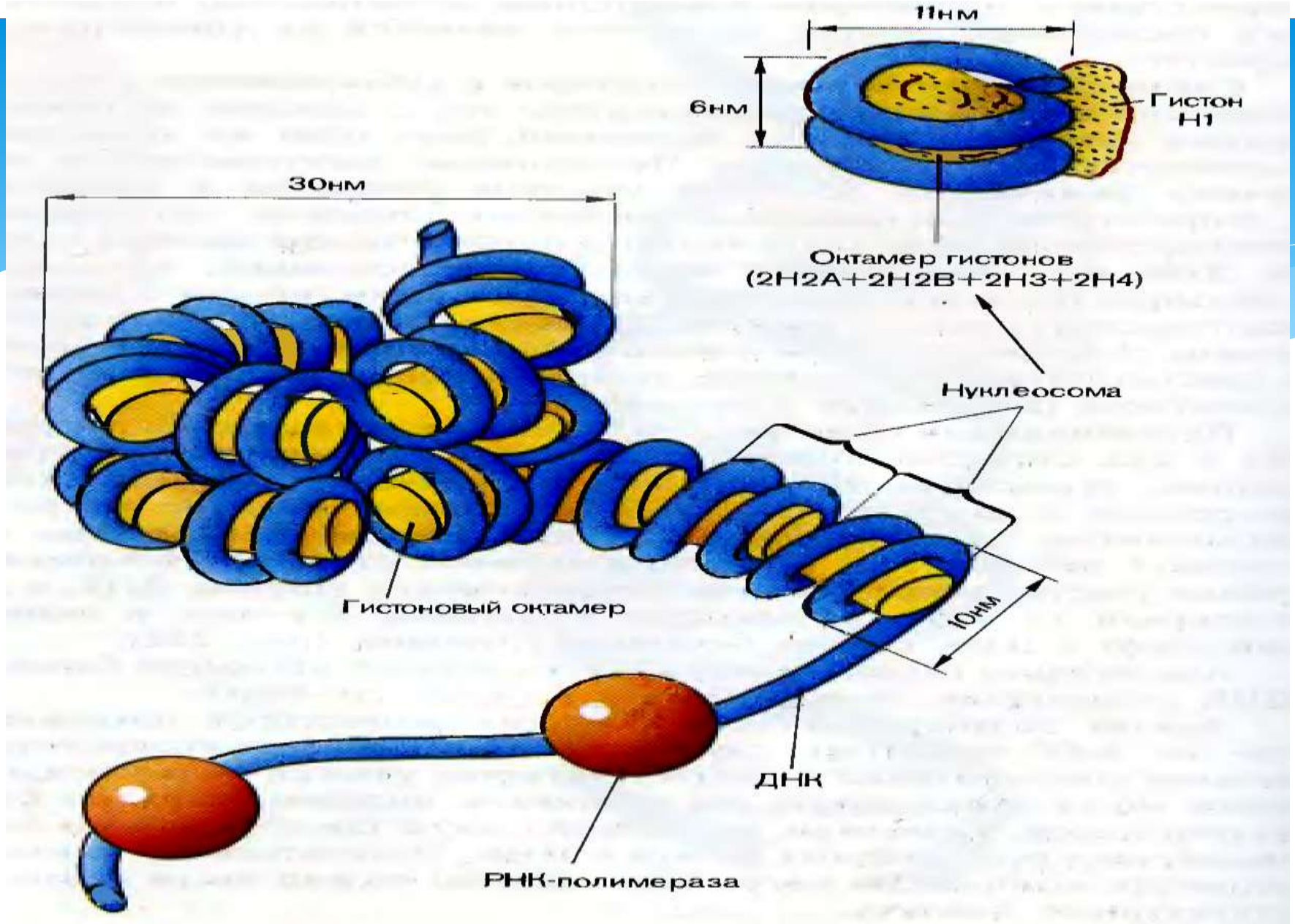

Матричная ДНК + Затравка+
ДНК-зависимая ДНК-полимераза +
dATP + dGTP + dCTP + dTTP + ddTTP
Матричная ДНК + Затравка+
ДНК-зависимая ДНК-полимераза +
dATP + dGTP + dCTP + dTTP + ddCTP
Матричная ДНК + Затравка+
ДНК-зависимая ДНК-полимераза +
dATP + dGTP + dCTP + dTTP + ddATP
Матричная ДНК + Затравка+
ДНК-зависимая ДНК-полимераза +
dATP + dGTP + dCTP + dTTP + ddGTP
1
2
3
4

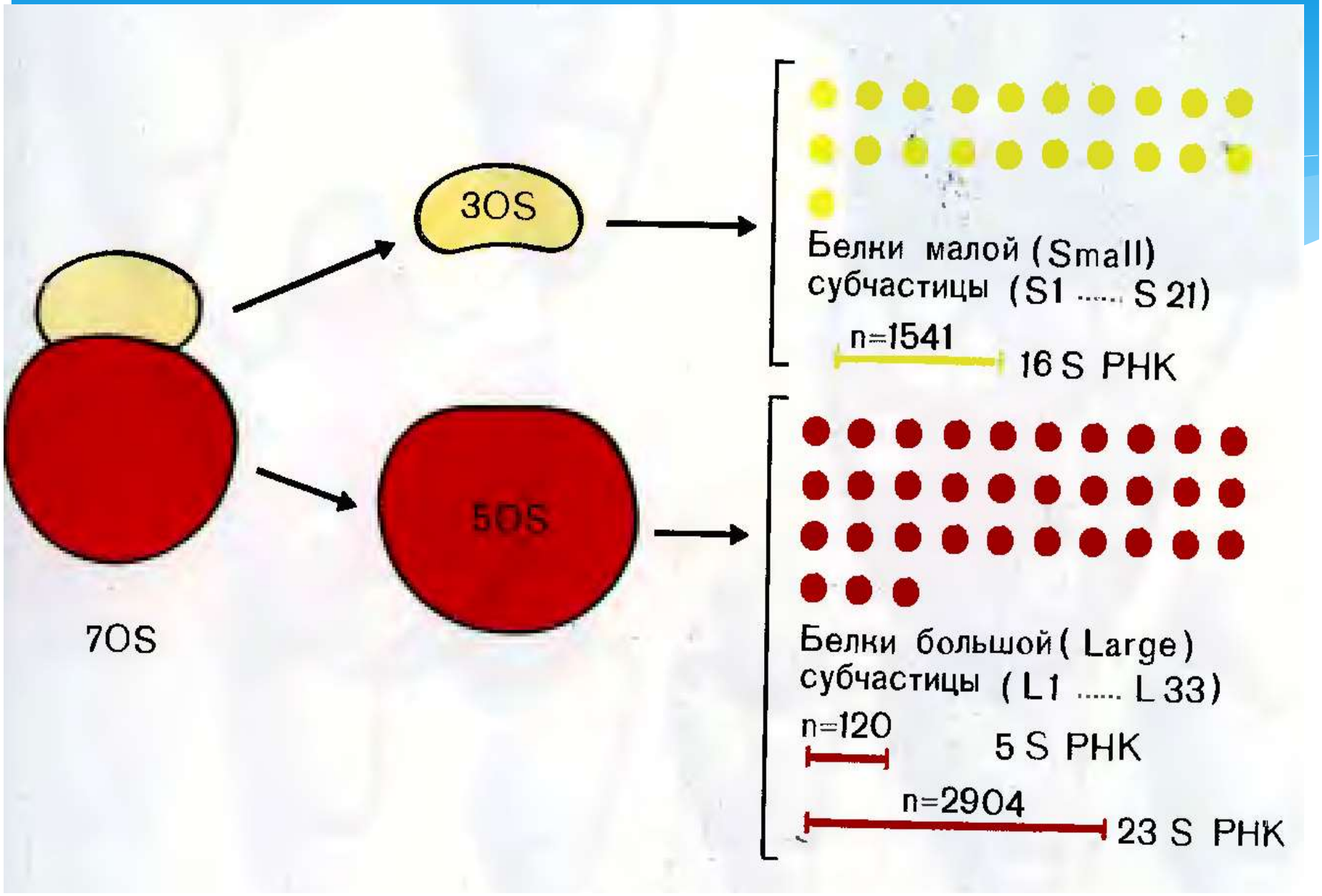
Электрофорез



Nuklein kislotalar konformatsiyasi




11нм
6нм
Гистон H1
30нм
Октамер гистонов (2H2A+2H2B+2H3+2H4)
Нуклеосома
Гистоновый октамер
10нм
ДНК
РНК-полимераза


30S
50S
70S
Белки малой (Small)
субчастицы (S1 ..... S 21)
n=1541
16 S РНК
Белки большой (Large)
субчастицы (L1 ..... L 33)
n=120
5 S РНК
n=2904
23 S РНК

E’TIBORINGIZ UCHUN RAHMAT!