







Nucleic	: Acids: S	hape
TABLE 24-1 Structural Features of Ideal B-	DNA	STATE
	В	
Helical sense	Right handed	
Diameter	~20 Â	
Base pairs per helical turn	10	
Helical twist per base pair	36°	
Helix pitch (rise per turn)	34 Å	
Helix rise per base pair	3.4 Å	
Base tilt normal to the helix axis	6°	
Major groove	Wide and deep	
Minor groove	Narrow and deep	A DNA
Sugar pucker	C2'-endo	A-DNA
- gai pacito	Anti	



Nucleic Acids: Shape Structural Features of A-, B-, & Z-DNA

TABLE 24-1 Structural Features of Ideal A-, B-, and Z-DNA

	A	В	z	
Helical sense	Right handed	Right handed	Left handed	
Diameter	~26 Å	~20 Å	~18 Å	
Base pairs per helical turn	11	10	12 (6 dimers)	
Helical twist per base pair	31°	36°	9° for pyrimidine-purine steps; 51° for purine-pyrimidine steps	
Helix pitch (rise per turn)	29 Å	34 Å	44 Å	
Helix rise per base pair	2.6 Å	3.4 Å	7.4 Å per dimer	
Base tilt normal to the helix axis	20°	6°	7°	
Major groove	Narrow and deep	Wide and deep	Flat	
Minor groove	Wide and shallow	Narrow and deep	Narrow and deep	
Sugar pucker	C3'-endo	C2'-endo	C2'-endo for pyrimidines; C3'-endo for purines	
Glycosidic bond conformation	Anti	Anti	Anti for pyrimidines; syn for purines	







Nucleic Acids: Global Shape Metaphase Chromosome

How do we get something that is 2-10 cm long into one of these, \rightarrow which is only 10 μ m?

This condensation is 10,000x. Even interphase its 1000x







Histone	Number of Residues	Mass (kD)	% Arg	% Lys	Stoichi
H1	215	23.0	1	29	1
H2A	129	14.0	9	11	2
H2B	125	13.8	6	16	2
H3	135	15.3	13	10	2
H4	102	11.3	14	11	2





















Nucleic Acids: Global Shape

Consequences of supercoiling:

- 1) Required for information retrieval; must be negative
- 2) All circular extra-chromosomal DNAs are negatively supercoiled
- 3) Can be used for isolation of these DNAs in the laboratory















