Lecture 22 (11/6/20)		Nucleic Acids		
•Reading:	Ch8; 285-290	A Nucleotidee		
	Ch24; 963-978	A. NUCLEOLIGES		
		B. Nucleic Acids		
 Problems: 	Ch8 (text); 9	C Tho 1 S's		
	Ch8 (study-guide: facts); 3	0.1116435		
	Ch24 (text); 5,7,9,10,14,16	1. Size		
	Ch24 (study-guide: applying); 1	2. Solubility		
	Ch24 (study-guide: facts); 1,2,4	3. Shape		
NEXT		a. B-DNA		
		b. A-DNA		
• Reading:	Ch1; 29-34	c. Z-DNA		
	Ch8; 295-299	d. Iopology		
	Ch9; 319-325, 346	I. Packaging		
Duchlasses		iii Topoisomerases		
• Problems:	Ch8 (text); 6,7,8,10 Ch8 (study guide: applying): 1.2	4. Stability		
	Ch8 (study-guide: facts); 10,11	a. Nucleotides		
	Ch9 (text); 1,2,3,4	i. Tautomers		
	Ch9 (study-guide: facts); 1,2,3,4,5	ii. Acid/base		
	Ch24 (study-guide: facts); 3,5,6	b. Nucleic Acids		
	Ch26 (text); 3	i. Chemistry		
	Ch26 (study-guide: applying); 2,3	II. Denaturation		
		iv Nucleases		

















В
Right handed
~20 Å
10
36°
34Å
3.4 Å
6°
Wide and deep
Narrow and deep
C2'-endo A-DNA
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: Shape Nucleotide Sugar Conformations



Nucleic Acids: Global Shape Metaphase Chromosome

How do we get something that is 2-10 cm long into one of these, which is only 10 μ m (10,000x)?







Nucleic Acids: Global Shape Histones Are Highly Conserved

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







Nucleic Acids: Global Shape Histone-Depleted Chromosome













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











