MCB 150

Lipids and Biomembranes Part 2;
Nucleic Acids

Today's Learning Catalytics Session ID is:
40421935

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Announcements:

- Exam I is Thursday, February 8, from 7:00–9:00 PM
  - Check Canvas or your TA for room assignments

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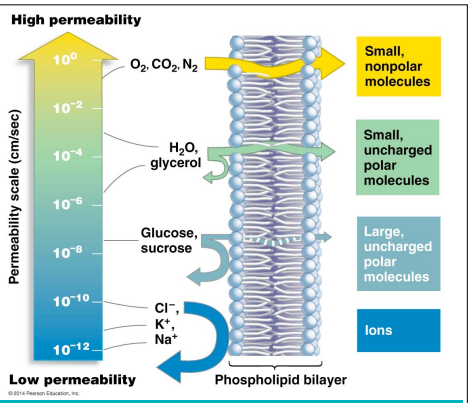
So what does and does not get through?



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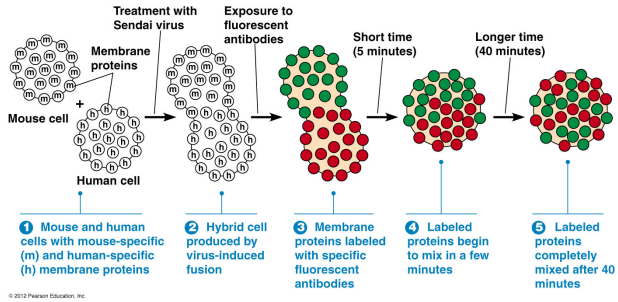
Biological membranes are **fluid**:



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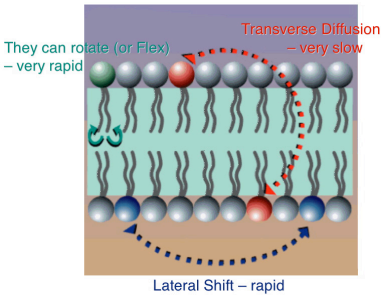
If biomembranes are fluid, in what ways can the lipids move around within the membrane?



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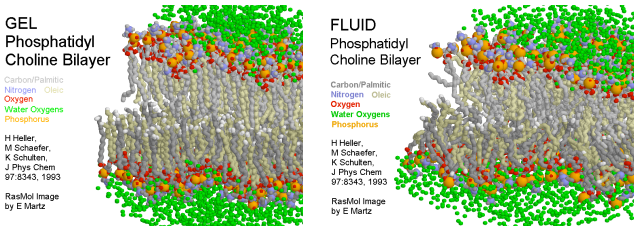
Membrane fluidity is temperature dependent:



The transition from fluid to gel phase (and vice versa) is influenced by the lipid composition of the membrane

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The cell can regulate membrane fluidity by changing:

		Fluidity
1. The number of unsaturated fatty acids		
	High level →	+
	Low level →	–
2. The tail length of fatty acids		
	Short chains →	+
	Long chains →	–
3. The number of cholesterol molecules (at low temperatures)		
	High level →	+
	Low level →	–

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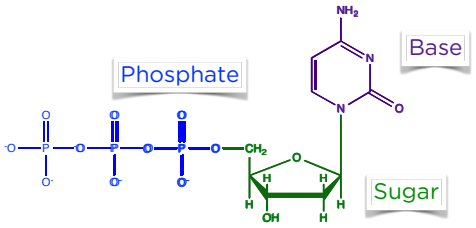
Our next macromolecule: **Nucleic Acids**

- Two types: Deoxyribonucleic Acid (DNA) and Ribonucleic Acid (RNA)
- Serve an **information storage** role in a cell
- The monomers of Nucleic Acids are **Nucleotides**:



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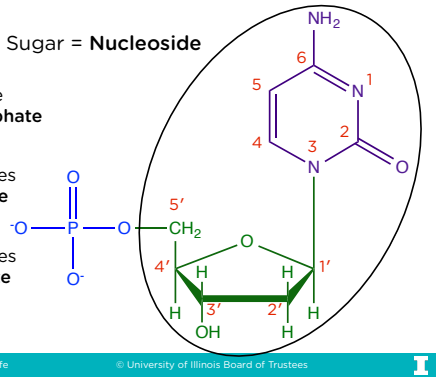
Numbering, labeling, and naming conventions:

Base + Sugar = **Nucleoside**

Nucleoside + 1 Phosphate
= **nucleoside monophosphate**

Nucleoside + 2 Phosphates
= **nucleoside diphosphate**

Nucleoside + 3 Phosphates
= **nucleoside triphosphate**



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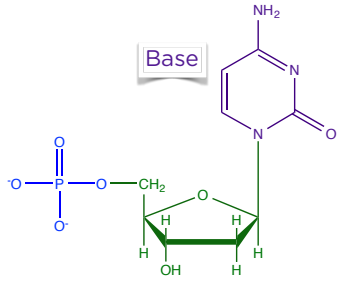
The nucleotides (abbr. nts) of DNA and RNA differ in two important ways:

1. Which nitrogenous bases are found in each nucleic acid?



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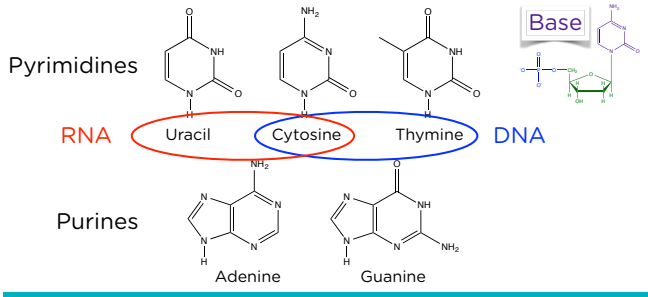

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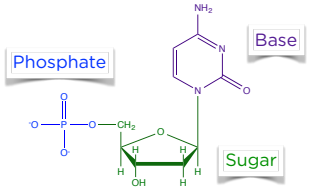
Nucleotide nomenclature:



Base	Abbreviation
Adenine	A
Guanine	G
Cytosine	C
Uracil	U
Thymine	T

- All nts in DNA chain have same 5-carbon sugar and a phosphate group
- All nts in RNA chain have same 5-carbon sugar and a phosphate group
- For nucleotides of each of these nucleic acids, all that differs is the base, so the designation of the nucleotide is the abbreviation of the base

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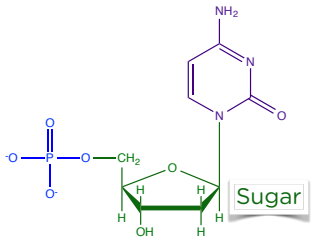

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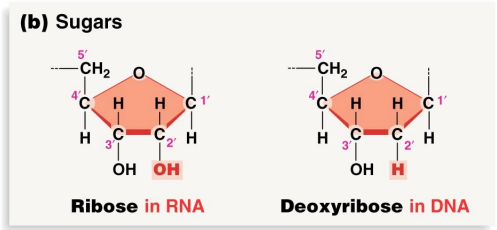

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Summarizing Nucleic Acid Properties (DNA):

- **Deoxyribose** sugar (H at 2′ carbon)
- Pyrimidine bases are **Cytosine** (C) and **Thymine** (T)
- Purine bases are **Adenine** (A) and **Guanine** (G)
- DNA monomers are called **deoxyribonucleotides** (or deoxyribonucleoside triphosphates, or **dNTPs**)
- Usually **double-stranded**

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Summarizing Nucleic Acid Properties (RNA):

- **Ribose** sugar (OH at 2′ carbon)
- Pyrimidine bases are **Cytosine** (C) and **Uracil** (U)
- Purine bases are **Adenine** (A) and **Guanine** (G)
- RNA monomers are called **ribonucleotides** (or ribonucleoside triphosphates, or **NTPs**)
- Usually **single-stranded**

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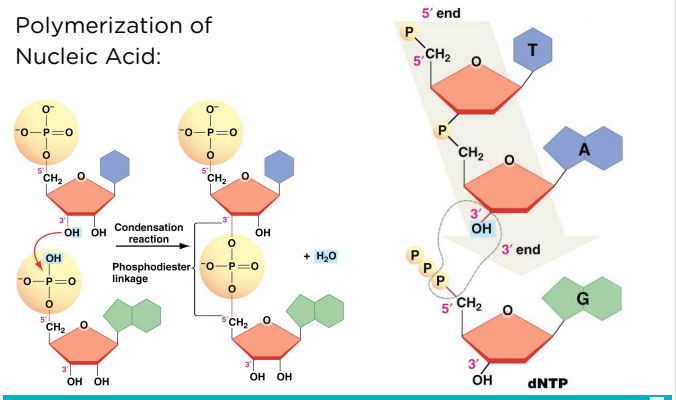
Polymerization of Nucleic Acid:



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