Chapter 5: The Structure and Function of Macromolecules

Class Notes: Part A

I. The Molecules of Life

- **Four main classes of large biological molecules:**
  1.
  2.
  3.
  4.

II. Biological Molecules Come in Different Sizes

- **<u>Monomer</u> = Subunit or building block molecule of a polymer.**
- **<u>Polymer</u> = (Poly = many; mer = part) Large molecule connected by similar subunits.**
- **<u>Macromolecule</u> = (Macro = large) Large organic polymer.**

II. Biological Molecules Come in Different Sizes

- **Polymers:**

III. Synthesis and Breakdown of Polymers

- **Condensation (dehydration) reactions =**
- **Hydrolysis reactions =**

Question 5.1

-

IV. Carbohydrates

•

IV. Carbohydrates

A. <u>Monosaccharides</u> = (Mono = single; sacchar = sugar)

A. Monosaccharides

1.
2.
3.
4.

- **Examples include**
  - **fructose**
  - **galactose**
  - **glucose**

A. Monosaccharides

Structure:

A. Monosaccharides

•

IV. Carbohydrates

B. <u>Disaccharides</u> =

• **<u>Glycosidic linkage</u> =**

B. Disaccharides

Disaccharide	Monomers	General Comments
Maltose	**Glucose + Glucose**	**Beer brewing sugar**
Lactose	**Glucose + Galactose**	**Milk sugar**
Sucrose	**Glucose + Fructose**	**Table sugar; transport sugar in plants.**

Question 5.2

•

IV. Carbohydrates

C. <u>Polysaccharides</u> =

C. Polysaccharides

Important functions:

1.

2.

C. Polysaccharides

1. Starch

-
-
-

C. Polysaccharides

2. Glycogen

-
-
-

C. Polysaccharides

3. Cellulose

- –
- –
- –

C. Polysaccharides

STARCH	CELLULOSE
Monomers are connected with α 1-4 linkage	Monomers are connected with β 1-4 linkage.

Fig 5.7a,
Fig 5.7b, c

C. Polysaccharides

-
  - –

Question 5.3

•

V. Lipids

•

•

• **Three types:**
triacylglycerols (triglycerides), phospholipids **and** ***steroids (sterols).***

A-1. Triacylglycerols (TAG)

• **Structure:**
–
–

• ***ester linkages***

A-1. Triacylglycerols

-
-
-

A-2. Fatty acids on TAG

- Saturated fatty acids
  -
  -
  -
- Unsaturated fatty acids
  -
  -

A-2. Fatty acids on TAG

- **Hydrogenation = Adding H-bonds to unsaturated fatty acids to produce saturated fatty acids.**
  -

A-3. Useful Functions for Fats

-

*200 lbs (25% body fat) -> 250 lbs (25% carbohydrate stores)

-

B. Phospholipids

- **Structure:**
  -
  -
  -

B. Phospholipids

- **Structure:**
  -
- **Function:**
  -

C. Steroids (Sterols)

- **Structure:**
  –
- **Example-Cholesterol:**
  –
  –

Question 5.4