

## Topic 15. Digestion of lipids. Catabolism of triacylglycerols, its regulation. Oxidation of fatty acids and glycerol.

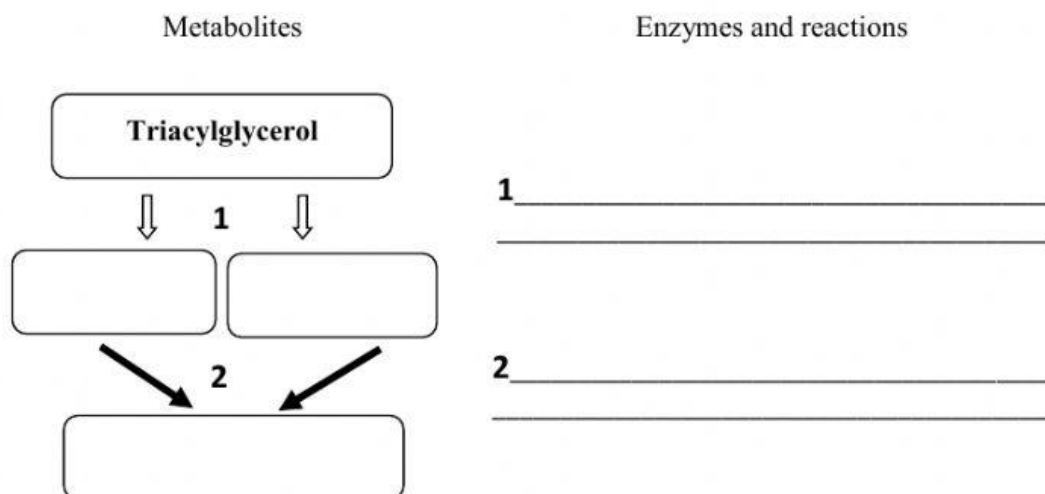
### *Theoretical questions:*

1. Catabolism of Triacylglycerols in Digestive Tract: reactions.
2. Catabolism of Triacylglycerols in Adipose Tissue: reactions, regulation of TAG Lipase activity.
3. Glycerol catabolism. Energy balance of aerobic oxidation of Glycerol in muscle tissue.
4. Fatty Acids Oxidation:
  - 4.1. Fatty Acids activation.
  - 4.2. Transfer of Fatty Acids across the inner mitochondrial membrane, regulation of the process.
  - 4.3. Reactions and enzymes of  $\beta$ -oxidation.
  - 4.4. Energy balance of aerobic oxidation of Fatty Acids.

### Study Questions and Tasks

#### 1. Catabolism of Triacylglycerols:

##### 1.1. Scheme in Digestive Tract:



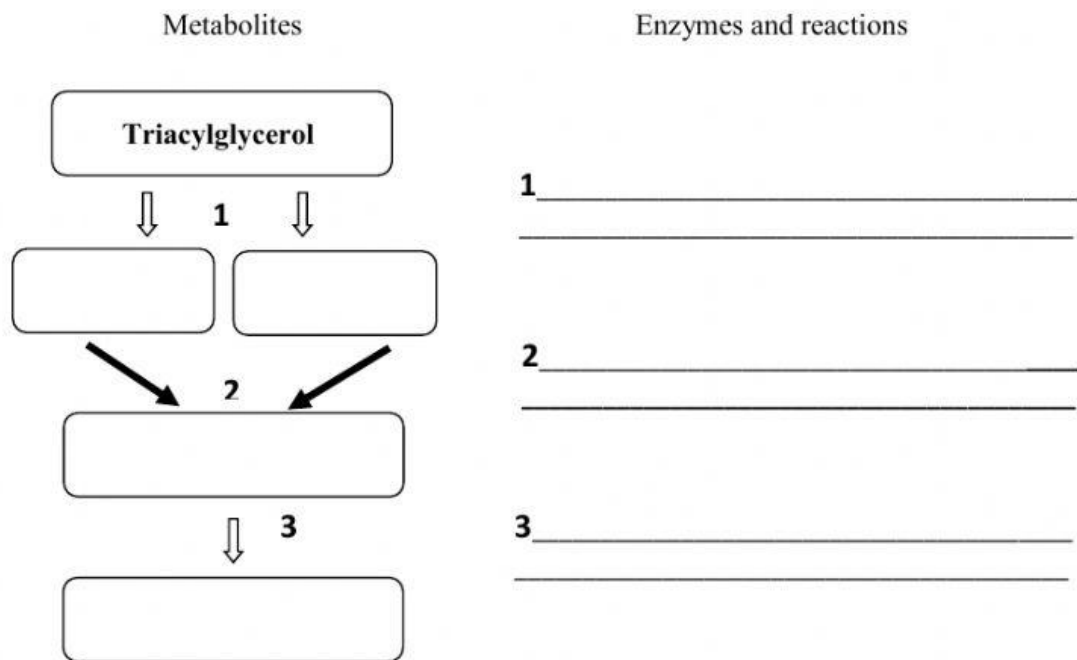
##### 1.2. Reactions in Digestive Tract:

1.

2.

3.

**1.3. Scheme in Adipose Tissue:**



**1.4. Reactions in Adipose Tissue:**

1.

2.

3.

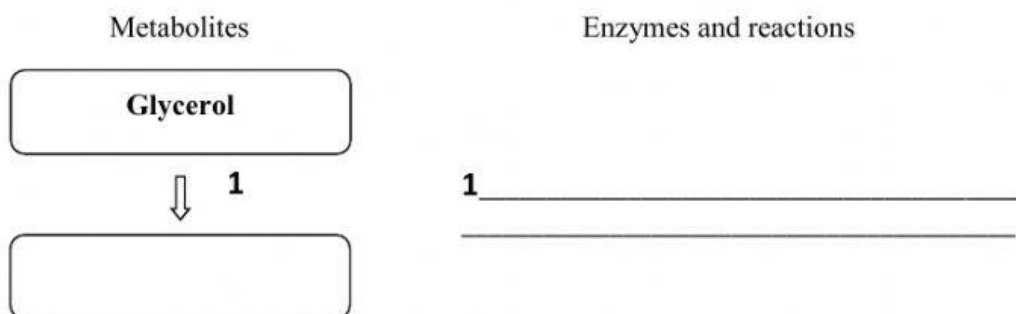
4.

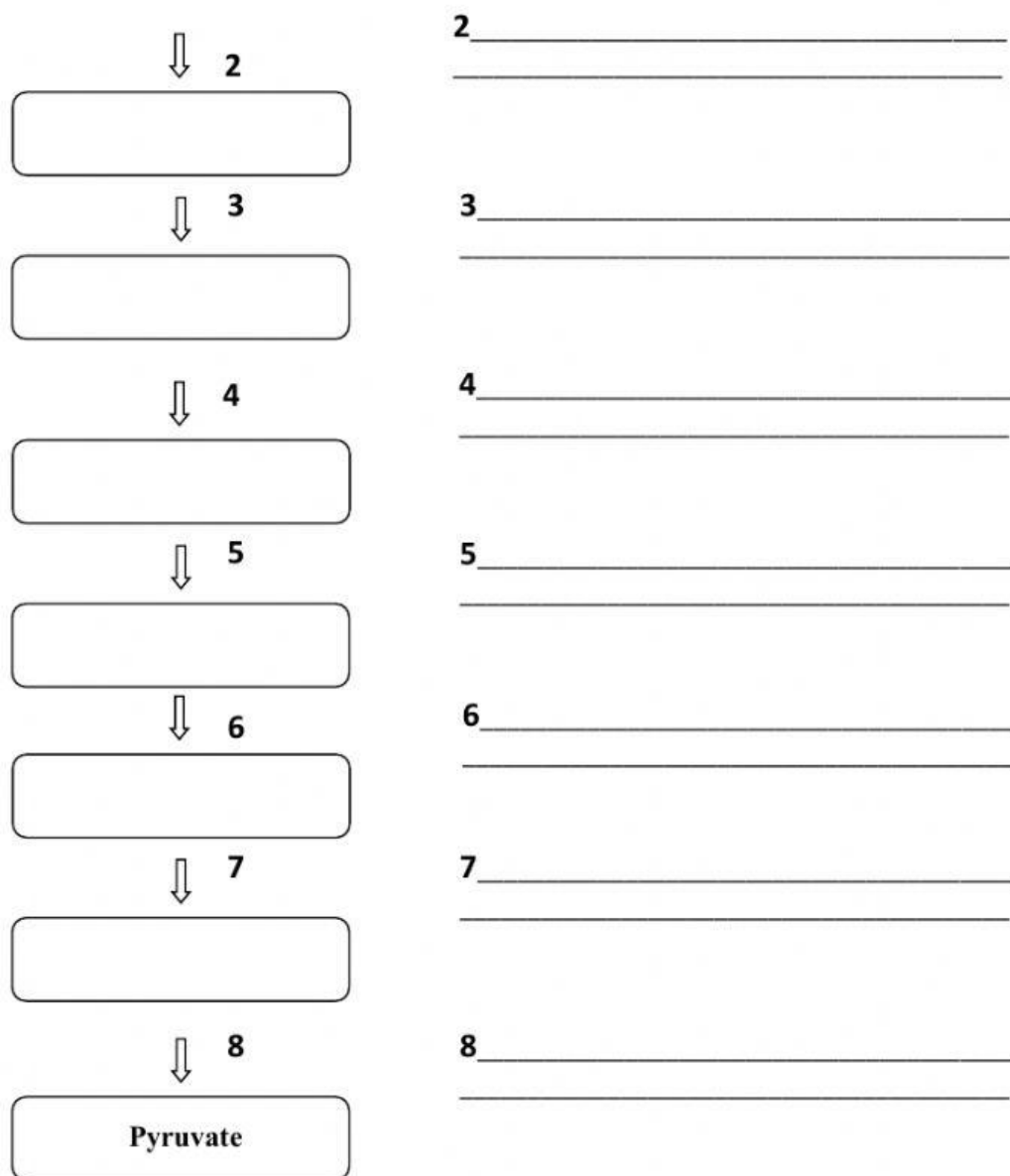
1.5. Write down the regulatory enzymes of TAG Lipase activity



## 2. Glycerol catabolism.

2.1. Scheme of glycerol oxidation till pyruvate





2.2. Write down the reactions of glycerol catabolism till GAP

1.

2.

3.

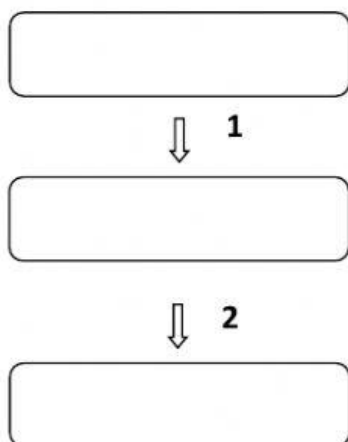
**2.3.** Energy balance of aerobic oxidation of Glycerol in muscle tissue.

	Glycerol till GAP	GAP till pyruvate	Krebs cycle + ETC
Number of ATP from			
Total number of ATP			

### 3. Fatty Acids Oxidation:

**3.1.** Transfer of Fatty Acids across the inner mitochondrial membrane. Draw a scheme.

**3.2.** Scheme of  $\beta$ -oxidation:  
Metabolites



Enzymes and reactions

**1** \_\_\_\_\_  
\_\_\_\_\_  
**2** \_\_\_\_\_  
\_\_\_\_\_

↓ **3**

↓ **4**

**3** \_\_\_\_\_

\_\_\_\_\_

**4** \_\_\_\_\_

\_\_\_\_\_

3.3. Reactions and enzymes of  $\beta$ -oxidation:

1.

2.

3.

4.

### 3.4. Energy balance of aerobic oxidation of palmitate

	Number of Acetyl-CoA	Number of $\text{NADH}^+ + \text{H}^+$	Number of $\text{FADH}_2$
Number of ATP from			
Total number of ATP			

**Text-books:**

1. Biochemistry 5th Edition Ch.16, pp.189-195.
2. Prasad textbook of biochemistry OCR. Topic 11, pp. 212-217.