Topic 17. Biosynthesis and metabolism of Cholesterol. Bile acids, their role. Metabolism of Ketone Bodies. Lipoproteins of blood plasma. Metabolism of Phospholipids.

Theoretical questions:

1. Cholesterol, its structure and biological role. Steroids. Bile acids, the role in digestion of lipids.
2. Synthesis of cholesterol: metabolic sources, reactions until mevalonate formation. Regulation of cholesterol synthesis.
3. Metabolism of ketone bodies: synthesis and utilization.
4. Lipoproteins, classification and their role in transport of lipids in blood plasma. The role of lipoproteins in cholesterol metabolism.
5. Phospholipids, their structure and role in biological membranes.
6. Synthesis of glycerophospholipids (phosphatidylethanolamine, phosphatidylcholine, phosphatidylserine). The role of CTP.

Study Questions and Tasks

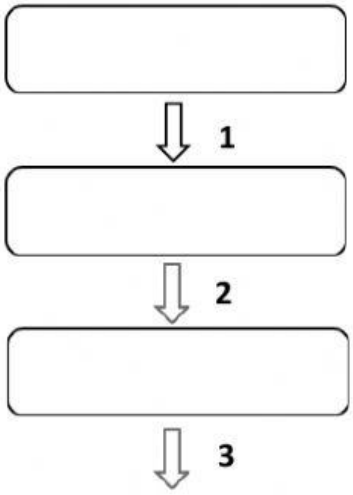
1. Cholesterol structure and biological role. Fill in the table:

Formula of Cholesterol	Main functions of Cholesterol
	1.
	2.
	3.
	4.
	5.

2. Synthesis of Cholesterol:

2.1. Draw a scheme of cholesterol synthesis till mevalonate, then main metabolites:

Metabolites **Enzymes and Reactions**



1 _____

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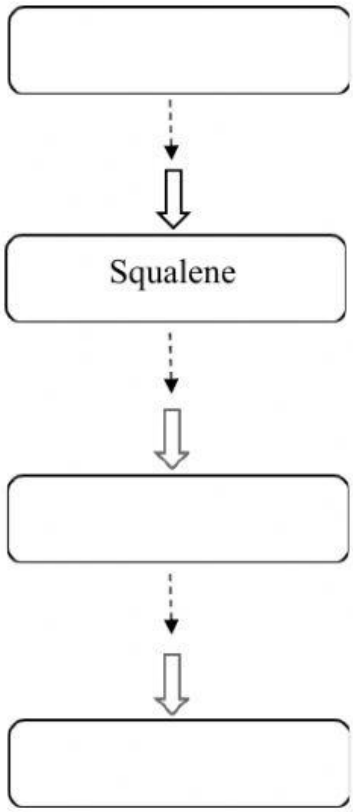
2 _____

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3 _____

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LIVEWORKSHEETS



2.2. Write down reactions until mevalonate formation:

1.

2.

3.

2.3. Regulation of Cholesterol Synthesis.

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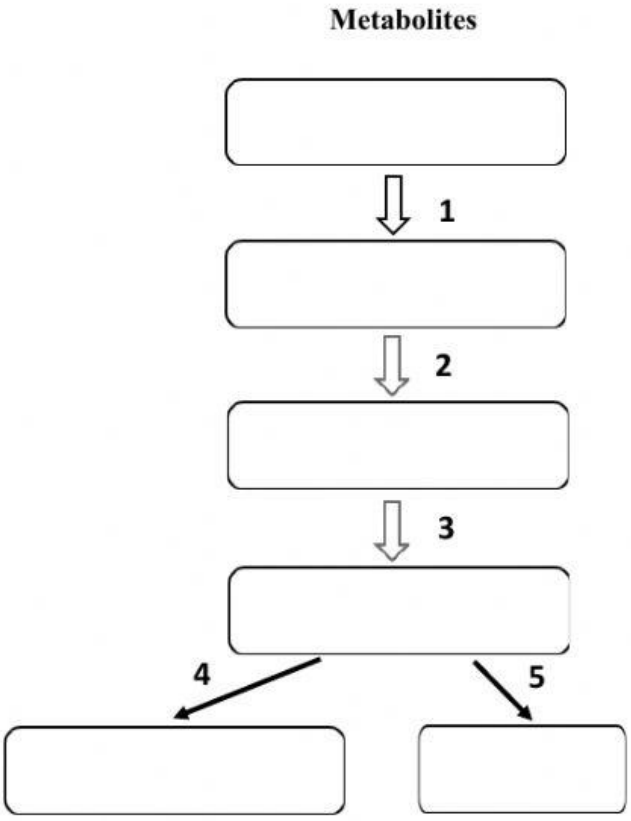
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LIVEWORKSHEETS

3. Metabolism of ketone bodies.

3.1. Synthesis of ketone bodies. Write down a scheme:



3.2. Synthesis of ketone bodies. Write down reactions:

1.

2.

3.

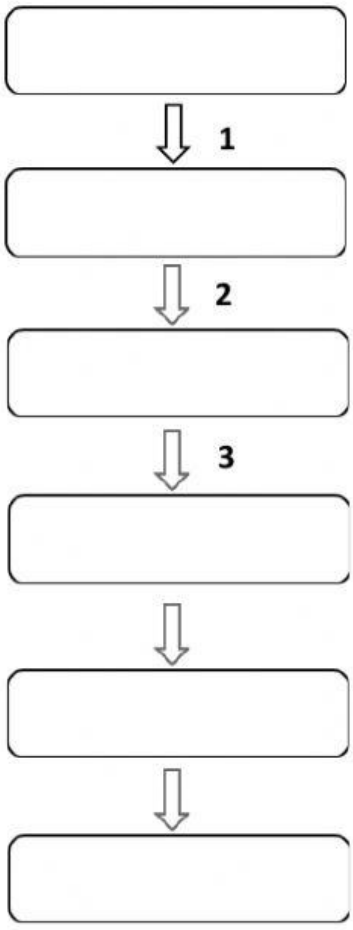
LIVEWORKSHEETS

4.

5.

3.3. Utilization of ketone bodies. Write down a scheme:

Metabolites



Enzymes and Reactions

1 _____

_____

2 _____

_____

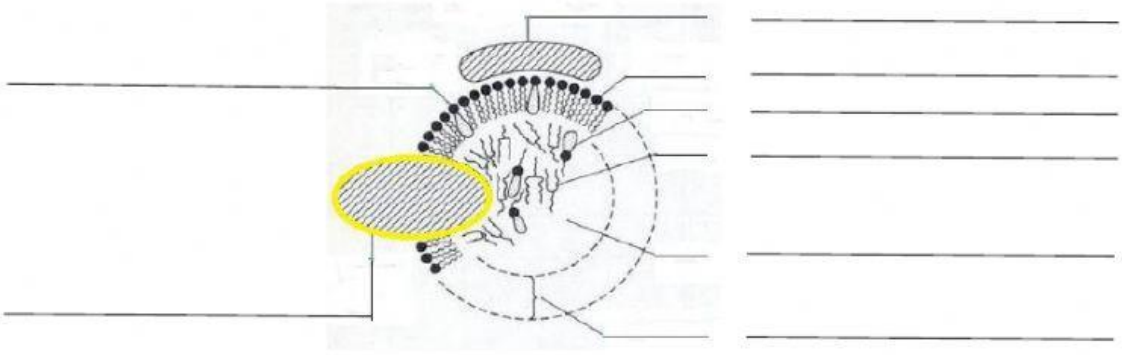
3 _____

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LIVEWORKSHEETS

4. Lipoproteins.

4.1.Draw a scheme of lipoprotein structure.



4.2. Classification of Lipoproteins:

Classes	Place of Synthesis	Biological Role

5. Synthesis of glycerophospholipids.

5.1. Write down structural formulas of phosphatidylethanolamine, phosphatidylcholine and phosphatidylserine

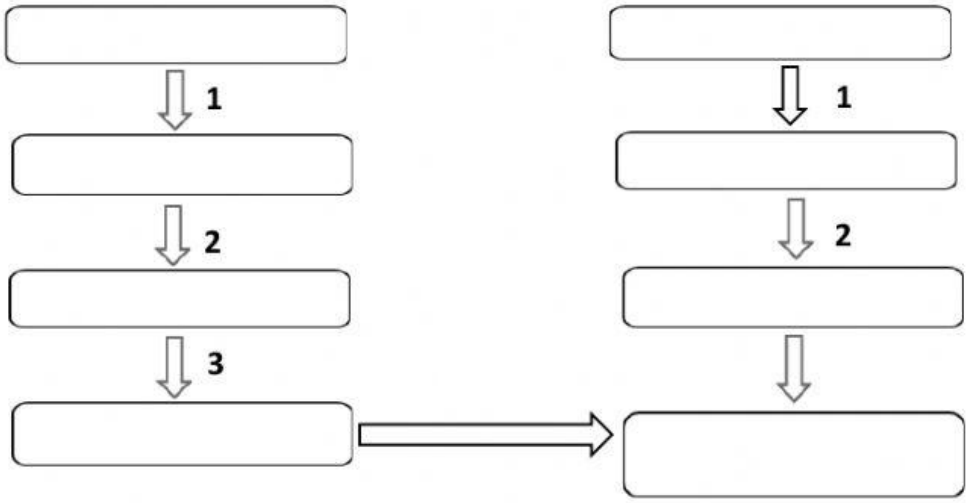
phosphatidylethanolamine **phosphatidylcholine**

phosphatidylserine

LIVEWORKSHEETS

5.2. Draw a general scheme.

Synthesis of Phosphatidic Acid from Glycerol **Activation of Nitrogenous Bases**



Textbooks:

1. Biochemistry 5th Edition Ch.16., pp.195-197, Ch.17, pp.201-208, Ch.18, pp.219-237, Ch.24, p.330.
2. Prasad textbook of biochemistry OCR. Topic 4. pp. 76-78, Topic 11. pp. 226-245.

LIVEWORKSHEETS