Topic 12. Pentose phosphate pathway. Glycogen catabolism and synthesis, their regulation.

Theoretical questions:

1. The Pentose Phosphate Pathway (PPP), its localization in the cell.
2. Reactions and enzymes of the oxidative step, $HADPH_2$ formation.
3. Summary of the non-oxidative step of PPP. The links with Glycolysis and Gluconeogenesis.
4. Structure of Glycogen.
   4.1. Glycogen breakdown, reactions and enzymes. Regulation of glycogen breakdown.
   4.2. Glycogen synthesis, reactions and enzymes. Regulation of glycogen synthesis.
5. Reciprocal regulation of Glycogen metabolism.
6. Metabolism of Glycogen in different tissues: skeletal muscles and liver.

Study Questions and Tasks

1. The Pentose Phosphate Pathway (PPP)

1.1.Definition_____

_____

_____

_____

_____

1.2. Biochemical role and localization:

_____

_____

_____

_____

_____

1.3. Scheme

Metabolites

[ ]

⇩ **1**

[ ]

⇩ **2**

[ ]

⇩ **3**

[ ]

⇩ **4**

[ ]

Enzymes and reactions

1_____

_____

2_____

_____

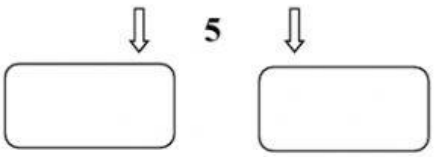
3_____

_____

4_____

_____

LIVEWORKSHEETS



5 _____

_____

1.4. **Write down the reactions** of the oxidative step of PPP starting from glucose

1.

2.

3.

4.

5.

2. Structure of Glycogen.

2.1. Glycogen consists of _____

2.2. The main bond in glycogen is _____

2.3. In the branch point there is a bond _____

2.4. The name of protein inside of glycogen is _____

LIVEWORKSHEETS

3. Metabolism of Glycogen.

3.1. Write down the reactions of Glycogen synthesis:

1.

2.

3.

4.

3.2. Write down the reactions of Glycogen catabolism:

1.

2.

LIVEWORKSHEETS

3.

3.3. Regulation of glycogen metabolism.

SYNTHESIS	CATABOLISM
Regulatory enzyme	
Molecular mechanism of regulation	
Inhibition or activation?	

Sites for additional information:
https://www.wiley.com/college/boyer/0470003790/animations/animations.htm
https://www.wpunj.edu/sec/vsec/science_courses/biochem/

Text-books:
1. Biochemistry 5th Edition Ch.11, pp.125-136, Ch.23, pp.307-320.
2. Prasad textbook of biochemistry OCR. Topic 10. pp. 172-211.

LIVEWORKSHEETS