

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, HADPH₂ 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

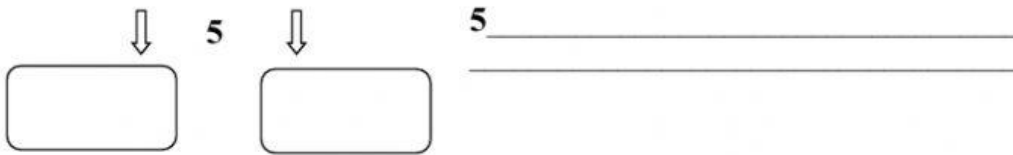
1. The Pentose Phosphate Pathway (PPP)

1.1. Definition

1.2. Biochemical role and localization:

1.3. Scheme

Metabolites	Enzymes and reactions
↓ 1	1
	2
↓ 2	
	3
↓ 3	
	4
↓ 4	



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 _____

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.

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.