

## 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<sub>2</sub> 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

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##### 1.2. Biochemical role and localization:

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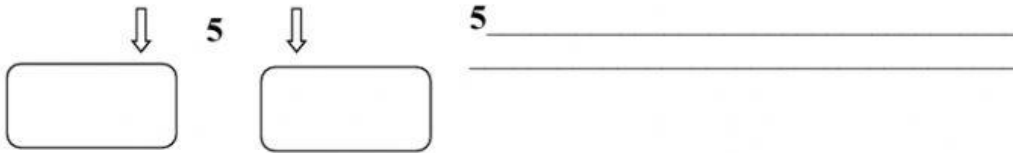
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##### 1.3. Scheme

Metabolites	Enzymes and reactions
<div></div>	
↓ 1	1 <div></div>
<div></div>	2 <div></div>
↓ 2	
<div></div>	3 <div></div>
↓ 3	
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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/](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.