**Lesson 8 – Glycolysis and gluconeogenesis**

**1. Glycolysis**

Fill in the table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Enzyme | Enzyme class | Substrates | Products | What happens in the reaction? | How many ATP molecules are produced/used in the reaction? | Regulation |
| Phase I | | | | | | |
| Hexokinase or  Glucokinase |  |  |  |  |  |  |
| Glucose-6-phosphate isomerase |  |  |  |  |  |  |
| Phosphofructokinase |  |  |  |  |  |  |
| Aldolase |  |  |  |  |  |  |
| Triosephosphate isomerase |  |  |  |  |  |  |
| Phase II | | | | | | |
| Glyceraldehyde-3-phosphate dehydrogenase |  |  |  |  |  |  |
| Phosphoglycerate kinase |  |  |  |  |  |  |
| Phosphoglycerate mutase |  |  |  |  |  |  |
| Enolase |  |  |  |  |  |  |
| Pyruvate kinase |  |  |  |  |  |  |
| In anaerobic conditions | | | | | | |
| Lactate Dehydrogenase |  |  |  |  |  |  |

**2. Anaerobic and aerobic glycolysis**

What is the difference between aerobic and anaerobic glycolysis?

Why is anaerobic glycolysis needed in the human body?

What is the fermentation of pyruvate? What is the function of fermentation of pyruvate under anaerobic conditions?

How many ATP molecules in glycolysis are formed as a result of substrate phosphorylation?

How many ATP molecules will be formed from one glucose molecule under aerobic conditions?

How many ATP molecules will be formed from one glucose molecule under anaerobic conditions?

Why does glucose oxidation under anaerobic and aerobic conditions produce different amounts of ATP molecules?

**3. Gluconeogenesis**

What is the gluconeogenesis? Where is this processes located?

What can be a substrate for gluconeogenesis?

What is the Cori cycle? What happens in the Cori cycle? What is the function of the Cori cycle?

Fill in the table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Enzyme | Enzyme class | Substrates | Products | What happens in the reaction? | How many ATP molecules are produced/used in the reaction? | Regulation |
| Lactate Dehydrogenase |  |  |  |  |  |  |
| Pyruvate carboxylase |  |  |  |  |  |  |
| Phosphoenolpyruvate carboxykinase |  |  |  |  |  |  |
| Enolase |  |  |  |  |  |  |
| Phosphoglycerate mutase |  |  |  |  |  |  |
| Phosphoglycerate kinase |  |  |  |  |  |  |
| Glyceraldehyde-3-phosphate dehydrogenase |  |  |  |  |  |  |
| Triosephosphate isomerase |  |  |  |  |  |  |
| Aldolase |  |  |  |  |  |  |
| Fructose-1,6-bisphosphate |  |  |  |  |  |  |
| Glucose-6-phosphate isomerase |  |  |  |  |  |  |
| Glucose-6-phosphatase |  |  |  |  |  |  |