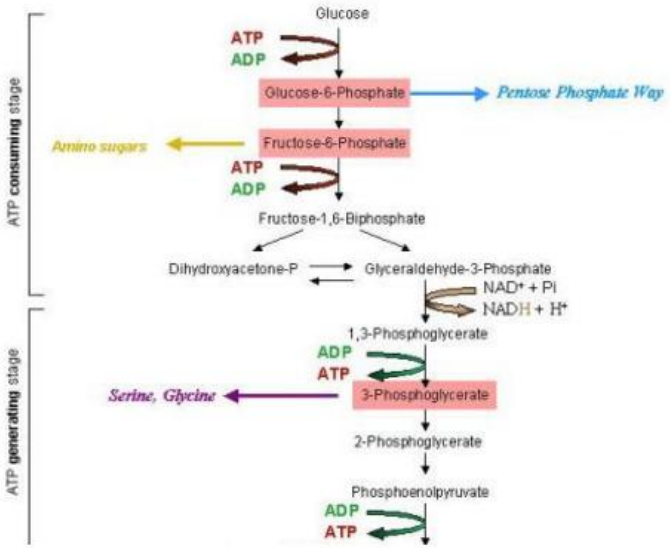
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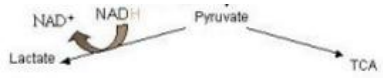
Resource name	DENTAL BIOCHEMISTRY
Resource description	This is a lecture on Dental Biochemistry
Resource content	

Contents:

1. Glycolysis
2. Krebs Cycle
3. Lipid Metabolism

Glycolysis





ATP production: Aerobic metabolism of glucose produces 32 ATP via malate-aspartate shuttle (heart and liver) 30 ATP via glycerol-3-phosphate shuttle (muscle)

Anaerobic glycolysis produce only 2 net ATP per glucose molecule.

ATP hydrolysis can be coupled to energetically unfavourable reaction.

Glycogenesis is the process of glycogen synthesis, in which glucose molecules are added to chains of glycogen for storage. This process is activated during rest periods in the liver, and also activated by insulin in response to high glucose levels, for example after a carbohydrate-containing meal.

Glycogenolysis is the breakdown of glycogen (n) to glucose-1-phosphate and glycogen (n-1). Glycogen branches are catabolized by the sequential removal of glucose monomers via phosphorolysis, by the enzyme glycogen phosphorylase

Glycogenolysis takes place in the cells of the muscle and liver tissues in response to hormonal and neural signals. In particular, glycogenolysis plays an important role in the fight- or-flight response and the regulation of glucose levels in the blood

Krebs Cycle

Mnemonic- **C**arbon **C**orporation of **I**ndia **K**indly **S**end **S**ome **F**unds through **M**oney **O**rder

The first letter "C" stands for Cycle- rest of the first letters are the starting letters of substrates in kreb's cycle

TCA cycle reaction occur in mitochondria.

Mnenomic:Citrate Is Krebs Starting Substrate for Making Oxaloacetate.

TCA cycle produces 3NADH,1FADH2,2CO2,1GTP per acetyl-CoA=10 ATP.

Digestion of Carbohydrates:

- Only monosaccharides are absorbed.
- Carbohydrates must be digested to glucose and fructose for absorption to proceed.
- Lactase and sucrase degrade their respective disaccharides to monosaccharides.
- Lactase breaks down lactose to glucose and galactose.
- Sucrase breaks down sucrose to glucose.

Digestion of Proteins:

- Endopeptidases break down proteins into amino acids.
- Pepsin is produced in the stomach as pepsinogen. It is then converted into pepsin by gastric acid.

Digestion of Lipids:

Lipids are broken down into fatty acids by Lipase.

There are two types of Lipases:

- Lingual Lipase found in the saliva.
- Pancreatic Lipase produced in the Pancreas acts on lipids in the small intestine.

Nutrient	Digestion	Site of absorption
Carbohydrate	To monosaccharide (glucose, galactose, fructose)	Small Intestine
Proteins	To amino acids, dipeptides, tripeptides	Small Intestine
Lipids	To fatty acids, monoglycerides, cholestrol	Small Intestine

LIPID METABOLISM

LIPOLYSIS - Lipid catabolism whereby lipids become

1. **Glycerol** that can be converted into **Pyruvic Acid** which enters the TCA Cycle. 1 ATP per PA
2. **Fatty Acids** converted via **BETA-OXIDATION**
   a. 12 ATP per each 2-carbon fragment via acetyl-CoA in the TCA Cycle.
   b. 5 ATP from NADH & $FADH_2$ via ETS
   c. TOTAL of 144 ATP molecules per 18 carbon Fatty acid molecule.

LIPOGENESIS - Lipid synthesis

1. **Glycerol** by *dihydroxyacetone phosphate* via glycolysis
2. Acetyl-CoA can build any amino acid, carbohydrate, or lipid except essential fatty acids: Linoleic acid & Linolenic acid

LIPID TRANSPORT

1. Free fatty acids - bound to albumin
2. Lipoproteins

a. Chylomicrons - carries lipids from GI to CVS
b. LDLs - to peripheral tissues from liver
c. HDLs - from peripheral tissues to liver

1. Which of the following is the end product of Glycolysis pathway?

a. Pyruvate
b. **Glucose**
c. Citric acid
d. Galactose

1. Gluconeogenesis occurs in?

a. **Liver and kidney**
b. Ovary and testes
c. Liver and brain
d. Heart and ovary

1. Hydrolysis of ingested triglycerides is catalyzed by

a. **Lipases**
b. Maltase
c. Glycolytic enzymes
d. Alcohol dehydrogenase

1. Triglycerides are broken down to

a. Free fatty acids and glucose
b. Glucose and galactose
c. **Free fatty acids and glycerol**
d. Glycerol and lipoic acid

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