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THE ROLE PLAYED BY EXERCISE INTENSITY IN CLEARANCE OF BLOOD LACTATE

By Student Name

INTRODUCTION

- ❖ Blood lactate accumulates during high intensity exercises.
- ❖ Active recovery clears blood lactate.
- ❖ ¹Pyruvate is converted to lactate, leading to lactate accumulation

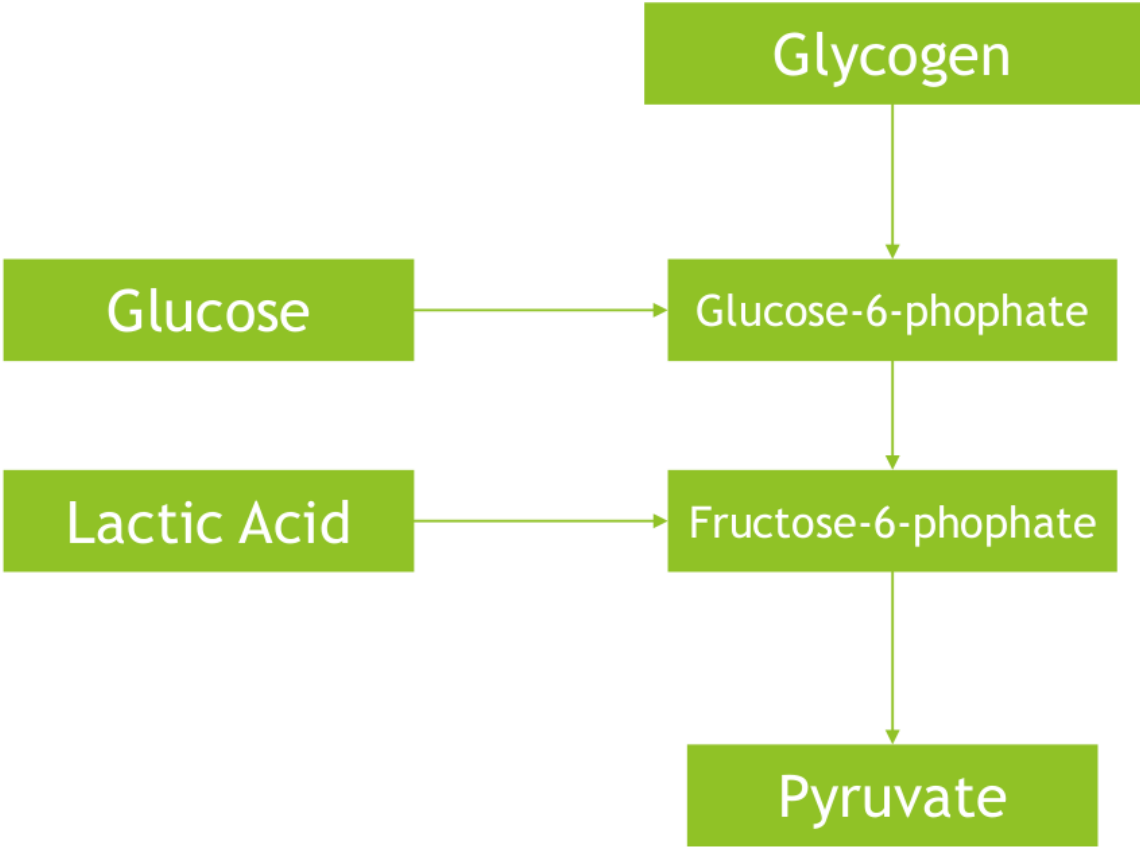
BACKGROUND.

- ❖ ¹ Active recovery clears accumulated lactate better than passive recovery. (Belcastro & Bonen, 1975)
- ❖ However, there is no optimal active recovery intensity that clears the accumulated lactate

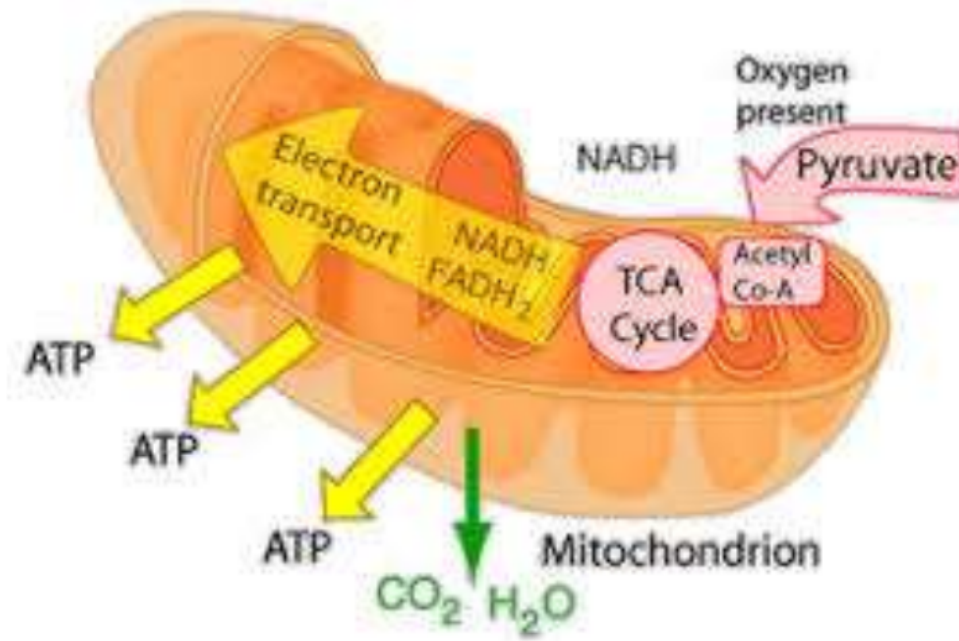
LACTIC ACID/LACTATE

- ❖ Pyruvic Lactic acid, or lactate, is a chemical byproduct of anaerobic respiration
- ❖ Pyruvic Lactic Acid is produced when glycogen and glucose are broken down into pyruvate, which is then converted into ATP.
- ❖ Pyruvic Lactic Acid can be reduced to lactic acid or join the mitochondria for oxidation
- ❖ Lactic acid is weak and rapidly dissociates into lactate and hydrogen ions

HOW LACTIC ACID IS PRODUCED



HOW LACTIC ACID IS PRODUCED



CONVERSION OF PYRUVATE TO LACTATE

- ❖ Anaerobic conditions transform pyruvate to lactate.
- ❖ Pyruvate is produced in the glycolytic pathway and metabolized to produce NADH and FADH_2
- ❖ Two ATP is produced during glycolysis. Two molecules of NAD^+ are reduced to $\text{NADH}+\text{H}$ molecules. Pyruvate molecules are got from splitting of glucose
- ❖ Pyruvate ferments in the absence of oxygen.

LACTATE KINETICS.

- ❖ Lactic acidosis is attributed to anaerobic glycolysis due to inadequate oxygen delivery.
- ❖ However, it has become the mechanism of hyperlactemia is multifactorial and due to factors beyond hypoxic tissue injury
- ❖ Lactic acid is an unreliable marker of oxygen debt and inadequate resuscitation.

HOW LACTATE ENTERS AND LEAVES BLOODSTREAM

- ❖ Disaccharide lactose binds with lactase and the active sites cleave lactose into glucose and galactose.
- ❖ Lactic acid builds up within many tissues, including muscles, then enters the bloodstream.

LACTATE CLEARANCE

Lactic acid produced can be:

- ❖ Converted to pyruvate in a cell that is well-oxygenated and enter the mitochondria then undergoes oxidative phosphorylation to result in production of huge quantities of energy.
- ❖ Used as a source of fuel by certain cells during metabolism.

LACTATE TRANSPORTERS

- ❖ Transport of lactic acid is facilitated by monocarboxylate transporters (MCTs) across the cells' plasma membrane .
- ❖ MCTs also enable transport of pyruvate, acetoacetate, β -hydroxybutyrate and acetate.

GLUCONEOGENESIS

- ❖ Glucose provides the only source of energy the brain, kidney medulla, erythrocytes, and testes.
- ❖ Gluconeogenesis is a process used by organisms to produce glucose used in catabolic reactions. The glucose is produced from non-carbohydrate precursors.

WHAT LACTIC ACID CAN DO

- ❖ Lactate is an important source of energy in working and non-working tissue, as well as the liver, the heart, kidneys, and brain.
- ❖ Delayed onset muscle soreness (DOMS) is caused by a number of factors. However, lactic acid is not a contributing factor.
- ❖ ³ Lactate threshold is a measurable and trainable variable that can help in monitoring adaptation to training

EFFECT OF EXERCISE INTENSITY IN LACTATE CLEARANCE.

- ❖ An increase in exercise intensity increases lactate levels in the blood, until it reaches a break point, when lactate production exceeds clearance.
- ❖ This is also called the lactate threshold (LT).

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