



EXPERIMENT No.(1) :

Basic principles of Lactate dehydrogenase test (LDH) ACTIVITY

- ALSO KNOWN AS (**LDH**)
- Lactate dehydrogenase ACTIVITY
- KINETIC
- ENZYMATIC METHOD
- AN **ENZYME (EC 1.1.1.27)**

EC 1 - Oxidoreductases

EC 1.1 - Acting on the CH-OH group of donors

EC 1.1.1 - With NAD⁺ or NADP⁺ as acceptor

EC 1.1.1.27 - L-lactate dehydrogenase

- LHD is an enzyme which is width sprid through the body tissue has an important role in the conversion of pyruvate into lactate within the tissue whenever there is hypoxia in the body
- LDH (Lactate dehydrogenase) is an enzyme that produces energy.
- LDH enzyme catalyzes the conversion of lactate to pyruvic acid back as it coverts NAD⁺ to NADH and back.
- A dehydrogenase is an enzyme that transfers a hydride from one molecule to another.
- **Found:** LDH is extensively found in body tissues such as blood cells , lungs, kidney, liver, muscles, tumor cells and heart muscles. • LDH released during tissue damage, common marker of injuries and diseases such as heart failure.
- **ISOENZYMES:**
Isoenzymes are multiple enzyme, isomers of enzyme (Tetramer).
- There are five isoenzymes of LDH.
LDH-1 found in heart and in RBC as well as in brain.
LDH-2 found in the reticuloendothelial system.
LDH-3 found in the lungs.
LDH-4 found in the kidneys, placenta, and pancreas.
LDH-5 found in the liver and striated muscle.
- **NORMAL VALUES OF LDH** • Normal range of LDH is 140u/l to 280 u/l.
- **CLINICAL SIGNIFICANCE OF LDH**
- LDH may be used as a general indicator for the severity of acute and chronic tissue damage.
- LDH may be used to detect and monitor progressive conditions such as anemia including hemolytic anemia, megaloblastic anemia and severe infections.
- LDH determine prognosis or monitor treatment i.e chemotherapy of cancer such as germ cell tumors e.g testicular and ovarian cancer, lymphoma , leukemia and neuroblastoma.



Conditions in which it is Elevated

- Blood flow deficiency
- Hemolytic anemia
- Infectious mononucleosis
- liver disease
- low blood pressure Muscle injury •Muscle weakness, loss of muscle tissue (muscular dystrophy)
- Cancer •Pancreatitis •Stroke •Tissue death •If LDH level is raised may order an LDH isoenzyme test to determine the location of tissue damage.

QUESTIONS :

1-Which Condition Produces the Highest Elevation of Serum Lactate Dehydrogenase ?

- A. Pernicious Anemia**
- B. Myocardial Infarction
- C. Acute Hepatitis
- D. Muscular Dystrophy

As/ **A.** Serum LD levels are highest in pernicious anemia, reaching 10–50 times the upper reference limit (URL) as a result of intramedullary hemolysis. Moderate elevations ($5\text{--}10 \times \text{URL}$) usually are seen in acute myocardial infarction, necrotic liver disease, and muscular dystrophy. Slight increases ($2\text{--}3 \times \text{URL}$) are sometimes seen in obstructive liver disease.

2-Which statement about methods for measuring LD is true?

- A. The formation of pyruvate from lactate (forward reaction) generates NAD^+
- B. The pyruvate-to-lactate reaction proceeds at about twice the rate as the forward reaction**
- C. The lactate-to-pyruvate reaction is optimized at pH 7.4

As/ **B.** Although the rate of the reverse reaction ($\text{P} \rightarrow \text{L}$) is faster, the $\text{L} \rightarrow \text{P}$ reaction is more popular because it produces a positive rate (generates NADH), is not subject to product inhibition, and is highly linear. The pH optimum for the forward reaction is approximately 8.8.