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LACTATE

DETERMINATION OF LACTATE IN WHOLE BLOOD, PLASMA OR CEREBROSPINAL FLUID

- *Enzymatic Method*
- *Instrument Application Sheets Available*
- *Use Whole Blood, Plasma or Cerebrospinal Fluid*
- *Incl. Lactate Standard*
- *Deproteinization procedure with 8% Perchloric Acid*
- *Also available Lactate/Pyruvate Control, High Level*
- *Wavelength 340, 334, 365 nm*

(Comparable with former Sigma ® method)

Products	Product no.	Quantity
Lactate Reagent Set	2864	25 – 250 tests
Lactate / Pyruvate Control, high Level	2896	10 x 5 ml
Perchloric Acid 8% Deproteinization Reagent	2933	6 x 100 ml

SUMMARY

CLINICAL BACKGROUND AND ASSAY PRINCIPLE

Lactate and pyruvate levels provide an index of the severity of circulatory failure. Increased blood lactate levels are reported in a number of disorders including: liver disease, congestive heart failure, diabetes mellitus, muscular dystrophy, thiamine deficiency and neoplastic disorders.

The procedure utilizes the enzyme, lactate dehydrogenase, which catalyses the following reversible reaction:

$$\text{Lactate} + \text{NAD} \xrightarrow{\text{LD}} \text{Pyruvate} + \text{NADH}$$

In the presence of excess NAD and Hydrazine, substantially all lactate is converted to pyruvate. The increase of absorbance at 340 nm due to reduction of NAD to NADH becomes a measure of the amount of lactate originally present.

PROCEDURE

Temperature:	25, 37 °C
Wavelength:	340 nm (Hg 365 nm or Hg 334 nm)
Lightpath:	10 mm
Zero:	blanc

SAMPLE MATERIAL

It is recommended that specimen collection be carried out in accordance with NCCLS document M29-T2. No known test method can offer complete assurance that human blood samples will not transmit infection. Therefore, all blood derivatives should be considered potentially infectious. Large and variable changes in lactate may occur after specimen collection. There appears to be no adequate means of preserving the lactate level (including the use of sodium fluoride) except immediate precipitation of blood proteins. Because of the time required to obtain serum or plasma from drawn blood, the lactate values observed with plasma are likely to be different from the initial values. Therefore, the use of deproteinized whole blood for lactate determination is recommended.

INTERFERING SUBSTANCES

Several investigators have studied the specificity of the lactate dehydrogenase reaction in terms of possible interference by various α- and ß-keto and hydroxy acids. Included those acids studied were malate, glyoxylate, α-ketobutyrate, α- and ß-hydroxybutyrate, oxalacetate, glycerate, acetoacetate, ß-hydroxypyruvate and phenylpyruvate. Some of these compounds were found to act as substrates to varying degrees for LD enzyme.
However, in practically all cases, it was reported that they were rarely present in significant concentrations in biologic fluids or else yielded substrate turnover rates too slow to cause any significant interference.

EXPECTED VALUES

Fasting Venous Blood:

Lactate :	0.33	-	1.33	mmol/l
	3	-	12	mg/dl

Cerebrospinal Fluid, children up to age 16:

Lactate :	1.11	-	2.78	mmol/l
	10	-	25	mg/dl

The expected values stated were taken from the literature. The cited methods used to obtain these values are similair to those described and results should be applicable. Copeland suggests that each laboratory determine its own normal range. Attention should be given to the fact that certain measurements in clinically healthy individuals are influenced by diet, sex, age diurnal variation, physical activity, menstrual cycle, pregnancy and environmental factors.

NOTES

1. For in vitro diagnostic use only.
2. Warnings:
   Lactate Buffer Reagent (2859) is harmful in contact with skin and toxic by inhalation and if swallowed.
   Mechanical exhaust is required and use latex gloves for protection of the hands.
   Use pipette ballon. When working with volume pipette never use mouth / sucking.
   Concentrations in %:
   10 – 15 % Hydraziniumsulfate.
   0 – 1 % Chloroform.
3. Perchloric Acid 8% w/v, Deproteinization Reagent (2933) is irritant in contact with eyes and skin.
4. For professional use only
5. Always contact INstruchemie for the complete product insert and latest edition.
6. Printed in the Netherlands, Lactate-summary-290331-1.FEN