Lactate FS*

Diagnostic reagent for quantitative in vitro determination of lactate in plasma and CSF on photometric systems

Order information
Cat. No. Kit size
1 4001 99 10 021 R1 5 x 20 mL + R2 1 x 25 mL
1 4001 99 10 023 R1 1 x 800 mL + R2 1 x 200 mL
1 4001 99 10 930 R1 4 x 20 mL + R2 2 x 10 mL

Summary [1, 2]
Lactate is the final product of the anaerobic glycolysis and serves as indicator for the oxygen status in cellular tissues. Increased lactate levels in blood occur in anoxia due to shock, congestive heart failure, intoxication and thiamine deficiency. Therefore, lactate is measured in intensive care medicine. As metabolic variable for the capability of the muscles lactate determination is used in evaluation of the training status in athletes.

Method
Enzymatic UV test with lactate dehydrogenase (LDH)

Principle
L-Lactate + NAD$^+$ \( \xrightarrow{\text{LDH}} \) Pyruvate + NADH + H$^+$

In the presence of NAD, lactate is converted by the lactate dehydrogenase. This procedure releases NADH which is measured at 340 nm. The absorbance of the produced NADH is proportional to the lactate concentration in the sample.

Reagents

Components and Concentrations
R1: Buffer pH 9.0 500 mmol/L
LDH \( \geq 25 \text{kU/L} \)
R2: NAD 20 mmol/L

Storage Instructions and Reagent Stability
The reagents are stable up to the end of the indicated month of expiry, if stored at 2 – 8 °C, protected from light and contamination is avoided. Do not freeze the reagents!

Warnings and Precautions
2. Reagent 1 contains sodium azide (0.95 g/L) as preservative. Do not swallow! Avoid contact with skin and mucous membranes.
3. Reagent 1 contains biological material. Handle the product as potentially infectious according to universal precautions and good laboratory practice.
4. In very rare cases, samples of patients with gammopathy might give falsified results [6].
5. Please refer to the safety data sheets and take the necessary precautions for the use of laboratory reagents. For diagnostic purposes, the results should always be assessed with the patient’s medical history, clinical examinations and other findings.
6. For professional use only!

Waste Management
Please refer to local legal requirements.

Reagent Preparation

Substrate Start
The reagents are ready to use.

Sample Start
Mix 4 parts of R1 + 1 part of R2 (e.g. 20 mL R1 + 5 mL R2) = monoreagent
The stability of the mono-reagent is 14 days at 2 – 8 °C. Do not use icteric or hemolytic samples with sample start.

Materials required but not provided
NaCl solution 9 g/L
General laboratory equipment

Specimen
Plasma and CSF (no serum)
Use glycolytic inhibitors e.g. fluoride/oxalate or fluoride/heparin as anticoagulants.
Stability in plasma [3]: 8 hours at 20 – 25 °C
14 days at 2 – 8 °C.
Discard contaminated specimens!

Assay Procedure

Application sheets for automated systems are available on request.

Wavelength 340 nm
Optical path 1 cm
Temperature 37 °C
Measurement Against reagent blank

Substrate Start

Reagent blank
Sample/Calibrator
Sample/Calibrator

Mix and incubate 5 min. at 37 °C. Read absorbance A then add:
Reagent 2 250 µL 250 µL
Mix and incubate 5 min. at 37 °C. Read absorbance A2 within 30 min.

\[ \Delta A = (A2 - A1) \text{ sample/calibrator} \]

Sample Start

(Do not use icteric or hemolytic samples)

Reagent blank
Sample/Calibrator
Sample/Calibrator

Mix and incubate 5 min. at 37 °C. Read absorbance A within 30 min.

\[ \Delta A = (A2 - A1) \text{ sample/calibrator} \]
Calculation

With calibrator

\[
\text{Lactate} \text{[mg/dL]} = \frac{\Delta A \text{ Sample}}{\Delta A \text{ Cal}} \times \text{Conc. Cal} \text{[mg/dL]}
\]

With factor

From absorbance readings calculate \(\Delta A\) and multiply by the corresponding factor from table below:

\[
\Delta A \times \text{factor} = \text{Lactate concentration [mg/dL]}
\]

Substrate start | Sample start
--- | ---
340 nm | 120.6 | 144.4

Conversion factor

\[
\text{Lactate [mg/dL]} \times 0.1109 = \text{Lactate [mmol/L]}
\]

Method Comparison

A comparison of DiaSys Lactate FS (y) with a commercially available assay (x) using 117 samples gave following results:

\[
y = 0.984 \times x - 0.742 \text{mg/dL}; \ r = 0.999
\]

Reference Range [5]

Plasma:

Venous: 4.5 – 19.8 mg/dL (0.5 – 2.2 mmol/L)
Arterial: 4.5 – 14.4 mg/dL (0.5 – 1.6 mmol/L)

CSF:

Adults: 10 – 22 mg/dL (1.1 – 2.4 mmol/L)
Newborn: 10 – 60 mg/dL (1.1 – 6.7 mmol/L)
3 – 10 days: 10 – 40 mg/dL (1.1 – 4.4 mmol/L)
> 10 days: 10 – 25 mg/dL (1.1 – 2.8 mmol/L)

Each laboratory should check if the reference ranges are transferable to its own patient population and determine own reference ranges if necessary.

Literature


Manufacturer

DiaSys Diagnostic Systems GmbH
Alte Strasse 9 65558 Holzheim Germany