Measuring lactate on the ABL90 FLEX analyzer

The ABL90 FLEX is a point-of-care cartridge-based blood gas analyzer with integrated CO-oximetry, blood gas, electrolyte and metabolite measurements.

The analytical performance of lactate was evaluated on the ABL90 FLEX analyzer using the ABL735* benchtop analyzer as reference instrument.

Previously, the ABL725 analyzer has been evaluated by Suen et al. [1]. Suen evaluated lactate (whole-blood) measurements on the ABL725 analyzer against the Vitros 250 chemical analyzer using samples from adults over the test range of 0.5-12 mmol/L (4.5-108.1 mg/dL). In conclusion, the ABL725 analyzer showed acceptable correlation with the Vitros 250 on the lactate measurements.

**Conclusion**

The analytical performance of the ABL90 FLEX analyzer for lactate over the range of 0.3-25 mmol/L (2.7-225 mg/dL) shows the same accuracy as the ABL735 analyzer (see Figs. 1 and 2).

**Methods and results**

To analyze lactate the blood is measured on an amperometric electrode using the enzyme lactate oxidase, which converts lactate to pyruvate and hydrogen peroxide. The released hydrogen peroxide is oxidized at the platinum anode, resulting in a release of electrons that are proportional to the concentration of sample lactate.

A comparison study of the ABL90 FLEX and the ABL735 analyzers was performed on adult human whole-blood samples at six levels (0.3 mmol/L (2.7 mg/dL), 1 mmol/L (9.0 mg/dL), 5 mmol/L (45 mg/dL), 10 mmol/L (90 mg/dL), 15 mmol/L (135 mg/dL), 25 mmol/L (225 mg/dL)) of lactate. Within a period of 22 days each level was tested five times per day on three different days on nine ABL90 FLEX and five ABL735 analyzers (N=1622). Each dot on the graph (Fig. 1) represents the average for each level per day, i.e. 60 measurements.

\[ y = 1.0790x + 0.1 \]

\[ R^2 = 0.9901 \]

* The ABL735 analyzer is also used as reference method for the ABL800 FLEX analyzer
For the clinically most interesting range a Bland-Altman plot [3] was made to evaluate the agreement of the lactate measurements between the ABL90 FLEX analyzer and the ABL735 analyzer (Fig. 2). The mean difference (solid horizontal line) was obtained, and the limits of agreement (dotted lines) were calculated as the mean difference +/- 2SD. The mean difference between the analyzers was 0.11 mmol/L (0.90 mg/dL) and the limits of agreement were 0.56 mmol/L (5.0 mg/dL) and -0.35 mmol/L (-3.2 mg/dL), respectively.

**FIG. 2: Bland-Altman plot comparison – ABL90 FLEX vs. ABL735 analyzer**

In addition to the ABL90 FLEX analyzer’s high analytical performance

- it is easy to operate
- it has a short measuring time (35 sec)
- it requires minimum maintenance

This makes the ABL90 FLEX analyzer the practical solution in acute care point-of-care settings.

**Reference:**

Further communication pending on other parameters/interference.