Patient
Date of birth
Sample taken
Receipt of sample
Test completed
Final result
Validated by
Medical Director

MMD

RESULTS

Sample type: Blood in CPDA vials

Requisition:
Lactate-pyruvate index PLUS

Cell type:
Peripheral blood mononuclear cells (PBMC)

Lactate/Pyruvate index PLUS

Test	Result	Interpretation
Lactate/Pyruvate in dormant cells	1.20	The cells are primarily using carbohydrates and converting around 20-30% of them to lactate. Fatty acids can be used to around 20%-30%
Lactate/Pyruvate in activated cells	0.89	The cells are primarily using mitochondria for energy (ATP) production. Carbohydrates are metabolized by approximately 70%. However, especially fatty acids may be used additionally by up to 50%.

The normal range for immune cells usually ranges from 1.0 – 0.7. Examples are calculated below

Index	Basal metabolic index
>2.0	The cell is primarily using carbohydrates and preferentially converting them to lactate.
>1.2 – 2.0	The cell is primarily using carbohydrates and partially converting them to lactate.
1 – 1.2	The cell is primarily using carbohydrates and transporting them into the mitochondria.
0.8 – 1.0	The cell is using carbohydrates, fatty acids and amino acids. The carbohydrates are primarily being transported into the mitochondria.
<0.8	The cell is primarily using fatty acids as fuel.

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Lactate/pyruvate index

Glucose in cells is converted to pyruvate, and can then be converted to lactate in the cytoplasm or transported into the mitochondria via the pyruvate dehydrogenase complex (PDC). The higher the value of lactate compared to pyruvate, the more glycolysis is occurring. A higher level of pyruvate compared to lactate is a prerequisite for successful transfer of substrates in the mitochondria for oxidative phosphorylation.

An increase in lactate may signify impaired mitochondrial function, or the result of excess glucose increasing glycolytic flux to an extent that preferentially shunts pyruvate to lactate instead of entering the mitochondria. Conversion of pyruvate to lactate blocks further ATP production. So the pyruvate/lactate ratio gives an important indication of how efficiently the mitochondria are working (see Figure below):

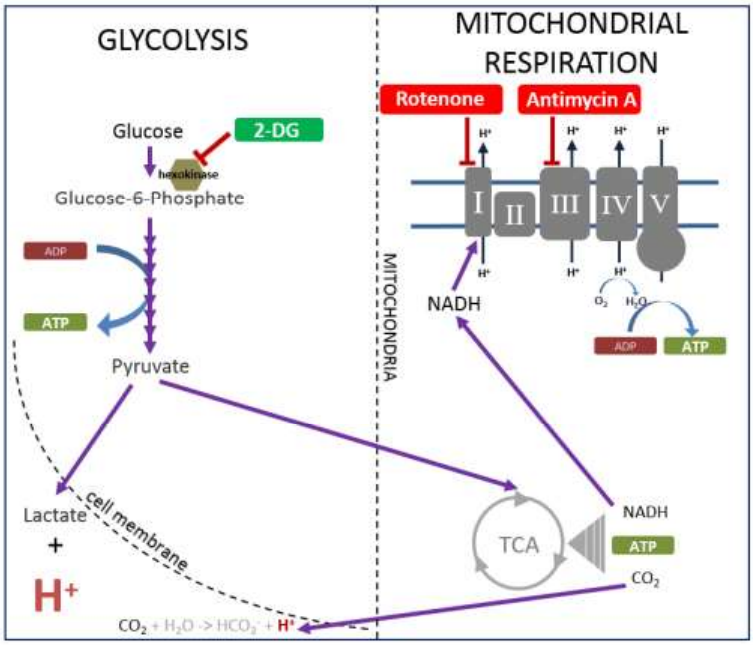


Figure 2, https://www.agilent.com/cs/library/usermanuals/public/103344-400.pdf

The pyruvate/lactate index can also provide information on the extent to which the mitochondria are able to utilise fatty acids for energy production. To do this, we calculate the basal metabolic rate from the ratio of carbon dioxide produced by the cells to oxygen consumed by the cells.