

Free Fatty Acids

Also Known as:

Non-esterified fatty acids (NEFA)

Relevant disorders

Disorders of fatty acid metabolism
Hyperinsulinism
Ketogenic diet monitoring

Related Metabolic Tests

Acylcarnitines
3 hydroxy butyrate
Glucose
Lactate

Indication for Test

Intermediary metabolites (IMs), include lactate, pyruvate, acetoacetate as well as 3-hydroxybutyrate and free fatty acids (or non-esterified, NEFA). All are normally present in blood and have a vital role in energy metabolism. These compounds are linked through a number of different pathways, which interact depending on nutritional status.

During normal nutritional status (i.e. a normal glucose concentration) ketones (3OHB) and free fatty acids (FFA) would not be mobilised as energy will be provided by the breakdown of glucose. During episodes of hypoglycaemia or prolonged fasting, the normal physiological response should be to mobilise these metabolites. Therefore increased levels would be seen, with 3OHB levels greater than FFA. Abnormal patterns in these metabolites can indicate errors in fatty acid oxidation or disease states such as hyperinsulinism.

Methodology

FFA in serum, when treated with acyl CoA synthetase in the presence of ATP, magnesium cations and CoA, form the thiol esters of CoA known as acyl CoA as well as the by products AMP and pyrophosphate. In the second part of the procedure, the acyl CoA is oxidised by acyl CoA oxidase to produce hydrogen peroxide, which in the presence of peroxidase, allows the oxidative condensation of 3-methyl N-ethyl-N(B-hydroxyethyl)-aniline with 4-

aminoantipyrine to form a purple-coloured complex with an absorbance maximum at 550nm.

Interference from ascorbic acid in the sample is prevented by the addition of ascorbic oxidase to the reaction mixture.

Sample requirements

2ml **Fluoride Heparin blood**. Venous or capillary.
Lithium heparin, serum and EDTA samples are unsuitable.

Transport information/Contact Information

Send by first class post.

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Turn Around Time

1 – 5 days

Reference Ranges

Interpretation will be provided with the report.

References

- Pitfalls in the measurement of some intermediary metabolites. FM carragher, JR Bonham and JM Smith Ann Clin Biochem 2003; **40**:313-320
- McMurray CH et al. Clin Chem 3013 (1984) 421-5
- The investigation of hypoglycaemia during childhood. J R Bonham Ann Clin Biochem 1993;30:238-247