Antioxidant activity
(serum total and nutritional antioxidant activity)
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Introduction

The radical-scavenging antioxidants of human serum represent a heterogeneous group of substances, some synthesised in the body and some derived exclusively from the diet. The concept of serum total antioxidant activity (TAA) was evolved in the 1990's [1] after it was found that serum antioxidant activity is normally tightly controlled and that there can be serious consequences of prolonged low serum TAA in oxidative stress states [2,3,4]. There is now a considerable amount of published work on the relationship between serum TAA and long-term effects on human health [5,6].

Total and nutritional antioxidant activity

Approximately half of the serum TAA can be accounted for by the activities of albumin and uric acid [7,8], synthesized in the liver. Other endogenous compounds (such as bilirubin) may be important under certain circumstances. The remainder of the serum antioxidant activity is contributed by diet-derived compounds (vitamins, polyphenols, phenylpropanoids etc.) and is measured as the nutritional antioxidant activity (NAA).

Indications: Oxidative stress states, nutritional deficiencies.

Patient preparation: abstain from taking antioxidant supplements (any supplements containing vitamins A, C or E) for 12 hours prior to sampling.

Specimen requirements: 5 ml of clotted blood (red / red speckled top tube). The serum should be separated for samples from outside the United Kingdom.

Interpretation and reference interval

The reference interval for serum total antioxidant activity by this method is 1.32 – 1.58 mmol/L (Trolox equivalents).

The reference interval for serum nutritional antioxidants is 450 – 800 μmol/L (Trolox equivalents).

Oxidative stress, i.e. the presence of a relative excess of pro-oxidants in the extra-cellular fluid, causes a fall in these figures. However, deficiencies of vitamin C (reference interval 34 – 114 μmol/L) or vitamin E (reference interval 25 – 60 μmol/L) can be predicted to have a marginal effect on serum TAA and hence levels of these vitamins should be assessed individually.

Methodology

By decolourisation of the ABTS radical cation, using Trolox as a standard [1].

Turn around time: 5 working days.

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References

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