



## **Health Risk Profile** **February 2009**

The Biolab Health Risk Profile screen has been modified and updated. Serum selenium is now included in the profile and we are reporting the two isoforms of glutathione peroxidase corresponding to the red cell and plasma activity (GSHPx-1 and GSHPx-3). We are also adding serum paraoxonase to the profile, to give another antioxidant enzyme (along with glutathione peroxidase and superoxide dismutase). In addition we are no longer including white cell zinc in the profile – it is replaced by serum zinc.

### **Indications**

The Health Risk Profile is a heterogeneous group of laboratory tests, each of which has its own nutritional significance. Within the profile there are 5 panels of tests

- Vitamins
- Elements
- Fatty acids
- Enzymes
- Bile acids and Proteins

The vitamins measured are vitamins C (ascorbic acid), A (retinol), and E (tocopherol), with beta-carotene and lycopene. We regularly report deficiency levels of vitamin C and vitamin E, reflecting their often poor dietary intake. In contrast, we seldom find vitamin A deficiency, but report many high or toxic serum levels of this fat-soluble vitamin, which can reflect either excessive supplementation with vitamin A or displacement of the vitamin from hepatocytes as a consequence of chronic ethanol consumption. Levels of lycopene and carotene reflect intake the subject's intake of these carotenoids from fresh fruit and vegetable consumption.

The elements measured in the Health Risk Profile are now serum zinc, copper, chromium and selenium, along with red cell magnesium as a measure of intracellular magnesium, which we find is the commonest elemental deficiency in our patient population.

A range of omega-6 and omega-3 essential fatty acids is measured. Either class of essential fatty acid may be deficient, although low intake of omega-3 fatty acids is specifically recognised as one of the major shortfall in the typical UK diet.

The antioxidant enzymes are the first, preventative line of cellular defence against oxidative damage. The normal response to oxidative stress is induction of these enzymes and the increase in their activity makes the release of damaging free radical species less likely. Low levels of these enzymes represent a risk factor for the development of diseases associated with oxidative stress. The health Risk profile includes the antioxidant enzymes glutathione peroxidase, superoxide dismutase and paraoxonase.

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We also measure the phosphatase enzymes, acid phosphatase (as a marker of osteoclastic activity and of prostatic health in the male) and alkaline phosphatase (as a marker of osteoblastic activity and also of possible hepatobiliary obstruction). Lactate dehydrogenase, gamma-glutamyl transferase and glutathione-S-transferase are part of the profile since their activity may reflect hepatocellular damage and enzyme induction. Lactate dehydrogenase (LDH) can originate from the cytoplasm of almost any cell in the body and hence increased LDH activity in the serum can also suggest leakage from non-hepatic tissues if other liver function tests are normal.

Bile acids have no known function in the circulation and elevation of serum levels of bile acids is recognised as a sensitive marker of hepato-biliary dysfunction, which can cause obstruction of their flow into the gastro-intestinal tract. Plasma albumin levels are partially dependent on protein intake and absorption; they also depend on other causes of impaired albumin synthesis, such as liver damage and the rate of albumin catabolism (which increases in inflammation). Serum globulins levels largely reflect variations in the gamma globulin fraction (IgG, IgA, IgM, IgD and IgE) which increase in hepatic disease and other inflammatory disorders.

Measurement of haemoglobin A<sub>1c</sub> reflects the glucose concentration in the plasma over the preceding c.3 months. Glucose binds to the beta chain of haemoglobin at a rate that reflects the plasma glucose level at any one time. The formed glycosylated haemoglobin circulates for the lifespan of the red blood cell, thus giving an indication of diabetes risk.

### **Patient preparation**

The patient should be fasting and should have refrained from taking nutritional supplements for 48 hours prior to venipuncture.

### **Specimen requirements**

The following venoject tubes are needed for the Health Risk Profile:

- 2 x EDTA tubes (lavender top)
- 1 x lithium heparin tube (green top)
- 1 x trace element free (dark blue top)
- 1 x serum separator tube (red or gold top)

The correct tubes are available from Biolab on request. If posted, blood samples must reach us within 24 hours.

### **Turn around time**

2 weeks (10 working days).

### **Interpretation**

The Biolab Health Risk Profile report contains an interpretive comment. This will be more useful if clinical data, drug and supplement history and a possible diagnosis are included on the request form. Reference intervals for all the analytes measured are shown on the report.