Beta-glucuronidase

What is Beta-glucuronidase?

Beta-glucuronidase is an inducible enzyme elaborated by anaerobic E. coli, Peptostreptococcus, Bacteroides, and Clostridia. Increased activity of this enzyme has been implicated in increased the enterohepatic recirculation of toxins, hormones, drugs, and carcinogens.

Turn-around Time 14 days

How strongly is beta-glucuronidase linked to colon cancer?

Research correlates elevated levels of beta-glucuronidase with increased colon cancer risk. In fact, excessive beta-glucuronidase activity may be a primary factor in the etiology of colon cancer.

Does excessive beta-glucuronidase increase the risk of other cancers?

Human studies that directly link fecal beta-glucuronidase and breast cancer are lacking. Animal studies, however, have shown reductions in breast cancer risk via administration of calcium D-glucarate, a compound known to inhibit the enzyme. Animal or invitro studies suggest a similar relationship for liver, lung, and skin cancers.

Are there any problems associated with LOW beta-glucuronidase levels?

A certain amount of beta-glucuronidase activity appears to be important for normal enterohepatic recirculation of endogenous compounds such as vitamin D, thyroid hormone, and estrogen. Broad-spectrum antibiotics suppress intestinal microflora, which reduces beta-glucuronidase activity and intestinal reabsorption of estrogen. This may cause reduced efficacy of oral contraceptives in a subset of women administered antibiotics.

The bioavailability of genestein and daidzein (cancer-preventive agents) depends upon initial hydrolysis by intestinal beta-glucuronidase and sulfatase enzymes. Low levels of beta-glucuronidase may reduce the efficacy of these compounds.

What is the clinical significance of elevated beta-glucuronidase?

By uncoupling glucuronides, beta-glucuronidase can deconjugate potential toxins, increasing the formation of carcinogens in the bowel and promoting the enterohepatic recirculation of toxins, hormones, and various drugs in the body.
How can excessive beta-glucuronidase be reduced?

The following interventions may help to reduce beta-glucuronidase levels:
- Probiotics (including Lactobacillus acidophilus,\(^{15}\) Lactobacillus GG,\(^{16}\) and bifidobacteria)\(^{17}\)
- High-fiber diet (including both soluble and insoluble fiber)\(^{16,17,18}\)
- Fructooligosaccharides (FOS). FOS may act as a substrate for bifidobacteria. Combining FOS with cellulose may be even more effective.\(^{18}\)
- Low- or non-meat diet.\(^{18}\) Lacto-vegetarian diets are associated with reduced levels of beta-glucuronidase.\(^{19}\)
- Lowering colonic pH. Raising fecal pH from 5 to 8 in vitro induces 11.5-fold rises in beta-glucuronidase levels.\(^{20}\)
- Calcium-D-glucarate inhibits the enzyme.\(^{21,22}\) Foods with the highest concentration of calcium-D-glucarate include oranges, apples, grapefruit, and cruciferous vegetables.\(^{23}\)
- Ascorbic acid\(^{24}\)
- Silymarin (milk thistle)\(^{25}\)

Cumin or black pepper (avoid cayenne, which can increase levels of the enzyme)\(^{26}\)

What further testing might be indicated?

Women's Hormonal Health Assessment, Female Hormone Profile, or Menopause Profile—to assess the possible impact of beta-glucuronidase on estrogen levels

Detoxification Profile—to assess functioning of the glucuronidation pathway

How do I order this test?

For CDSA 2.0 test kits, Interpretive Guidelines or information, please call a GSDL Accounts Receivable representative at 888-201-8330 or use our secure web contact center at www.gsd.com/billing.

References