

CLINICAL SPECIFICATIONS

BPA BINDING PROTEIN

Chemical Found In:

BPA Binding Protein is a multifunctional enzyme mainly found in the endoplasmic reticulum of eukaryotes. It is a target for bisphenol A (BPA) binding, and hence is called BPA-Binding Protein.

Associated With:

Moderate alcoholic liver disease³
 Severe alcoholic liver disease³
 Hepatoma³
 Liver cirrhosis³
 Systemic lupus erythmatosus³

Known Cross-Reactions:

Clinical Significance:

The detection of antibodies to BPA-Binding Protein in serum indicates autoimmune reactivity to the BPA bound enzyme, a neo-antigen. These new antigens are comprised of the haptenic chemical plus the tissue antigen. The formation of neo-antigens initiates an immune response which may result in antibody production against the chemical and the human tissue. Continued exposure to the chemical and the subsequent production of antibodies against various tissue antigens, may result in autoimmune reactivity. The binding of BPA to enzyme results in the disruption of enzyme actions, which may adversely affect many cellular processes.¹ BPA has been shown to exhibit negative (estrogens, indomethacin) or positive (progestogen, androgen) effects on enzyme reductase activity, suggesting that BPA-binding to enzyme could affect endocrine target cells through nuclear receptors.^{2,5} Furthermore, BPA's inhibitory action on the enzyme, may cause an interference in the protein synthesis required for synapse formation, which results in the inhibition of synaptogenesis,⁴ which may explain why enzyme involvement is implicated in brain impairment disorders such as ischemia, Parkinson's disease, Alzheimer disease, and Creutzfeldt-Jakob disease.^{4,6}

References:

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3. Nagayama, et al. Occurrence of autoantibody to protein disulfide isomerase in patients with hepatic disorder. *J Toxicol Sci*, 1994; 19(3):163-169.
4. Okada, et al. Inhibitory effects of environmental chemicals on protein disulfide isomerase in vitro. *Osaka City Med J*, 2005; 51:51-63.
5. Primm and Gilbert. Hormone binding by protein disulfide isomerase, a high capacity hormone reservoir of the endoplasmic reticulum. *J Biologic Chem*, 2001; 276(1):281-286.
6. Thomas, et al. Defective protein folding as a basis of human disease. *Trends Biochem Sci*, 1995; 20:456-459