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Poster Presentation

Protein Changes Resulted in Sub-Chronic Neurotoxicity of Bisphenol A in Rat Brain

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Abstract

Bisphenol A (BPA) is one of the most widely used chemicals in the plastic industry, which enter the human body through occupational and food contact. In this study, the protein changes in rat cerebral cortex was evaluate in order to evaluate the neurotoxicity of BPA. 24 adult male rats were randomly selected and divided into four groups (n=6) and each group respectively received 0, 0.5, 5 and 50 mg/kg of BPA for 4 weeks orally. To determine the oxidative status, reduced Glutathione (GSH) and Malondialdehyde (MDA) were measured in brain cortical tissue. After extracting the protein of each sample, the proteins transferred to the acrylamide gel of two-dimensional electrophoresis and from the obtained protein map, 10 points – with at least 10% or more volume difference with control group - were sent for mass spectroscopy analysis. The lipid peroxidation in both doses of 0.5 and 5 mg/kg was significantly ($P < 0.05$) greater than the control group. Based on the results of mass spectroscopic analysis and data from the Mascot database, 10 changed proteins were identified as below: Pyruvate kinase PKM (Pkm), Alpha-enolase (Eno1), Aconitate hydratase (Aco2), and Creatine kinase B-type (Ckb) -involved in the metabolism of neurons-, Phosphatidylethanolamine-binding protein 1 (Pebp1), 14-3-3 protein eta (Ywhah) and Guanine nucleotide-binding protein subunit beta-1 (Gnb1) –which play different roles in cell signaling. Dihydropyrimidinase-related protein 2 (DPYSL2) and Glutamine synthetase (Glul) -which are important in the proper functioning of the neurons- and a structural protein; the Neurofilament light polypeptide (Nefl). Different reports indicate that changes in the level of these proteins are related to various neuropsychiatric disorders such as Alzheimer's disease, Parkinson's disease, depression, schizophrenia, and brain tumors. Further studies are needed to examine the role of BPA in these diseases.

Keywords: Bisphenol A, Neorotoxicity, Proteomics

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