
INTERACTIONS OF THIMEROSAL WITH PROTEINS – ETHYLMERCURY ADDUCT FORMATION OF HUMAN SERUM ALBUMIN AND B-LACTOGLOBULIN A

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Thimerosal is a mercury-containing compound used as preservative in vaccines and other drugs in concentrations up to 100 mg/L. In multi-dose ampullae, its antibacterial and antifungal properties prevent microbial contamination during repeated removal of single doses. It was introduced in 1931 and has been banned in the European Union in 2001 due to suspected neurotoxic effects especially in children. A connection between THI-containing vaccines and an increased occurrence of autism could neither be proven nor excluded until today. Surprisingly, many of the recently introduced vaccines against the “swine flu” (pandemic H1N1 virus) do contain thimerosal and are applied within the European Union.

Therefore, the interaction of thimerosal with free thiols in proteins has been investigated using liquid chromatography (LC) with inductively coupled plasma-mass spectrometry (ICP-MS) and electrospray mass spectrometry (ESI-MS) detection. As model proteins, β -lactoglobulin A from bovine milk and human serum albumin have been used. Physiological conditions upon an intravenous injection of thimerosal-containing drugs were mimicked. The formation of ethylmercury-protein adducts was proved and the identification of the binding site of ethylmercury, a free thiol residue in the peptide T13 was achieved after tryptic digestion of β -lactoglobulin A.