

# CURRENT TRENDS IN MASS SPECTROMETRY AND CHROMATOGRAPHY

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## Mass Spectrometric Determination of Peptides in Butyrylcholinesterase (BuChE) Digests

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**S**tatement of the Problem: Organophosphate (OP) compounds are one of the major classes of pesticides widely used in agricultural settings. OP exposure can occur through contact with contaminated soil and air or by consumption of OP contaminated food and water. Exposure may also occur occupationally while working in agricultural settings. Butyrylcholinesterase (BuChE) has a high binding affinity for OP compounds and can act as a bioscavenger thereby reducing the amount of freely circulating OPs and reducing their harmful effects. The ability of BuChE to adduct to OP compounds allows for BuChE to serve as a biomarker for OP poisoning. The purpose of this study is to identify BuChE peptides, other than the active site peptide, that can be used to determine total BuChE protein content in a specimen. Methodology & Theoretical Orientation: BuChE was extracted from unexposed plasma and plasma exposed to parathion or dichlorvos using immunoprecipitation on a solid agarose bead support. Extracted BuChE was digested on beads with pepsin and the resulting peptides were analyzed using HPLC-MS/MS. Formic acid (0.1%) in water and methanol were used as mobile phases at a flow rate of 0.4 mL/min. Peptides were analyzed in positive ion mode. Findings: MS2 scan results shown in Figure 1 depict the peptide mass spectra obtained as a result of pepsin cleavage of BuChE. Peptide mass to charge ratios did not match any of the theoretical peptide masses that were predicted with peptide cutter software. Conclusion & Significance: Quantification of the total amount of BuChE in a plasma specimen can be used to determine the extent of OP exposure in a person. The measurement of an additional peptide for BuChE can increase our understanding of exposure levels and enhance development of diagnostics method for OP poisoning.

### Biography

Jihee Stephanie Yeh is a Ph.D. student in the Department of Pharmaceutical Sciences at Mercer University. She is the Chair of 2017-2018 Mercer University Student Chapter of AAPS (MUSCA). She has Master's degree in Neurobiology and Behavior from Georgia State University. Her current work focuses on analytical chemistry and toxicology and she is currently developing diagnostic tests for identifying organophosphate poisoning. Furthermore, her field of interest includes the development of diagnostics for chemical warfare agents, specifically sulfur mustard.

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