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Detection and identification of novel biomarkers of exposure to pesticides

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Undesired exposure to xenobiotic compounds such as commercial or domestic pesticides is a major health concern. Some of the most widely employed pesticides are organophosphorus (OP) compounds that, similar to nerve agents, adduct and inhibit acetylcholinesterase (AChE) within nerve synapses. OPs also adduct other secondary protein targets for which health consequences are equivocal and incompletely defined. Protein post-translational modification (PTM) by adduction may influence protein properties such as enzymatic activity or immunogenicity. Hence there is a need to identify all secondary targets of pesticides that may be modified by PTM after either acute or cumulative pesticide exposures and the consequences of protein adduction fully determined. Additionally, secondary targets may provide useful biomarkers of pesticide exposure that display superior sensitivity to sole measurements of AChE inhibition. Herein we detail our characterisation and identification of secondary targets of commonly encountered OPs, and discuss their potential to act as both biomarkers of pesticide exposures and decoy surrogate binding targets.

Biography

Wayne Grant Carter received his Honours degree in Biochemistry with Nutrition from the University of Southampton. He then completed a Ph.D. at the University of Southampton studying the molecular signalling cascade elicited by insulin (Carter et al., 1995; Asamoah et al., 1995; Carter et al., 1996) supervised by Dr. Graham Sale. Dr. Carter then moved to the Babraham Institute, Cambridge, to work with Professor Jeremy Saklatvala, on studies to elucidate the signalling mechanisms activated as a response to pro-inflammatory cytokines (Finch et al., 2001). Dr. Carter then relocated with Professor Saklatvala's group to the Kennedy Institute of Rheumatology, part of Imperial College, London. Subsequently, Dr. Carter moved to the University of California at Irvine to work with Professor Dana Aswad, similarly studying protein post-translational modification, and protein damage and repair (Young et al., 2001). Dr. Carter then joined the Department of Human Anatomy & Genetics headed by Professor Kay Davies CBE FRS at the University of Oxford, before moving to take up an industrial post with Mobious Genomics, Exeter. He is currently an Editorial Board member of the BIOINFO Journal of Proteomics; Current Chemical Research; Journal of Analytical Sciences, Methods and Instrumentation; World Journal of Biological Chemistry; and Executive Editor for Europe for Journal of Chromatography and Separation Techniques.

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