

## MEETING ABSTRACTS

# ACETYLCHOLINESTERASE REGULATES INFLAMMATORY RESPONSES IN CULTURED MACROPHAGES: A PLAYER IN CHOLINERGIC ANTI-INFLAMMATORY PATHWAY

Etta Y. L. Liu<sup>1,2</sup>, Miranda L. Xu<sup>1,2</sup>, Xiang P. Kong<sup>1</sup>, Qiyun Wu<sup>1,2</sup>, Tina T. X. Dong<sup>1,2</sup>, Karl W. K. Tsim<sup>1,2</sup>  
Presenting author: Etta Y. L. Liu

<sup>1</sup> Shenzhen Key Laboratory of Edible and Medicinal Bioresources, SRI, The Hong Kong University of Science and Technology, Shenzhen, China;

<sup>2</sup> Division of Life Science, Center for Chinese Medicine, The Hong Kong University of Science and Technology, Hong Kong, China

Acetylcholine (ACh), the primary neurotransmitter released by vagus nerve, suppresses the levels of pro-inflammatory cytokines and tissue damage via the  $\alpha 7$ -nicotinic ACh receptor ( $\alpha 7$ -nAChR); this connection is being known as “cholinergic anti-inflammatory pathway (CAP)”, a communication between immune and nervous systems. Acetylcholinesterase (AChE) is responsible for rapid elimination of ACh in vertebrate. In the treatment of Alzheimer's disease (AD), AChE inhibitors are commonly employed. The modulatory role of AChE inhibitors in inflammation have been reported. Here, the expression profile of AChE was determined in cultured macrophages. The tetrameric form of PRiMA-linked AChE was found to be the predominant form, and its glycosylation pattern was similar to that of brain AChE. The challenge of LPS induced the rate of transcription of AChE, and this induction was shown to be triggered by NF $\kappa$ B, a key transcription factor in regulating immune responses. In LPS-treated macrophages, the release of cytokines was inhibited by co-applied galantamine, or other AChE inhibitors, in a dose-dependent manner: this LPS-induced inflammation was also altered by over expression of PRiMA-linked AChE. In cultured macrophages, the LPS-induced cell migration, confirmed by Transwell<sup>®</sup> motility assay, was suppressed by applied ACh, and this suppression was further enhanced by the co-applied galantamine, or other AChE inhibitors. In parallel, the levels of MMP2 and CDC42, two pro-migratory genes, were suppressed in the presence of galantamine. Thus, the role of AChE in CAP needs to be elucidated.

## Acknowledgements

This work was supported by Shenzhen Science and Technology Committee Research Grant (JCYJ20160229205726699, JCYJ20160229205812004, JCYJ20160229210027564, CKFW2016 082916015476, JCYJ20170413173747440, ZDSYS201707281432317 and 20170326). Etta Y. L. Liu hold a Lee's Pharmaceutical-Kanya Lee Postgraduate Scholarship.