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FUNCTIONAL AND EXPRESSION PROFILES EXPLORING MOLECULAR CHANGES TO THE RENAL COTRANSPORTERS PEPT1 AND PEPT2 DUE TO AGEING

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Renal PEPT1 and PEPT2 cotransporters play an important role in the balance of circulating body oligopeptides and certain peptide like drugs. The reduction in renal functions associated with ageing can affect reabsorption/excretion balance. Several studies report the importance of adjusting protein intake and optimizing drug dosages for individuals with compromised renal function to avoid adverse reactions. We aim to comprehensively investigate age related changes of PEPT co-transporters at gene, protein and functional level in two important regions of the kidney superficial cortex and outer medulla. A standard method is used to isolate brush border membrane vesicles (BBMV) and outer medulla membrane vesicles (OMMV) from the kidneys of young, middle-aged and old Wistar rats. Different biomolecular techniques are used to determine age-related changes of PEPT cotransporters from different angles: conventional and real-time RT-qPCR are utilized for characterizing the gene expressions; chemiluminescent Western blotting and Immunohistofluorescence are used for relatively quantifying and localizing the protein expressions; fluorescence-based methods were developed to measure the transport activity across BBMV and OMMV. The protein expression of PEPT1 was not only increased in BBMV from old rats, but PEPT1 also appeared in OMMV from middle-aged and old rats. SLC15A1 gene expression in the renal cortex increased in middle-aged group. PEPT2 protein expression was not only increased with ageing, but PEPT2 also was found in BBMV from middle-aged and old groups. SLC15A2 gene expression in the renal outer medulla increased in the old group. These changes in the localization and expression profile of PEPT1 and PEPT2 could explain the changes of the transport activity in BBMV and OMMV. These findings provide novel insights which would be useful for maintaining protein nutrition and optimizing the delivery of some peptidomimetic drugs in elderly individuals.

Biography

Othman A Alghamdi has completed his Master of Scientific Studies in Biomedical Science in 2012 and PhD in Molecular Biology and Biotechnology in 2016 from the School of Science and Technology, University of New England, Australia. He is currently an Assistant Professor and the Head of Department of Biological Sciences at the Faculty of Science, University of Jeddah. He has published five papers in well reputed journals and attended several global conferences to present his scientific contribution.

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