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FUNCTIONAL AND EXPRESSION PROFILES EXPLORING MOLECULAR CHANGES TO THE PEPT1 AND PEPT2 CO-TRANSPORTERS IN NORMOTROPHIC AND HYPERTROPHIC HEARTS

Othman A Alghamdi^{1,2}, Nicola King², Graham L Jones⁴, Paul K Witting⁴, Pierre D J Moens²

¹University of Jeddah, KSA

²University of New England Armidale, Australia

³University of Plymouth, UK

⁴The University of Sydney, Australia

Objective: Some dipeptides have been implicated in myocardial protection, but little is known about their membrane transporter PEPT2. The aim of this study was to determine whether the expression and activity of cardiac-type PEPT2 cotransporter could be affected with ageing and/or hypertension.

Methods: Sarcolemmal vesicles (SV) were isolated from the hearts of all rat groups using a standard procedure to investigate the transport activity and protein abundance by fluorescence spectroscopy and Western blot respectively. The SLC15A2 PEPT2 gene expression was relatively quantified by RT-qPCR.

Results: In the Wistar rat groups, the protein and gene expressions of PEPT2 were upregulated with ageing. These changes were accompanied by corresponding increases in the competitive inhibition and the transport rate (V_{max}) of β -Ala-Lys (AMCA) into SV isolated from middle aged hearts. Although, the transport rate of β -Ala-Lys (AMCA) into SV isolated from old hearts were significantly the lowest compared to middle-aged and young adult hearts, the inhibition percentage of β -Ala-Lys (AMCA) transport by Gly-Gln was the highest. In the Wistar-Kyoto rats (WKY) and spontaneously hypertensive rats (SHR) groups, Y-SHR hypertrophied hearts showed a remarkable increase in PEPT2 gene expression, but accompanied by a significant decrease in the protein expression and activity. With advanced age, however, M-SHR hypertrophied hearts revealed significantly lower gene expression, but higher protein expression and activity than Y-SHR hearts.

Conclusion: These findings suggest that increased expression of PEPT2 co-transporter in normotrophic older hearts and hypertrophied middle-aged hearts can be exploited to facilitate di- and tripeptide transport by PEPT2 into these hearts, which subsequently could result in improved myocardial protection in elderly.

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.

oalghamdi@uj.edu.sa