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MEETING ABSTRACTS

Wnt3a INDUCES THE TRANSCRIPTION OF ACETYL-CHOLINESTERASE: AN ENZYME PLAYING A ROLE IN OSTEOBLASTIC DIFFERENTIATION

Miranda L. Xu [1,2], Etta Y. L. Liu [1,2], Qiyun Wu [1,2], Duan Ran [1,2], Tina T. X. Dong [1,2], Karl W. K. Tsim [1,2]
Presenting author: Miranda L. Xu

[1] Shenzhen Key Laboratory of Edible and Medicinal Bioresources, SRI, The Hong Kong University of Science and Technology, Shenzhen, China;
[2] Division of Life Science, Center for Chinese Medicine, The Hong Kong University of Science and Technology, Hong Kong, China

Acetylcholinesterase (AChE) plays hydrolytic role to terminate cholinergic transmission in vertebrate. AChE is intensively reported to exist in different tissues, and may participate in differentiation process. Here, AChE was demonstrated to participate in osteoblastic differentiation. In rat-derived bone tissues and primary cultured osteoblasts, the expression of AChE was increased in parallel with bone development, as well as osteoblastic differentiation. Transcriptional expression and protein of AChE in differentiating osteoblast could be enhanced by application of Wnt3a. Runx2, a downstream transcription factor in Wnt/β-catenin signaling pathway, played crucial role in Wnt3a-induced AChE expression in osteoblasts. This was confirmed by identification of Runx2-binding site in the *ACHE* gene promoter, over-expression of Runx2 and deletion of the Runx2-binding site in the *ACHE* promoter. Bone defect was observed in *ACHE*-/- mice. The non-enzymatic role of AChE in osteoblast was determined by over-expression system and application of AChE inhibitors. By transcriptomics, AChE was found to influence gene expressions of Wnt/β-catenin signaling components, and may participate in osteoblastic function, e.g. affecting osteoclastogenesis and cell adhesion of osteoblast. A notion of non-cholinergic role of AChE in osteoblast, as well as an insight for elucidating other possible mechanisms in regulation of bone formation was provided.

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