NEW MECHANISMS OF METASTATIC BONE CANCER PAIN: CANCER TISSUE-DERIVED ENDOGENOUS FORMALDEHYDE ACTIVATION ON TRPV1 RECEPTOR

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Abstract In recent years, our serial investigations focused on the role of cancer cells-derived endogenous formaldehyde in bone cancer pain. We found that cancer cells produced formaldehyde through demethylation by serine hydroxymethyltransferase (SHMT1 and SHMT2) and lysine-specific histone demethylase 1 (LSD1). When the cancer cells metastasized into bone marrow, the elevated endogenous formaldehyde induced bone cancer pain through activation on the transient receptor potential vanilloid subfamily member 1 (TRPV1) in the peripheral nerve fibers. More interestingly, TRPV1 expressions in the peripheral fibers were up-regulated by the local insulin-like growth factor I (IGF-I) produced by the activated osteoblasts. In conclusion, tumor tissue-derived endogenous formaldehyde induced bone cancer pain via TRPV1 activation.

Key words: Bone cancer pain; Formaldehyde; Transient receptor potential vanilloid subfamily member 1 (TRPV1); Insulin-like growth factor I (IGF-I)