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Association of the Enzymatic Activity of Human Cathepsin K with the Metastasis of Breast and Prostate Cancers to Bones in Human – A Review

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Background: The effect of proteolytic enzymes including Cathepsin K (CatK), a cysteine cathepsin, in onset and progression of cancers including apoptosis, proliferation, cancer immunology, inflammatory cell recruitment to tumors and aiding in the mobilization of normal healthy cells from their tissue compartments assisting in cancers and their metastasis in human has been research intensive. CatK involves in various aspects and stages of cancer and metastasis.

Objective: To collect together and summarize biochemical and physiological pathways of how CatK is involved in metastasis of breast and prostate cancers and CatK regulated mechanisms underlying metastasis of such cancers to bones.

Methodology: Information for the review was gathered through published literature from global databases including Google Scholar and PUBMED through nearly 50 different studies done on investigating physiological and biochemical interactions between enzymatic activity of CatK with breast and prostate cancers and their metastasis to bones. Keywords used were prostate and breast cancers, CatK, enzymatic activity, physiology and biochemistry.

Results: Analysis of published studies revealed that immunohistochemical studies of breast cancer cells indicate that they over express CatK resulting in induction of wrong mechanisms of cell signaling in breast cancers, creating a higher tendency for their metastasis to bones. Immunohistochemical, immunoprecipitation and fluorogenic assays of prostate cancers indicated elevated levels of CatK. Lesions derived from prostate cancer cell masses were observed to undergo increased bone formation and resorption levels. Such resorption levels causes secretion of biological factors promoting tumor expansion. CatK was observed to be a key component promoting higher resorption levels.

Conclusions: It is concluded that CatK is over expressed in breast and prostate cancers and this over expression triggers cancer inducing biomolecules to cause metastasis of them to bones. Authors suggest that, to completely understand the association of CatK on cancerous cells and their mechanism in metastasis, distributory patterns of CatK in human tissues needs to be extensively studied.

Keywords: *Prostate cancer, Breast cancer, Cathepsin K, Human, Metastasis*

Acknowledgement: Funding from the Section of Genetics at the Institute for Research and Development in Health and Social Care, Sri Lanka, is acknowledged.