

Prostate cancer metastasis and soy isoflavones: a dogfight over a bone

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Abstract

Prostate cancer is a complex, progressive, bone-tropic disease, which is usually associated with skeletal issues, poor mobility and a fatal outcome when it reaches the metastatic phase. Soy isoflavones, steroid-like compounds from soy-based food/dietary supplements, have been found to decrease the risk of prostate cancer in frequent consumers. Herein, we present a systematization of the data on soy isoflavone effects at different stages of metastatic prostate cancer progression, with a particular interest in the context of bone-related molecular events. Specifically, soy isoflavones have been determined to downregulate the prostate cancer cell androgen receptors, reverse the epithelial to mesenchymal transition of these cells, decrease the expressions of prostate-specific antigen, matrix metalloproteinase and serine proteinase, and reduce the superficial membrane fluidity in prostate cancer cells. In addition, soy isoflavones suppress the angiogenesis that follows prostate cancer growth, obstruct prostate cancer cells adhesion to the vascular endothelium and their extravasation in the area of future bone lesions, improve the general bone morphofunctional status, have a beneficial effect on prostate cancer metastasis-caused osteolytic/osteoblastic lesions and possibly affect the pre-metastatic niche formation. The observed, multilevel antimetastatic properties of soy isoflavones imply that they should be considered as promising components of combined therapeutic approaches to advanced prostate cancer.

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