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Fatty acid synthase regulates the chemosensitivity of breast cancer cells to Cisplatin – induced apoptosis

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Fatty Acid Synthase (FASN) is a key enzyme in fat biosynthesis that is over-expressed in advanced breast cancer stages. Cisplatin (CDDP) is a platinum – based drug used in the treatment of certain types of this disease. Although it was shown that FASN inhibition induced apoptosis by enhancing the cytotoxicity of certain drugs in breast cancer, its role in regulating the chemosensitivity of different types of breast cancer cells to CDDP-induced apoptosis is not established yet. Therefore, two different breast cancer cell lines; Triple Negative Breast Cancer (TNBC; MDA-MB-231) and Triple Positive Breast Cancer (TPBC; BT-474) cells were used to examine such role. We show that TNBC cells had naturally less fat content than TPBC cells. Subsequently, the fat content increased in both cells when treated with palmitate rather than oleate, whereas both fatty acids produced apoptotic ultra-structural effects and attenuated FASN expression. However, oleate increased FASN expression in TPBC cells. CDDP decreased FASN expression and increased apoptosis in TNBC cells. These effects were further enhanced by combining CDDP with fatty acids. We also illustrate that the inhibition of FASN by either siRNA or exogenous inhibitor decreased CDDP - induced apoptosis in TPBC cells suggesting its role as an apoptotic factor, while an opposite finding was observed in TNBC cells when siRNA and fatty acids were used, suggesting its role as a survival factor. To our knowledge, we are the first to demonstrate a dual role of FASN in CDDP-induced apoptosis in breast cancer cells and how it can modulate their chemosensitivity.

Biography

Shadia Al-Bahlani is an Assistant Professor and Head of Department for Department of Allied Health Sciences, College of Medicine and Health Sciences, Sultan Qaboos University, Oman. She obtained her PhD in Cellular and Molecular Medicine from University of Ottawa, Ottawa, Canada. Her research interest is in Cellular and Molecular Pathology mainly in Cancer. She is highly skilled in Cell Culture and Molecular Biology techniques. She is running the Biomedical Science program in the college with the help of a dedicated team. She has a good experience in academia in terms of curriculum management, course evaluation and advising students.

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