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The anticancer mechanisms of docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) on human hepatocarcinoma: a proteomic approach

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Omega-3 fatty acids have been linked to cancers prevention. However it is not clear whether there are different anticancer mechanisms between the omega-3 fatty acids docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). The present study adopted a proteomic approach in order to identify specific biomarkers to define the signaling pathways that are unique to both DHA and EPA. By using the non-metastatic human hepatocarcinoma cell line PLC/PRF/5, we have profiled the protein expression of the PLC/PRF/5 cells after 72 hours treatment of DHA (200 μ L) and EPA (200 μ L) by the two dimensional gel electrophoresis (2D-PAGE). Differentially expressed proteins were identified by the matrix-assisted laser desorption/ionization time of flight mass spectrometry (MALDI-TOF/TOF). Our results show that both DHA and EPA inhibited cancer growth and induced apoptosis. DHA posed a stronger cytotoxic effect than EPA. Differentially expressed proteins in the signaling pathways, cell proliferation, tumor metastasis and apoptosis were found between EPA and DHA treatment. DHA suppressed calumenin and annexin A2, which are proteins affecting tumor metastatic stability and EPA down-regulated. The heterogeneous nuclear ribonucleoprotein K (hnRNP K) and ubiquinol-cytochrome C reductase core protein 1 (UQCRC1) play a key role in the coordination of transcriptional responses to DNA damage and in mitochondria-to-nucleus retrograde response, respectively. The present study provides signature proteins associated with the anticancer mechanisms of DHA and EPA, and indicating some functional differences between the two different types of omega-3 fatty acids in the prevention of human liver cancer.

Biography

Jennifer Man-Fan Wan has completed her PhD from Southampton University and Postdoctoral studies from Harvard Medical School, Boston, USA. She is an Associate Professor at the School of Biological Sciences, the University of Hong Kong. She has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member of *Nature Partner of Science of Food*.

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