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Beneficial effects of omega-3 long-chain fatty acids in breast cancer and cardiovascular diseases: Voltage-gated sodium channels as a common feature?

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Cancers are among the leading causes of death worldwide. Voltage-gated sodium channels, among other ion channels, appear as new molecular players in epithelial cancers. Highly metastatic breast cancer cells express Na(V)1.5, the main isoform expressed in cardiac cells, where the current generated by the flux of sodium ions is responsible for the excitability. Breast cancer cells are not excitable and the protein activity regulates cell invasiveness, through the modulation of activity of acidic cathepsins, a characteristic involved in the metastatic phenotype. Interestingly, it is known that omega-3 LC-PUFA can exert beneficial effects by preventing post-myocardial infarction arrhythmias and by reducing the incidence of metastatic breast cancer. In this review, we compare the effects of some omega-3 LC-PUFA on Na(V)1.5 expressed in both cardiac and MDA-MB-231 breast cancer cells. We propose that some of the effects of omega-3 LC-PUFA act through common mechanisms involved in both diseases. Copyright © 2010. Published by Elsevier Masson SAS.