Long-chain omega-3 fatty acids are known to have anticancer activity, however the mechanisms of their anticancer action remains elusive. The research aims to establish how long-chain omega-3 fatty acids kill human cancer cells. It is hypothesized that long-chain omega-3 fatty acids, such as docosahexanoic acid (DHA), interact with cellular antioxidant enzymes and suppress cancer cell viability via oxidative stress-mediated mechanisms.

DHA was discovered to induce the expression of the antioxidant enzyme, heme oxygenase 1 (HO-1), through the Nrf2 signaling pathway in human cancer cells. The study also identified clofibrate, a compound that shares many functional similarities with DHA, that likewise enhances HO-1 expression in the model systems. Other cellular mechanisms were also identified that account for the anticancer action of zinc protoporphyrin (ZnPP, a HO-1 inhibitor).