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Therapeutic effects of trehalose liposomes against breast tumors along with apoptosis

Trehalose stabilizes membranes and proteins in cells most likely by hydrogen bonding. Trehalose liposomes (DMTre) composed of L- α -dimyristoylphosphatidylcholine (DMPC) and trehalose micelles have been produced. Hydrodynamic diameter (d_{hy}) of DMTre composed of 30 mol% DMPC and 70 mol% TreC14 was 100 nm with single and narrow range of size distribution, which was preserved for a period remaining stable for more than one month. The thickness of the fixed aqueous layer (TFAL) of DMTreCn was evaluated from the zeta potential and increase in TFAL values of DMTreCn was obtained in a dose-dependent manner. The TFAL values for DMTreCn were larger than that of DMPC liposomes. The remarkable inhibitory effects of DMTre on the growth of human colon, gastric, hepatocellular, lymphoblastic and lung carcinoma cells have been reported. In this study, the inhibitory effects of DMTre on the growth of breast tumor (MCF-7 and MDA-MB-453) cells were examined *in vitro* and *in vivo*. DMTre inhibited the growth of breast tumor cells leading to apoptosis. The activation of caspase-6 and 9 was obtained for breast tumor cells treated with DMTre. The suppression of tumor weight of xenograft mice model of carcinoma treated with DMTre was obtained. To investigate induction of apoptosis against tumor, the tissue section of tumor in xenograft mice model of carcinoma after the treatment with DMTre was dyed and observed using microscope. Many apoptotic brown color cells in the tissue section of tumor was observed, indicating that DMTre could induce apoptosis in tumor cells against mice model of carcinoma.

Biography

Yoko Matsumoto is a Professor of Department of Life Sciences at Sojo University, Japan. She received her PhD in Pharmacy from Kyushu University, Japan. She was a Visiting Researcher in Colorado University at Boulder with Prof. Tom Cech. She has received Outstanding Female Researcher Award from the Society of Chemical Engineering, Japan. She is one of Director for Japan Nanomedicine Society and Councilor for Japanese Association for Molecular Target Therapy of Cancer. Her current research interest focuses on trehalose liposomes for therapeutic applications. She has published more than 120 original papers.

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