

Summary of the DVM thesis No. , Faculty of Veterinary Medicine, Urmia University

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Title: The effects of liposome-encapsulated linoleic acid on intestinal epithelial cancer cells (HCT116)

Summary:

Nanotechnology is one of the research fields with an impressive role in biological sciences, which has been widely used in the prevention, treatment, and reduction of complications. The nano-sized liposome has a bilayer membrane and vesicle structure with amphiphilic properties, which can be proposed as a practical option in drug delivery. Considering the potency of linoleic acid in the induction of inflammation and cell growth and proliferation inhibition in cancer cells, the current study aims to evaluate the effect of liposome-encapsulated linoleic acid in HCT116 (cancer cells of human colorectal tissue) cell line. In this study, after synthesizing liposome from lecithin, linoleic acid was loaded in liposome structure in concentrations range of 50, 100, 200, and 400 μM . Thereafter, the HCT116 cells were exposed to the modified liposome and linoleic acid in different concentrations. The control groups were designed as liposome without fatty acid and fatty acid alone with the same concentrations range. Samples were taken from the supernatant of the treated cells 24 hours after the start of the treatment. Cell viability was evaluated by MTT and trypan blue (TB) tests, while the oxidative stress and nitrosative stress levels were measured by malondialdehyde (MDA), total lipid peroxidation (TLP), and total antioxidant capacity (TAC) tests, as well as nitric oxide (NO) test, respectively. Obtained results showed that the survival of cells that were treated with linoleic acid encapsulated by liposome, compared to the control groups, including liposome and fatty acid control groups, is significantly reduced. The results of MDA and NO tests indicated an increase in MDA and NO levels in the liposome-encapsulated linoleic acid group at the concentration of 400 μM . It can be concluded that liposome-encapsulated linoleic acid can show the enhanced effects of linoleic acid against colon epithelial cancer cells, which can be considered the preliminary results for further studies.

Keywords: colorectal cancer, oxidative stress, liposome, linoleic acid, HCT116