

Summary of the DVM Thesis No., 6941 Faculty of Veterinary Medicine, Urmia University

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Title: The effects of oleic acid encapsulated with liposome on intestinal epithelial cancer cells (HCT-116)

Summary: Despite remarkable progress in the field of cancer prevention and treatment, scientists try to find optimal treatments and medications with less suffering side effects for cancer patients. Nanotechnology and nanomedicine have gain more attention in the field of cancer therapy and drug delivery system nowadays. Liposome as a nanoparticle with spherical bilayer membrane has different beneficial characteristics such as higher biocompatibility, optimal size, and the capacity to deliver different drugs (especially cancer drugs). It is well known that liposome drug delivery system is the only FDA approved drug nano delivery system. Epidemiological studies focusing on Mediterranean area showed that the area has lower number of cancer patients with diets composed of higher amounts of oleic acid. Colorectal cancer, which is known as one of the most common cancers in the worldwide, can lead to the number of health problems such as leaky intestinal barrier. The current study aims to evaluate the effects of liposomes containing oleic fatty acid on HCT116 cells as a colon epithelial cancer cell line. Following liposome synthesis oleic acid has been encapsulated by liposome in a concentration range of 50, 100, 200, and 400 μM . Thereafter, HCT116 cells were exposed to different treatments of oleic acid, liposome and oleic encapsulated with liposome for 24 and 48 h. MTT and trypan blue tests were used to evaluate cell viability. The oxidative stress has been assessed by measurement of Malondialdehyde (MDA), Total lipid hydroperoxide (TLHP), TAC (Total antioxidant capacity), and Nitric Oxide (NO) biomarkers in the supernatant of different treatments. Less viable cells were detected in the liposome encapsulated oleic acid group after 24h. The amount of NO and TLHP between different treatments did not differ significantly, but the total antioxidant capacity in the group of liposome with oleic acid (24 and 48 hours of treatment) increased in comparison to control group, and the amount of MDA in the same treatment after 48h showed lower amount of MDA when compared to the control group. The obtained results could be used as the preliminary results indicating that encapsulation of fatty acids with liposomes could lead to the higher efficiency of the fatty acids on cancer cells and oxidative stress status. Of note that further in vitro and in vivo studies are warranted to clarify the possible mechanism of action and beter formulations.

Key words: Liposome, Oleic Acid, HCT116, Trypan Blue, Oxidative Stress