Study on the Radio-Protection of Curcumin-Encapsulated Nanoliposomes on Human Lymphocytes

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The aim of the project is to study the radio-protective properties of curcumin-encapsulated nanoliposomes (referred to as curcumin-nanoliposomes) with regard to human lymphocytes of people frequently exposed to radiation. In this project, curcumin-nanoliposomes were successfully synthesized by combining lipid membrane hydration and sonication; which then has produced a small particle size (approximately 216 nm), a good polydispersity index (0.207), a high zeta potential (-27.7 mV), a high encapsulation efficiency (93.9%) and a moderate payload (8.6%). The existence of curcumin in nanoliposomes structures was verified by Fourier Transform Infrared Spectroscopy (FTIR) and Differential Scanning Calorimetry (DSC). The transportation of curcumin (nanoforms) into human lymphocytes was demonstrated by fluorescent microscopy image. The study of radio-protective effectiveness for human lymphocytes of curcumin (nanoforms) against gamma irradiation was carried out at the dose of 2 Gy, and investigated in the range from 1 to 90 µg/mL of curcumin concentration. The results indicated that 30 µg/mL is the optimal curcumin concentration for radio-protection. The results of this project can serve as a scientific foundation for a further study aiming to develop a radio-protective product to be applied to cancer radiotherapy.