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TITLE

Stealth liposomes loaded with photosensitizer as drug delivery system: Increasing tumor selectivity, enhancing PDT efficacy

Tran Thi Hai Yen
Hanoi University of Pharmacy, Vietnam

Photodynamic therapy (PDT) has developed over last century and is now becoming a more widely used for the treatment of various diseases such as cancer and macular degeneration. PDT consists of 2 components: administration of photosensitizer and irradiation of light at tumor tissue. Second-generation Russian photosensitizer photoditazin based on an aqueous solution of di-N-methylglucamine salt of chlorin e6 were actively used recently for PDT of malignant tumors, including skin cancer (squamous and basal cell), melanoma, breast cancer and their intradermal metastases, cancer of the mucous membranes (vulva, esophagus, bronchi, etc). With the aim of improving the tumoritropic behaviour of photosensitizers, liposomes are presently being used as delivery system for PDT.

We developed a novel stealth liposomes loaded with photoditazin, then we characterized liposomal suspension: size distribution, encapsulation efficiency. Study on tumor-selectivity was perfomed in mice using spectral fluorescent method with a fiber spectrum analyzer "LESA-01-Biospec" and He-Ne laser (under the assumption that the fluorescent intensity of the photosensitizer in a tissue is proportional to its content in tissue). Drug content in cancer tissue in group administered photoditadin aqueous solution was maximum at the moment of injection (maximum fluorescent intensity 2,55±0,31), then decreased gradually over time. Meanwhile in group administered liposomal photoditazin drug content in cancer tissue increased gradually and reached maximum at 4.5 hours after injections (maximum fluorescent intensity 3,95±0,45). In addition there was no increasing drug accumulation in normal tissue with the time after injection photoditazin in both forms: liposomal and aqueous solution. This demonstrated that stealth liposomes loaded with photoditazin have significant increased tumor-selective accumulation than aqueous solution ($p<0,05$). In vivo (in mice) comparative studies on therapeutic efficacy of photoditazin liposomes and aqueous solution showed that liposomal form significantly inhibited tumor growth than normal form ($p<0,05$). In addition, after 3 months since beginning treatment 29% of mice survived in the group administered liposomal photoditazin, but in group administered aqueous solution animal survival was 0%. Based on our early experience, we believe that stealth liposomal form of photoditazin is a perspective targeted drug delivery system for photosensitizer photoditazin.

Biography

Tran Thi Hai Yen has has completed her Ph.D from this Academy at the age of 29 in 2010. She is assistant professor in Department of Pharmaceutics in Hanoi University of Pharmacy, Vietnam. She has working experience in researching liposomal form and polymeric nanoparticles of drugs. In addition she has working experience in medical biochemistry when she did her own thesis. At this moment her present field R&D is preparation and investigation of nanodrugs.