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Liposome surface modification to encapsulate photosensitizers

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Abstract

To assess the penetrating ability of chlorine photosensitizers, their distribution in human skin was studied by ex vivo methods. It has been shown that the gel form of the photosensitizer chlorin E6 is distributed within the stratum corneum with minimal penetration into the deeper layers of the epidermis in the area of the sebaceous and sweat glands. To increase the penetrating ability, liposomal delivery systems made of soy phospholipids for encapsulating photosensitizers have been obtained. Electron microscopy analysis showed that the obtained liposomes are unilamellar and spherical in shape. The possibility of modifying the liposomal surface with various amphiphilic derivatives of poly-*N*-vinylpyrrolidone, which can act as a safe alternative to PEGylated liposomes, has been demonstrated. It was found that the modification of liposomal membranes leads to an increase in the size of liposomes due to the formation of a protective polymeric shell, which contributes to steric stabilization of the liposomal system and the prevention of exposure of liposomes to external destabilizing factors. Dynamic light scattering and electron microscopy methods were used to characterize the main physical and chemical properties of native and modified liposomal carriers and to study their stability. Vesicular phospholipid carriers of photosensitizers promote prolongation of action and efficiency increase of the drug used, they also promote the deposition of photosensitizers in the dermis when liposomal carriers are used in medical products and protect against aggregation and biodegradation when used in cosmetic products.

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