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Biocompatibility of Dead Sea Water and retinyl palmitate carrying poly(3-hydroxybutyrate-co-3-hydroxyvalerate) micro/nanoparticles designed for transdermal skin therapy

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Abstract

In this study, novel drug carriers were developed for the treatment of skin conditions such as psoriasis, aging, or ultraviolet damage using micro/nanocapsules and micro/nanospheres of poly(3-hydroxybutyrate-co-3-hydroxyvalerate). The sizes of the particles were in the micron range and were loaded with retinyl palmitate and Dead Sea Water. In some tests, $MgCl_2$ was used as a substitute for Dead Sea Water for accurate determination of released ions of Dead Sea Water. Encapsulation efficiency and loading of water-soluble excipients Dead Sea Water and $MgCl_2$ were almost eight times lower than the hydrophobic compound retinyl palmitate. The particles were not cytotoxic as determined with the 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide test using L929 mouse fibroblasts, BALB/3T3 mouse embryo fibroblasts, and HaCaT human keratinocytes. Ames test showed that the carriers were not genotoxic. The particles penetrated the membrane of human osteosarcoma cells Saos 2 and accumulated in their cytoplasm. No reactive oxygen species production could be detected which indicated low or

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