International Journal of Pharmaceutics

Volume 323, Issue 1-2, 12 October 2006, Pages 1-10

Enhancement of follicular delivery of finasteride by liposomes and niosomes. 1. In vitro permeation and in vivo deposition studies using hamster flank and ear models

Tabbakhian, M.[a], Tavakoli, N.[a], Jaafari, M.R.[b], Daneshamouz, S.[a]

[a] Department of Pharmaceutics, School of Pharmacy, Isfahan Pharmaceutical Sciences Research Center, Isfahan, Iran

[b] Department of Pharmaceutics, School of Pharmacy, Mashad University of Medical Sciences, Mashad, Iran

Abstract

View references (67)

Finasteride is indicated orally in the treatment of androgenetic alopecia and some other pilosebaceous unit (PSU) disorders. We wished to investigate whether topical application of finasteride-containing vesicles (liposomes and niosomes) could enhance drug concentration at the PSU, as compared to finasteride hydroalcoholic solution (HA). Liposomes consisted of phospholipid (dimyristoyl phosphatidylcholine (DMPC) or egg lecithin):cholesterol:dicetylphosphate (8:2:1, mole ratio). Niosomes were comprising non-ionic surfactant (polyoxyethylene alkyl ethers (Brij ® series) or sorbitan monopalmitate):cholesterol:dicetylphosphate (7:3:1, mole ratio). Vesicles were prepared by the film hydration technique and characterized with regard to the size, drug entrapment efficiency and gel-liquid transition temperature (T_c). In vitro permeation of ^{3}H-finasteride through hamster flank skin was faster from hydroalcoholic solution (0.13 μg/cm ^{2} h) compared to vesicles (0.025-0.058 μg/cm ^{2} h). In vivo deposition of ^{3}H-finasteride vesicles in hamster ear showed that liquid-state vesicle, i.e. those made of DMPC or Brij97:Brij76 (1:1), were able to deposit 2.1 or 2.3% of the applied dose to the PSU, respectively. This was significantly higher than drug deposition by gel-state vesicles (0.35-0.51%) or HA (0.76%). Both in vitro permeation and in vivo deposition studies, demonstrated the potentials of liquid-state liposomes and niosomes for successful delivery of finasteride to the PSU. © 2006 Elsevier B.V. All rights reserved.

Reaxys Database Information

|

Author keywords

Finasteride deposition in the pilosebaceous units; Follicular drug delivery; Hamster; Liposomes; Niosomes; Skin permeation

Indexed Keywords

EMTREE drug terms: cholesterol; dicetyl phosphate; dimyristoylphosphatidylcholine; finasteride; liposome; niosome; nonionic surfactant; phospholipid; polidocanol; polyoxyethylene alkyl ether; sorbitan palmitate

EMTREE medical terms: animal cell; animal experiment; animal tissue; article; controlled study; drug absorption; drug delivery system; drug penetration; drug synthesis; ear; film coating; gel; gel permeation chromatography; hamster; hydration; male; nonhuman; particle size; priority journal; sebaceous gland; skin penetration; topical treatment; transition temperature

MeSH: Administration, Cutaneous; Animals; Cholesterol; Cricetinae; Drug Carriers; Drug Delivery Systems; Ear, External; Enzyme Inhibitors; Finasteride; Liposomes; Male; Mesocricetus; Particle Size; Phosphatidylcholines; Phosphoric Acid Esters; Plant Oils; Polyethylene Glycols; Skin; Skin Absorption

Medline is the source for the MeSH terms of this document.

Chemicals and CAS Registry Numbers: cholesterol, 57-88-5; dicetyl phosphate, 2197-63-9; dimyristoylphosphatidylcholine, 13699-48-4, 18194-24-6; finasteride, 98319-26-7; polidocanol, 60828-78-6, 9002-92-0; sorbitan palmitate, 26266-57-9;Cholesterol, 57-88-5; Drug Carriers; Enzyme Inhibitors; Finasteride, 98319-26-7; Liposomes; Phosphatidylcholines; Phosphoric Acid