68
Accession number:12722134
Title:Terahertz dynamic imaging of skin drug absorption
Authors:Kyung Won Kim (1); Kwang-Sung Kim (2); Hyeongmun Kim (2); Sang Hun Lee (2); Jae-Hak Park (3); Ju-Hee Han (3); Seung-Hyeok Seok (4); Jisuk Park (1); YoonSeok Choi (1); Young Il Kim (1); Joon Koo Han (1); Joo-Hiuk Son (2)
Author affiliation:(1) Dept. of Radiol., Seoul Nat. Univ. Coll. of Med., Seoul, Korea, Republic of; (2) Dept. of Phys., Univ. of Seoul, Seoul, Korea, Republic of; (3) Dept. of Lab. Animal Med., Seoul Nat. Univ., Seoul, Korea, Republic of; (4) Dept. of Microbiol. & Immunology, Seoul Nat. Univ. Coll. of Med., Seoul, Korea, Republic of
Source title:Optics Express
Abbreviated source title:Opt. Express (USA)
Volume:20
Issue:9
Publication date:23 April 2012
Pages:9476-84
Language:English
ISSN:1094-4087
CODEN:OPEXFF
Document type:Journal article (JA)
Publisher:Optical Society of America
Country of publication:USA
Material Identity Number:CJ84-2012-011
Abstract:Terahertz (THz) imaging is a nondestructive, label-free, rapid imaging technique which gives the possibility of a real-time tracing of drugs within the skin. We evaluated the feasibility of THz dynamic imaging for visualizing serial changes in the distribution and penetration of a topical agent, dimethyl sulfoxide (DMSO) containing ketoprofen, using excised mouse skins. THz imaging was performed for 6 h after drug application to the skin and was compared with the results obtained using the Franz cell diffusion test, a standard in vitro skin absorption test. THz dynamic reflection imaging showed that the reflection signals decreased rapidly during the early time period, and remained constant through the late time period. The area of drug permeation within the skin layer on THz imaging increased with time. The dynamic pattern of THz reflection signal decrease was similar to that of DMSO absorption analyzed by the Franz cell diffusion test, which indicates that THz imaging mainly reflects the DMSO component. This study demonstrates that THz imaging technique can be used for imaging the spatial distribution and penetration of drug-applied sites.
Number of references:23
Inspec controlled terms:adsorption - biodiffusion - biomedical imaging - drugs - electromagnetic wave reflection - skin - terahertz wave imaging
Uncontrolled terms:terahertz dynamic imaging - skin drug absorption - nondestructive imaging technique - label-free imaging technique - rapid imaging technique - real-time tracing - dimethyl sulfoxide - ketoprofen - mouse skin - Franz cell diffusion testing - dynamic reflection imaging - drug permeation - DMSO absorption - spatial distribution - drug-applied sites - time 6 hr
Inspec classification codes:A8760G Microwaves and other electromagnetic waves (medical uses)

- A8770E Patient diagnostic methods and instrumentation - A8265M Sorption and accommodation coefficients (surface chemistry) - B7510L Microwaves and other electromagnetic waves (biomedical imaging/measurement)
Numerical data indexing:time 2.16E+04 s
Treatment:Practical (PRA)
Discipline:Physics (A); Electrical/Electronic engineering (B)
DOI:10.1364/OE.20.009476
Database:Inspec
IPC Code:A61P