

Accepted Manuscript

Research paper

Compartmental modeling of skin transport

A.A. Amarah, D.G. Petlin, J.E. Grice, J. Hadgraft, M.S. Roberts, Y.G. Anissimov

PII: S0939-6411(18)30581-2
DOI: <https://doi.org/10.1016/j.ejpb.2018.07.015>
Reference: EJPB 12838

To appear in: *European Journal of Pharmaceutics and Biopharmaceutics*

Received Date: 2 May 2018
Revised Date: 16 July 2018
Accepted Date: 17 July 2018

Please cite this article as: A.A. Amarah, D.G. Petlin, J.E. Grice, J. Hadgraft, M.S. Roberts, Y.G. Anissimov, Compartmental modeling of skin transport, *European Journal of Pharmaceutics and Biopharmaceutics* (2018), doi: <https://doi.org/10.1016/j.ejpb.2018.07.015>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Compartmental modeling of skin transport

A.A. Amarah^{1,2}, D.G. Petlin^{1,3}, J.E. Grice⁴, J. Hadgraft⁵, M.S. Roberts^{4,6}, Y.G. Anissimov^{1,7*}

¹School of Environment and Science, Griffith University, Gold Coast, Queensland, 4222, Australia

² University of Basrah, College of Science, Physics Department, Basrah, Iraq

³Tomsk Polytechnic University, 30 Lenin Avenue, Tomsk 634050, Russian Federation

⁴Therapeutics Research Centre, The University of Queensland Diamantina Institute, Translational Research Institute, Brisbane, 4102, Australia

⁵UCL School of Pharmacy, 29-39 Brunswick Square, London WC1N 1AX, United Kingdom

⁶Sansom Institute, School of Pharmacy and Medical Sciences, University of South Australia, Adelaide, SA, Australia

⁷Institute of Molecular Medicine, Sechenov First Moscow State Medical University, Moscow, Russia

* Correspondence: email: y.anissimov@griffith.edu.au, phone: +617 55528496

Abstract

The primary objective of this study is to introduce a simple and flexible mathematical approach which models transport processes in skin using compartments. The main feature of the presented approach is that the rate constants for exchange between compartments are derived from physiologically relevant diffusional transport parameters. This allows for better physical interpretation of the rate constants, and limits the number of parameters for the compartmental model. The resulting compartmental solution is in good agreement with previously published solutions for the diffusion model of skin when ten or more compartments are used. It was found that the new compartmental model with three compartments provided a better fit of the previously published water penetration data than the diffusion model. Two special cases for which it is difficult to implement the diffusion model were considered using our compartmental approach. In both cases the compartmental model predictions agreed well with the diffusion model.

Download English Version:

<https://daneshyari.com/en/article/8411705>

Download Persian Version:

<https://daneshyari.com/article/8411705>

[Daneshyari.com](https://daneshyari.com)