UC Davis

UC Davis Previously Published Works

Title

Identification and characterization of the molecular interactions of persistent organic pollutants with the multidrug resistance transport protein ABCB1

Permalink

https://escholarship.org/uc/item/9x85f0gj

Journal

FASEB JOURNAL, 28(1)

ISSN

0892-6638

Authors

Nicklisch, Sascha

Bonito, Lindsay

Sandin, Stuart

et al.

Publication Date

2014-04-01

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at https://creativecommons.org/licenses/by/4.0/

eScholarship.org Powered by the California Digital Library
University of California

The FASEB Journal

Biochemistry and Molecular Biology | Free Access

Identification and characterization of the molecular interactions of persistent organic pollutants with the multidrug resistance transport protein ABCB1 (974.4)

Sascha Nicklisch, Lindsay Bonito, Stuart Sandin, Amro Hamdoun

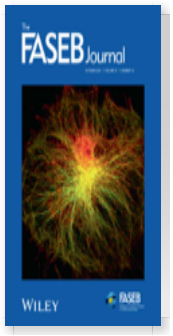
First published: 01 April 2014 |
https://doi.org/10.1096/fasebj.28.1_supplement.974.4

Get it at UC

Abstract

Multidrug resistance (MDR) transporters, from the ATP binding cassette (ABC) superfamily, are thought to act as determinants of chemical accumulation in cells. Despite a long history of research on the interactions of MDR proteins with pharmaceuticals, little is known about the molecular basis of their interactions with environmental compounds such as persistent organic pollutants (POPs). This research is urgently needed to further understanding of substrate recognition by the transporters and to test the hypothesis that pollutant persistence relates to predictable patterns of interaction with the major MDR transporter ABCB1.

We use purified recombinant P-glycoprotein (ABCB1) from mouse and yellowfin tuna to measure pollutant-



Volume 28, Issue S1
Experimental Biology 2014 Meeting Abstracts
April 2014
974.4

Related Information

Recommended

P-glycoprotein: multidrug-resistance and a superfamily of membrane-associated transport proteins

Peter F. Juranka, Roman L. Zastawny, Victor Ling

The FASEB Journal

The Q loops of the human multidrug resistance transporter ABCB1 are necessary to couple drug binding to the ATP catalytic cycle

Joseph K. Zolnerciks, Begum G. Akkaya, Marjolein Snippe, Peter Chiba, Anna Seelig, Kenneth J. Linton

The FASEB Journal

transporter interaction kinetics via ATPase stimulation and fluorophore knock-off experiments. These kinetic will be compared to what is observed with ABCB1 overexpressed in whole cells. Previously analyzed data on “real-world” pollutant levels in the cosmopolitan and widely consumed fish species of yellowfin tuna (Thunnus albacares) was used to guide the selection of persistent pollutants. The preliminary results of this study show that the majority of the selected persistent pollutants found in tuna are inhibitors of mouse ABCB1 efflux pump. Thereby, isomeric forms of the same pollutant can differ in their IC50 values up to an order of magnitude while reaching inhibition coefficients in the range of the model inhibitor cyclosporine A.

These studies aim at determining the conservation of pollutant-transporter interactions across marine and mammalian ABCB1 transporters. In addition, we want to investigate whether common structural features of ABC transporters and pollutants govern their interactions. These results will shed light on the question of how transporters can direct pollutant movement through the environment and will lead to new avenues for design of more potent pharmaceuticals and safer industrial chemicals.

***Grant Funding Source**: Supported by NIH and the WAITT Foundation*

© 2023 Federation of American Societies for Experimental Biology (FASEB)

About Wiley Online Library

Privacy Policy

Terms of Use

About Cookies

Manage Cookies

Accessibility

Wiley Research DE&I Statement and Publishing Policies

Help & Support

Contact Us

Training and Support

DMCA & Reporting Piracy

Opportunities

Subscription Agents

Advertisers & Corporate Partners

Connect with Wiley

The Wiley Network

Wiley Press Room

WILEY

Copyright © 1999-2023 John Wiley & Sons, Inc. All rights reserved