

[Print this Page for Your Records](#)[Close Window](#)

Control/Tracking Number: 14-L-4748-BPS

Activity: Late Abstract

Current Date/Time: 12/20/2013 1:39:02 PM

MELANONIN COUNTERACTS CHOLESTEROL'S EFFECTS ON LIPID MEMBRANE STRUCTURE

Author Block: Elizabeth Drolle¹, Norbert Kucerka², Matthew I. Hoopes³, Vince Y. Choi¹, John Katsaras⁴, Mikko Karttunen³, Zoya Leonenko¹.

¹Department of Biology, University of Waterloo, Waterloo, ON, Canada, ²Canadian Neutron Beam Centre, National Research Council - Chalk River, Chalk River, ON, Canada, ³Department of Chemistry, University of Waterloo, Waterloo, ON, Canada, ⁴Joint Institute for Neutron Sciences, Oak Ridge National Laboratory, Oak Ridge, TN, USA.

Abstract:

The cell membrane plays an important role in amyloid toxicity in relation to Alzheimer's disease. Amyloid oligomers interact with lipid membrane inducing various defects in lipid membrane, which are toxic to the cell. The membrane composition and the inclusion of small molecules, such as melatonin and cholesterol, may alter the membrane's structure and physical properties, which in turn may affect its interaction with amyloid peptides. Both melatonin and cholesterol have been linked to amyloid toxicity, with melatonin having been shown to have a protective role against amyloid toxicity. However, because the underlying molecular mechanism of this protection is still not well understood, further investigation in melatonin's effect on the membrane itself is of great interest.

We have studied the non-specific interaction of melatonin and cholesterol with a model lipid membrane prepared of dioleoyl-sn-glycero-3-phosphocholine (DOPC), where cholesterol and melatonin were both present in lipid membrane at various proportions. We used small-angle neutron diffraction (SAND) from the stacks of oriented lipid multilayers and molecular dynamic (MD) simulations to elucidate the structure of membranes, and in order to determine the effects of melatonin and cholesterol. From the present study we conclude that melatonin counteracts the effect cholesterol has on the structure of lipid membrane.

Specifically, the additional incorporation of melatonin results in membrane thinning, despite and in stark contrast to the increase in membrane thickness induced by increasing concentration of cholesterol. This very different response of membrane thickness to cholesterol and melatonin and their mixtures may help to understand their relation to amyloid toxicity and to clarify the role of cholesterol and melatonin in this process.

:

Author Disclosure Information: E. Drolle: None. N. Kucerka: None. M. Hoopes: None. V. Choi: None. J. Katsaras: None. M. Karttunen: None. Z. Leonenko: None.

Sponsorship (Complete):

* Are you a BPS Member?: Yes

* Sponsor Full Name: : Norbert Kucerka

* Sponsor Email Address: : Norbert.Kucerka@nrc.gc.ca

Topic (Complete): 3E Membrane Structure ; 3E Membrane Structure

Payment (Complete): Your credit card order has been processed on Friday 20 December 2013 at 1:38 PM.

Status: Complete

[Biophysical Society](#)

11400 Rockville Pike, Suite 800

Rockville, MD 20852

Phone: 240-290-5600

For technical inquiries, [click here](#) to contact OASIS Helpdesk or call 217-398-1792.[Leave OASIS Feedback](#)Powered by [OASIS](#), The Online Abstract Submission and Invitation System SM© 1996 - 2013 [Coe-Truman Technologies, Inc.](#) All rights reserved.