Lipid-mediated regulation of pore-forming activity of syringomycin E by thyroid hormones and xanthene dyes

Svetlana S. Efimova, Anastasiia A. Zakharova, Artem A. Ismagilov, Ludmila V. Schagina, Valery V. Malev, Pavel V. Bashkirov, Olga S. Ostroumova

PII: S0005-2736(17)30402-9
DOI: https://doi.org/10.1016/j.bbamem.2017.12.010
Reference: BBAMEM 82659

To appear in:

Received date: 24 August 2017
Revised date: 21 November 2017
Accepted date: 13 December 2017

Please cite this article as: Svetlana S. Efimova, Anastasiia A. Zakharova, Artem A. Ismagilov, Ludmila V. Schagina, Valery V. Malev, Pavel V. Bashkirov, Olga S. Ostroumova , Lipid-mediated regulation of pore-forming activity of syringomycin E by thyroid hormones and xanthene dyes. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Bbamem(2017), https://doi.org/10.1016/j.bbamem.2017.12.010

Lipid-mediated regulation of pore-forming activity of syringomycin E by thyroid hormones and xanthene dyes

Svetlana S. Efimova[*,1], Anastasiia A. Zakharova[1], Artem A. Ismagilov[1], Ludmila V. Schagina[1], Valery V. Malev[1,2], Pavel V. Bashkirov[3], Olga S. Ostroumova[1]*

[1]*Institute of Cytology of the Russian Academy of Sciences, St. Petersburg, 194064, Russia*
[2]*St. Petersburg State University, Petergof, 198504, Russia*
[3] *Federal Research and Clinical Centre of Physical-Chemical Medicine, Moscow, 119435, Russia*

**To whom correspondence should be addressed*:
Institute of Cytology of the Russian Academy of Sciences,
Tikhoretsky ave. 4, St. Petersburg, 194064, Russia
phone: +7 (812) 2972460; fax: +7 (812) 2970341
e-mail: *ssefimova@mail.ru*

Abstract

The effects of dipole modifiers, thyroid hormones (thyroxine and triiodothyronine) and xanthene dyes (Rose Bengal, phloxineB, erythrosin, eosinY and fluorescein) on the pore-forming activity of the lipopeptide syringomycin E (SRE) produced by *Pseudomonas syringae* were studied in a model bilayer. Thyroxine does not noticeably influence the steady-state number of open SRE channels (N_{op}), whereas triiodothyronine decreases it 10-fold at –50 mV. Rose Bengal, phloxine B and erythrosin significantly increase N_{op} by 350, 100 and 70 times, respectively. Eosin Y and fluorescein do not practically affect the pore-forming activity of SRE. Recently, we showed that hormones decrease the dipole potential of lipid bilayers by approximately 60 mV at 50 μM, while Rose Bengal, phloxine B and erythrosin at 2.5 μM reduce the membrane dipole potential by 120, 80 and 50 mV, respectively. In the present study using differential scanning microcalorimetry, confocal fluorescence microscopy, the calcein release technique and measurements of membrane curvature elasticity, we show that triiodothyronine strongly affects the fluidity of model membranes: its addition leads to a significant decrease in the temperature and cooperativity of the main phase transition of DPPC, calcein leakage from DOPC vesicles, fluidization of solid domains in DOPC/DPPC liposomes, and promotion of lipid curvature stress. Thyroxine exerts a weaker effect. Xanthene dyes do not influence the phase transition of DPPC. Despite the decrease in the dipole potential, thyroid hormones modulate SRE