Sandra Sakalauskaite et al., J Drug Metab Toxicol 2018, Volume 9
DOI: 10.4172/2157-7609-C1-012

The peculiarities of tetraphenylphosphonium and ethidium interaction with *Listeria monocytogenes* and efficiencies of efflux

Sandra Sakalauskaite, Kamile Sepetyte and **Rimantas Daugelavicius**
Vytautas Magnus University, Lithuania

Antimicrobial resistance is a steadily growing world wide problem. Multidrug resistance efflux pumps play a key role in resistance to antibiotics. Because of these pumps *Listeria monocytogenes* is a multidrug resistant pathogen, not sensitive to many antimicrobial compounds. It is very important to understand the mechanisms how could we regulate the activity of efflux because *L. monocytogenes* is an opportunistic foodborne Gram-positive pathogen causing serious human infections. It is not easy to develop new antimicrobial compounds which would not be efflux substrates. In addition, the sides effects of new compounds are unknown. So, the knowledge about the inhibition of antibiotics efflux out of cells could increase the efficiency of treatment. We used potentiometric and fluorescence methods to assay the activity of efflux in *L. monocytogenes*. We used tetraphenylphosphonium selective electrode to register the activity of efflux. In parallel, the intensity of ethidium fluorescence was determined. We used inhibitors of different families of efflux pumps, such as chlorpromazine, verapamil, and reserpine. Also we explored the effect of Phe-Arg-β-naphthylamide (PAβN) and 1-(1-Naphthylmethyl) piperazine on these gram-positive bacteria. The aim of our studies was to determine the peculiarities of tetraphenylphosphonium and ethidium interaction with *L. monocytogenes* cells and to evaluate the efficiency of efflux inhibition. We determined that all of the used inhibitors increase the accumulation of efflux pumps substrate. In addition, we observed that PAβN and NMP inhibit the efflux of tetraphenylphosphonium but not ethidium. Accumulation of TPP+ strongly inhibited the intensity of *L. monocytogenes* respiration while ethidium binding was not interfering with this process. The electrochemical analysis of PAβN binding to *L. monocytogenes* indicated that bacteria accumulate a large amount of this efflux inhibitor.

Biography

Sandra Sakalauskaite is pursuing her PhD at Vytautas Magnus University. She is a young researcher at Lithuanian Energy Institute. She has one publication in Materials Research Express entitled "Investigation of *E. coli* bacteria inactivation by photocatalytic activity of TiO_2 coated expanded polystyrene foam". Her dissertation is related to antimicrobial resistance caused by efflux pumps. The main purpose of the study is to find the mechanisms involved in inhibiting the efflux of the substrate out of bacteria cells.

sakalauskaite.sandra90@gmail.com

Notes: