Abstract

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Title of bachelor's thesis: Spectrophotometric determination of cholinesterase activity using carbamate inhibitors

Nowadays, two types of cholinesterase are known. Acetylcholinesterase is the first one (AChE, EC 3.1.1.7), whose function is the cleavage bond of acetylcholine to cholinergic receptors in the central and peripheral nervous system. The second type is butyrylcholinesterase (BChE, EC 3.1.1.8), sometimes called plasmatic cholinesterase or pseudocholinesterase. Whole function of BChE is yet not fully understood. Carbamate inhibitors belong to reversible cholinesterase inhibitors. Their effect decreases in time due to their own hydrolysis into inactive compounds.

The goal of this experimental work was to obtain the kinetic parameters of AChE and BChE, and optimize the method for determination of selected carbamate inhibitors – carbofuran and physostigmine/eserine. Determination of cholinesterase activity was made with Ellman method.

It turned out, firstly, that both of inhibitors act very similarly, time to reach maximum of inhibition was about 7-8 min, secondly, that BChE is more resistant to them, it has IC_{50} between 20-fold bigger for physostigmine and 60-fold bigger for carbofuran than with AChE. Reversibility of inhibition will be even further investigated. During the experiment with acetylcholinesterase, which lasts after 4 hours, was not observed no evidence of decarbamoylation, which would take effect at least partial recovery of activity.