

Biosensors performance for testing of drugs modulating cholinesterase activity

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Abstract

There is a continuous effort to prepare effective drugs modulating cholinesterase activity. Especially two types of drugs are the most common. Competitive inhibitors of acetylcholinesterase such as tacrine applicable for making Alzheimer's disease and myasthenia gravis progress milder are the first mentioned. Competitive inhibitor such pyridostigmine enable to protect cholinesterase from inhibition by irreversible inhibitors such as nerve agents. The second group are oxime based reactivators allowing return of cholinesterase activity after previous inhibition by organophosphates. The current methods approachable for in vitro testing of drugs modulating cholinesterase activity are typically based on photometric evaluation of cholinesterase activity. Here, biosensor is introduced as an alternative for testing of drugs. Electrochemical biosensors with intercepted cholinesterases were found applicable for in vitro studying. Advantage of biosensor is possibility to wash out drug and measure residual activity and estimate if reversible or irreversible effect is outweigh. Electrochemical biosensor was performed on testing of standard acetylcholinesterase reactivators obidoxime and HI-6, respectively anticholinergic drugs tacrine and 7-methoxytacrine. Strong correlation between electrochemical biosensor and photometric assay was found.

Keywords: biosensor, oxime, acetylcholinesterase, butyrylcholinesterase, reactivation

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