CORRELATION ANALYSIS BASED ON QUANTUM CHEMICAL PARAMETERS IN THE STUDY OF VDAC REGULATORS CONTAINING 4-HYDROXY-3,5-DI-TERT-BUTYL PHENYL GROUP

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In cerebral ischemia, VDAC channels regulate the formation of the mitochondrial transitional permeability pore and, accordingly, the processes of cellular bioenergetics and apoptosis, which makes them a promising pharmacotherapeutic target [1]. This study focused on the study of the VDAC-regulatory potential of compounds having a 4-hydroxy-3,5-di-tert-butyl phenyl group in their structure and assessing the dependence of the level of pharmacological activity of these compounds on the quantum-chemical and stereometric parameters of molecules. A total of 7 compounds were analyzed.

Table 1

Structure of test-substances

MitoFL1	MitoFL2	MitoPYR1	MitoPYR2	Mito FC1	Mito FC2	ATACL

As a pathology model, a model of permanent focal cerebral ischemia in Wistar rats was chosen as reflecting the spectrum of negative changes in cell mitochondria mediated by impaired VDAC activity [2]. The test substances were administered at a dose of 50 mg / kg *per os* after simulating cerebral ischemia for 3 days, after which changes in the activity of VDAC channels were determined in the brain tissues. As a result, it was found that the use of all studied compounds contributed to a decrease in the activity of VDAC channels, and the level of pharmacological activity of the evaluated substances depended to a greater extent on the length of the molecule ($r = 0.97509$); molecular area ($r = 0.89957$) and molecule volume ($r = 0.85641$) and practically did not depend on the heat of formation ($r = 0.07892$), dipole moment ($r = 0.03498$) and normal gradient ($r = 0.03626$).

References

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- [2] Liu HT, Tashmukhamedov BA, Inoue H, Okada Y, Sabirov RZ. Gliia. 2006; 54 (5): 343-57.