

## ORAL PRESENTATIONS

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### MITOCHONDRIA IN POTENTIAL DRUGS SCREENING – FOCUS ON NEURODEGENERATIVE DISEASES

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Age-related degenerative diseases, particularly neurodegenerative diseases (ND) such as Alzheimer's and Parkinson's diseases, are characterized by a complex, multifactorial etiology and the manifestation of symptoms only when cellular degeneration has already progressed. These factors necessitate the development of multitargeted drugs that target targets capable of compensating for lost functions, slowing or halting neuronal cells death, and reducing the manifestations of disease-specific proteinopathies [1].

It should be noted that impaired cellular and mitochondrial metabolic activities were the first pre-symptomatic markers for the development of NDs to be discovered. However, subsequent analysis of biological material from both patients and transgenic animals with characteristic proteins mutations yielded controversial results: hypermetabolism was observed alongside hypometabolism. Our studies also demonstrated divergent changes in oxygen consumption by the mitochondria in the brains of transgenic mice with tauopathy and cerebral amyloidosis, depending on the severity of symptoms. However, it should be noted that the vulnerability of mitochondria to mitochondrial permeability transition (MPT) induction steadily increases with the development of the disease, making the search for neuroprotective compounds capable of increasing mitochondrial resistance to MPT the most promising. Mitochondria play an important role in screening tests for neuroprotective agents. In this regard, mitochondrial control of cellular energy and metabolic balance, their role in regulating free radical production, and their antioxidant potential are being actively studied. However, influence on calcium-dependent processes of MPT pore formation is most important for the neuroprotective potential of drugs. As part of our targeted search for multitargeted drugs for the treatment of neurodegenerative diseases, we identified neuroprotective agents with the ability to increase mitochondrial resistance to MPT induction. These include stimulators of mitochondrial respiratory chain activity, oxidative phosphorylation uncouplers, antioxidants, mitochondrial calcium channel blockers, and inhibitors of MPT pore complex formation [2]. Identifying the most promising pathways of interaction with mitochondria for neuroprotection in various cellular models of neurodegeneration is an important objective for future research.

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#### **References:**

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