

# Mitochondrial permeability transition pore as a suitable target for neuroprotective agents against Alzheimer's disease

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**Background:** A considerable amount of data suggests the age-related impairments of mitochondrial functions in the development of sporadic forms of neurodegenerative pathologies. Mitochondria and the phenomenon of mitochondrial permeability transition (MPT), which marks the point of no return in cell death cascades, have special value in this regard. It is important that the vulnerability to MPT-inducing factors is increased with aging. Simultaneously, a decrease in the calcium retention capacity of mitochondria is developed, which leads to the disturbance of the functional activity of neurons. **Method:** The systematic investigations and web content related to the importance of MPT as the target for the search of neuroprotective and cognitive enhancing drugs, especially with multitargeted action, are reviewed. **Results:** Here, we have highlighted some experimental data that determines the importance of mitochondria for the search of neuroprotective drugs, and drugs with multitargeted action. We have also discussed a number of new compounds with similar properties. Being MPT inhibitors/modulators, virtually all the compounds described in this review have the ability to exhibit a neuroprotective effect, interact with some other targets, providing coupled beneficial therapeutic effects such as cognitive stimulation, anti-seizure, and antidepressant actions. **Conclusion:** Inhibitors of MPT, which increases calcium retention capacity of mitochondria, are considered as promising neuroprotective drugs able not only to halt the neurodegenerative cascade,

but also to increase the functional activity of neurons. © 2017 Bentham Science Publishers.

Alzheimer's disease

Mitochondria

Mitochondrial dysfunction

Multitarget benefits

Neurodegenerative diseases

Neuroprotective

alisporivir

amide

amyloid beta protein

azasteroid

cyclosporin A [4 n methylisoleucine]

dimebon

melatonin

mitochondrial permeability transition pore

n acetylserotonin

neuroprotective agent

pilocarpine

securinine

tryptamine

carrier protein

mitochondrial permeability transition pore

neuroprotective agent

Alzheimer disease

antidepressant activity

Article

calcium transport

cell function

cell organelle

cognition

human

immunosuppressive treatment

metabolic balance

mitochondrial membrane potential

molecular interaction

nerve degeneration

nerve stimulation

neurotransmission

nonhuman

oxidative stress

protein targeting

seizure

systematic review

Alzheimer disease

animal

drug effect

mitochondrion

physiology

Alzheimer Disease

Animals

Humans

Mitochondria

Mitochondrial Membrane Transport Proteins

Neuroprotective Agents