

Beneficial effects of nicotine, cotinine and its metabolites as potential agents for Parkinson's disease

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Parkinson's disease (PD) is a progressive neurodegenerative disorder, which is characterized by neuroinflammation, dopaminergic neuronal cell death and motor dysfunction, and for which there are no proven effective treatments. The negative correlation between tobacco consumption and PD suggests that tobacco-derived compounds can be beneficial against PD. Nicotine, the more studied alkaloid derived from tobacco, is considered to be responsible for the beneficial behavioral and neurological effects of tobacco use in PD. However, several metabolites of nicotine, such as cotinine, also increase in the brain after nicotine administration. The effect of nicotine and some of its derivatives on dopaminergic neurons viability, neuroinflammation, and motor and memory functions, have been investigated using cellular and rodent models of PD. Current evidence shows that nicotine, and some of its derivatives diminish oxidative stress and neuroinflammation in the brain and improve synaptic plasticity and neuronal survival of dopaminergic neurons. In vivo these effects resulted in improvements in mood, motor skills and memory in subjects suffering from PD pathology. In this review, we discuss the potential benefits of nicotine and its derivatives for treating PD. © 2015 Barreto, Iarkov and Moran.

Akt(PKB)

Beta-amyloid

Cotinine

Nicotine

Parkinson disease

Synucleinopathies

3 (2,4 dimethoxybenzylidene)anabaseine

cotinine

drug metabolite

nicotine

dopaminergic nerve cell

drug effect

drug safety

human

memory

motor performance

nerve cell plasticity

nervous system inflammation

nonhuman

oxidative stress

Parkinson disease

protein aggregation

Review