Short review on dopamine agonists: insight into clinical and research studies relevant to Parkinson’s disease

Khaled Radad1, Gabriele Gille2, Wolf-Dieter Rausch1

1 Institute for Medical Chemistry, Veterinary Medical University, Veterinaerplatz 1, A-1210, Vienna, Austria
2 Department of Neurology, Technical University, D-01307, Dresden, Germany

Correspondence: Wolf-Dieter Rausch, e-mail: wolf.rausch@v-wiener-ac.at

Abstract:
Parkinson’s disease (PD) is a chronic and progressive neurological disorder characterized by selective degeneration of dopaminergic neurons (DAergic) in the substantia nigra pars compacta (SNpc) and subsequent decrease in dopamine (DA) levels in the striatum. Although levodopa replacement therapy is initially effective in symptomatic treatment of parkinsonian patients, its effectiveness often declines and various levodopa-related side effects appear after long-term treatment. The disabling side effects of levodopa therapy include motor fluctuations such as the wearing-off or on-off phenomena, dyskinesias and psychiatric symptoms. Nowadays, DA receptor agonists are often regarded as first choice in de novo and young parkinsonian patients to delay the onset of levodopa therapy. In advanced stages of the disease, they are also used as adjunct therapy together with levodopa to retard the development of motor complications. DA receptor agonists mimic the endogenous neurotransmitter, dopamine, and act by direct stimulation of presynaptic (autoreceptors) and postsynaptic DA receptors. Next to their clinical role in treating parkinsonian patients, laboratory studies reported antioxidative and neuron-rescuing effects of DA receptor agonists either in vivo or in vitro. This may involve reduced DA turnover following autoreceptor stimulation and direct free radical scavenging activity. In this review, we focus on and summarize the recently reported effects of the most commonly used DA agonists either in clinical or in research studies relevant to PD treatment.

Key words:
Parkinson’s disease, levodopa, dopamine agonists, dopaminergic neurons