

---

## Dopamine, learning, and reward-seeking behavior

---

Óscar Arias-Carrión and Ernst Pöppel

Human Science Center, FESTO-Program for Applied Knowing, Ludwig Maximilian University, Goethestrasse 31, 80336 Munich, Germany

---

Review

**Abstract.** Dopaminergic neurons of the midbrain are the main source of dopamine (DA) in the brain. DA has been shown to be involved in the control of movements, the signaling of error in prediction of reward, motivation, and cognition. Cerebral DA depletion is the hallmark of Parkinson's disease (PD). Other pathological states have also been associated with DA dysfunction, such as schizophrenia, autism, and attention deficit hyperactivity disorder in children, as well as drug abuse. DA is closely associated with reward-seeking behaviors, such as approach, consumption, and addiction. Recent researches suggest that the firing of DA neurons is a motivational substance as a consequence of reward-anticipation. This hypothesis is based on the evidence that, when a reward is greater than expected, the firing of certain DA neurons increases, which consequently increases desire or motivation towards the reward.

---

Correspondence should be addressed to Ó. Arias-Carrión,  
Email: arias@exp-neuro.de

**Key words:** cognition, dopamine receptors, dopaminergic neurons, learning, reward-seeking behavior