



Modulatory effect of sildenafil in diabetes and electroconvulsive shock-induced cognitive dysfunction in rats

Chandrashekhar S. Patil¹, Vijay Pal Singh², Shrinivas K. Kulkarni²

¹Pharmacology R&D, Panacea Biotec Ltd. Lalru 140501, Punjab, India

²Pharmacology Division, University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh 160 014, India

Correspondence: Shrinivas K. Kulkarni e-mail: skpu@yahoo.com

Abstract:

The nitric oxide/guanylyl cyclase, cyclic guanosine monophosphate/phosphodiesterase 5 (NO/cGMP/PDE5) pathways play a key role in physiological and pathological situations, such as synaptic plasticity, learning and memory formation, diabetic gastropathy and neuropathy, long-term potentiation (LTP), epilepsy, cerebral ischemia, and neurodegenerative diseases. Several studies have demonstrated the alteration of NO-cGMP pathway in cognitive impairment. The present study was aimed to study the effect of sildenafil, a PDE5 inhibitor on diabetes and electroconvulsive shock (ECS)-induced cognitive dysfunction in rat using one-trial step-through type of passive avoidance and elevated plus maze task. Diabetic and ECS-treated rats showed poor learning performance in step-through passive avoidance and plus-maze task. Acute administration of sildenafil significantly reversed the diabetes and ECS-induced retention deficits in both the test paradigms. Sildenafil also significantly improved the cognitive performance in young rats in both the paradigms. Furthermore, L-NAME, a non-selective NOS inhibitor and methylene blue, a guanylate cyclase inhibitor blocked the effect of sildenafil. The results thus suggest that cognitive impairment might be due to the modulatory effect of nNOS or PDE5 enzyme on cGMP levels. Moreover, sildenafil-induced reversal of cognitive impairment suggests the protective role of PDE5 inhibitors in neurodegenerative disorders.

Key words:

sildenafil, cognition, diabetes, electroconvulsive shock
