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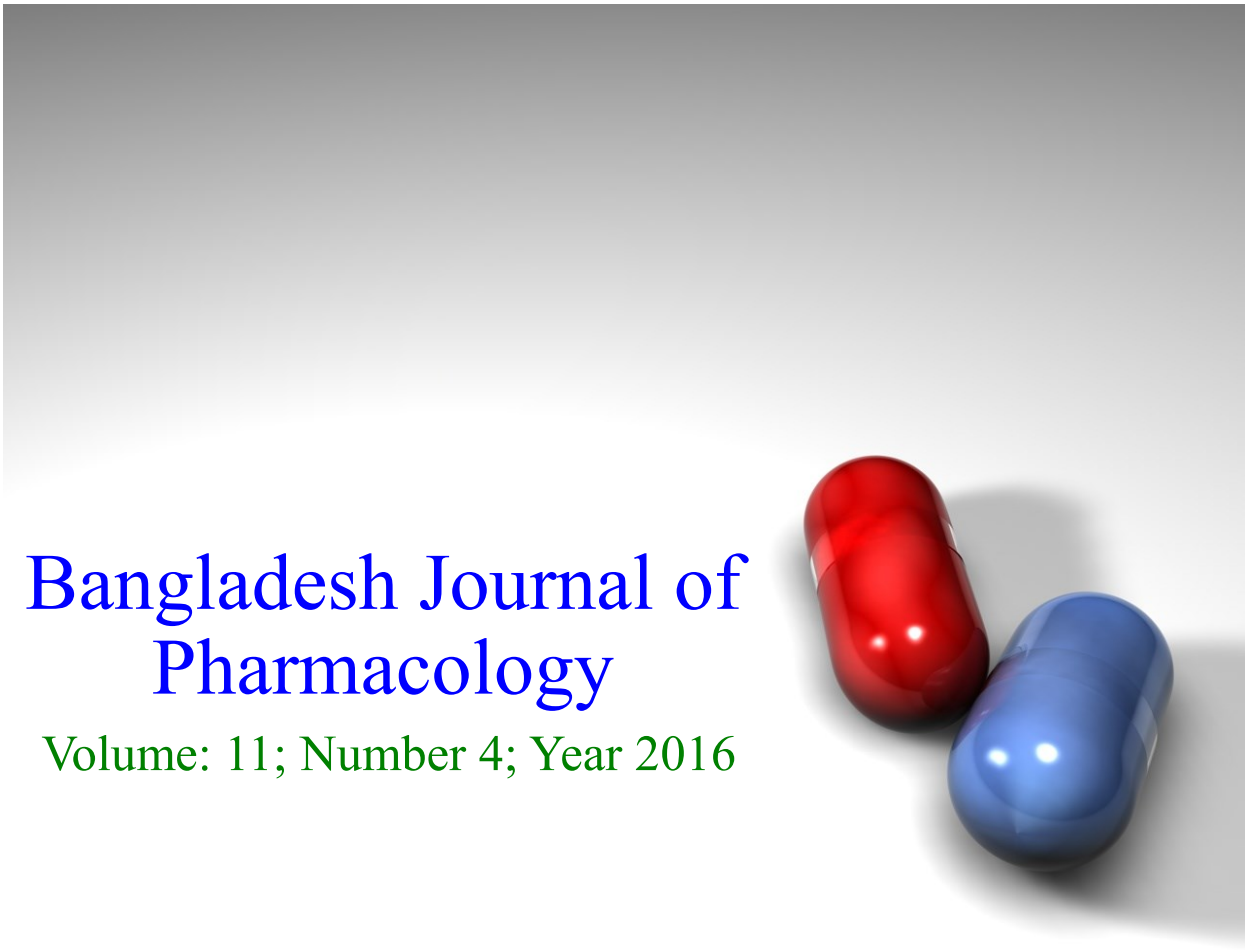

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Letter to the Editor

Effect of *Pedalium murex* against lipopolysaccharide-induced neurotoxicity in substantia nigra of rat midbrain

Sir,

Parkinson's disease affects approximately 1–3% of the population and is characterized by a slow and progressive degeneration of dopaminergic neurons in the substantia nigra (Obeso et al., 2000). This process is characterized by the progressive loss of dopaminergic neurons in the substantia nigra pars compacta and is accompanied by depletion of striatal dopamine and its metabolites such as DOPAC (3,4 dihydroxy phenyl acetic acid) and HVA (homovanillic acid). Activation of the immune system in response to stress and infection or bacterial endotoxin lipopolysaccharide produces profound neurophysiological, neuroendocrine and behavioral changes.

To date, specific pharmacologic agents that can be used in the management of septic shock are lacking and yet a rather scanty number of potential therapeutic agents are under clinical trials (Gallily et al., 1997). Lipopolysaccharide, among the principal components of all gram -negative bacteria, has been extensively studied as a major factor contributing to the pathogenesis of bacterial infections. Endotoxic shock can be elicited by a systemic injection of lipopolysaccharide induces the production and release of several cytokines (Morrison and Ryan, 1987). In response to these cytokines, several reactive oxygen species are produced from cells such as neutrophils and other phagocytic cells, creating a status of oxidative stress (Sugnio et al., 1987). Thus, this type of stress may hypothetically support the assumption that lipopolysaccharide-induced cell injury would be retarded by modifying free radical metabolism with the aid of antioxidant pretreatment.

One of the widely used medicinal herbs, in indigenous systems of medicine, is *Pedalium murex* which belongs to the family Pedaliaceae and commonly known as "Anai nerinji". Epidemiological studies have suggested posi-tive associations between the consumption of phenolic-rich foods or beverages and the prevention of diseases. The aim of the present study is to examine the effect of ethanolic extract of *P. murex* in the protection of dopaminergic neurons from lipopolysaccharide-induced neurotoxicity in rats.

The plant is authenticated by Botanical Survey of India (No. BSI/SC/5/23/2012-13/Tech-1934). Leaves were dried in shade and extracted with 90% v/v ethanol, the extract used for phytochemical screening. Results showed the presence of flavonoids, alkaloids, carbohydrate and proteins.

Adult male Sprague-Dawley rats (120) weighing 240-350 g purchased from the Animal House of J. K. K. N. College of Pharmacy. Rats were kept under standard laboratory conditions with controlled temperature, 12 hours light/dark cycle and given free access to standard diet and water. Animals were acclimatized for one week before starting the *in vivo* experiment. The experimental protocols were approved by the Institutional Animal Ethical Committee with reference No: 887/ac/15/CPCSEA. The lipopolysaccharide (*Escherichia coli*-derived; 500,000 endotoxin units/mg) and all chemicals were purchased from Sigma-Aldrich, USA.

Group I: Received 0.9% saline vehicle, i.p for 7 days and served as a vehicle; Group II: Received a single i.p injection of lipopolysaccharide (10 mg/kg); Group III: Received single i.p injection of lipopolysaccharide (10 mg/kg) and ethanolic extract of *P. murex* (100 mg/kg, i.p) for 7 days; Group IV: received single i.p injection of lipopolysaccharide (10 mg/kg) and ethanolic extract of *P. murex* (200 mg/kg, i.p) for 7 days.

After the experimental period, the rats were anesthetized then decapitated. Brain was removed and the midbrain was dissected. Each dissected midbrain was weighed and stored at -80°C until time brain tissues were processed for measurement of dopamine and its metabolites.

A single intraperitoneal injection of lipopolysaccharide

Table I

Effect of striatal dopamine and its metabolites

Group	Dopamine (µg/g wet tissue)	DOPAC (µg/g wet tissue)	HVA (µg/g wet tissue)
I	14.9 ± 0.9	1.3 ± 0.2	0.9 ± 0.0
II	9.8 ± 1.1	0.5 ± 0.1	0.4 ± 0.0
III	10.1 ± 1.2	0.7 ± 0.1	0.6 ± 0.0
IV	13.2 ± 0.9	1.1 ± 0.1	0.7 ± 0.0

(10 mg/kg) in male Sprague-Dawley rats resulted in a decrease of dopamine and its metabolites levels compared to the control. Dopamine and its metabolites levels were significantly increased in ethanol extract of *P. murex* (200 mg/kg) treated rats compared to in the lipopolysaccharide-treated rats. Ethanol extract of *P. murex* was found to possess potential therapeutic effect against lipopolysaccharide-induced neurotoxicity via preserving dopamine level in nigrostriatal pathway of rat midbrain.

In conclusion, the ethanol extract of *P. murex* may be used for remedy of neurodegenerative disease.

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