

Antidepressant-like Activity of *Andrographis paniculata* in Type-2 Diabetic Rats

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Description

Pharmacological observations suggesting antidepressant-like efficacy of a medicinally used *Andrographis paniculata* extract (AP) in type-2 diabetic are presented in this communication. Efficacies of 10 daily oral doses of 50, 100 and 200 mg/kg/day AP and 15 mg/kg/day imipramine were compared in behavioral despair and learned helplessness tests using type-2 diabetic rats, and bio- and neuro-chemical alterations in the brain tissue of treated animals subjected to learned helplessness test were quantified. Significant imipramine like antidepressant activity of AP was observed even after its lowest daily tested (50 mg/kg/day) in both behavioral tests used, and such efficacy of the extract dose dependently increased with its increasing dose. Imipramine like effects of AP in elevating lower hippocampal levels of norepinephrine, dopamine, and serotonin observed in diabetic rats towards normal values were also observed after its 50 mg/kg/day doses and such efficacy of the extract increased also with its increasing daily doses. Levels of all the three monoamines quantified in 100 mg/kg/day AP treated diabetic rats were significantly higher than those of the non-diabetic animals. Imipramine had no significant effects on body weight losses, hyperglycemia, insulin deficiency, lower catalase and superoxide dismutase activities and higher lipid peroxides in the frontal cortex, and mitochondrial monoamine oxidase activities observed in diabetic animals. All such quantified biochemical and other pathologies observed in diabetic were significantly antagonized even by 50 mg/kg daily oral doses of AP, and its efficacies always increased with its increasing daily doses. These observations strongly suggest that AP could be an herbal alternative for treatments of diabetes-associated depression resistant to imipramine like antidepressants, and that antidepressant-like efficacy of the

extract is most probably due to its inhibitory effects on brain mitochondrial monoamine oxidase activities. The observed beneficial of AP on brain oxidative status could be indicative of its neuro-protective potentials as well. In any case its minimal effective doses for all such efficacies should be below or around 50 mg/kg/day.

Conclusion

The behavioral despair and learned helplessness tests are two well-known and commonly used behavioral tests for assessing depressive state of animals, and they are often used for identifying therapeutic leads against clinical depression. In the present study the depressive state of vehicle treated type-2 diabetic rats in both the tests were more pronounced than non-diabetic ones, and imipramine like antidepressant activity of AP in diabetic rats were also observed in both the tests. Even 50 mg/kg/day dose of AP completely antagonized the exaggerated depressive behavior of diabetic rats in the behavioral despair test and its antidepressant-like efficacies observed in this test after its 100 or 200 mg/kg/day doses were quantitatively almost equal to that of the tested imipramine dose (15 mg/kg/day). Analogous were also the behavioral observations made on the first test day in the learned helplessness test. Efficacy of AP in this test increased somewhat on the subsequent two testing days, and efficacies of 200 mg/kg/day dose of AP were always higher than that of imipramine on all the three test days. These differences could as well be due to the difference in the modes of actions of imipramine and AP.

References:

1. Adams J (2017) Chronic pain can it be cured? J Pharmaceut Drug Devel 4: 105-109.
2. Adams J (2016) The efficacy of yin, yang and chi in the skin on pain. Medicines 3: 1-7.

3. Adams J, Wang X (2015) Control of pain with topical plant medicines. *Asian WÄcŞjc J Tropical Biomed* 5: 930-935.
4. Adams J (2013) WđĜvĜnØvĜ medicine and the †đĂĚŠØŽnĂŰ concept of living in balance. *World J Pharmacol* 9: 73-77.
5. Adams J (2011) Design ŃĂwε in randomized, placebo controlled, double blind clinical trials. *World J Pharmacol* 1: 1-6.