

CHAPTER 33

MEDICAL SCIENCES PHARMACOLOGY

Doctoral Theses

01. TANWAR (Anshul)
Effects of Withania somnifera extract on experimental model of type 2 diabetes mellitus associated cognition deficit and the possible mechanisms in rats.
Supervisor: Prof. Kavita Gulati
Th 26926

Abstract

The study was designed to investigate the effects of *Withania somnifera* (WS) root extract on type 2 diabetes associated cognitive dysfunction by assessing various markers of insulin resistance, neuroinflammation, neurodegeneration, brain oxidative stress etc. in high-fat diet-streptozotocin (HFD-STZ) induced diabetic rats. Initially, SD rats were divided into two groups, Normal control (NC; n=12) and Diabetic control (DC; n=24). NC animals were given normal pellet diet while DC animals were fed with in-house prepared high-fat diet (HFD) for a period of 8 weeks followed by administration of low dose of streptozotocin (STZ; 35 mg/kg, i.p.). NC animals were injected with vehicle citrate buffer after 8 weeks of normal diet. After 4 weeks of STZ administration i.e. after 12 weeks of the study, the levels of fasting blood glucose (FBG), serum triglycerides (TG) and total cholesterol (TC) were estimated. Rats with FBG level ≥ 200 mg/dL were considered as diabetic and selected for further pharmacological screening. After biochemical analysis, animals of normal control (NC) group were further divided into 2 groups while diabetic control animals (DC) were divided into 4 groups containing 6 animals each (n=6) and received treatment for another 8 weeks. The brain insulin resistance was assessed via IRS-1pS616 expression in prefrontal cortex and hippocampus by immunohistochemistry. Diabetic animals treated with WS showed reduced expression of IRS-1pS616 as compared to DC rats. Amyloid deposition was assessed in both tissues by congo red staining and it was found that DC+WS-100 and DC+WS-300 rats showed less deposition of amyloid peptides in prefrontal cortex and hippocampus as compared to DC rats. The results obtained in the study indicated that *Withania somnifera* (WS), also known as Ashwagandha or Indian ginseng, have neuroprotective properties against type 2 diabetes associated cognitive dysfunction and neurodegenerative changes in brain which may be due to reduction of peripheral as well as central insulin resistance. Thus, *Withania somnifera* may be used as a supportive therapy for the prevention of development of insulin resistance and its related CNS complications while further translational research is required.

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02. VERMA (Pankaj)

Experimental Studies to Evaluate the Mode of Action of Traditional Herbal Agents in Bronchial Asthma.

Supervisor: Prof. Kvita Gulati

Th 27161

Abstract

Bronchial asthma is a complex chronic inflammatory disease of the airways characterized by airway inflammation, reversible airflow obstruction and bronchial hyper responsiveness and regulated by several cellular and humoral factors. Pharmacotherapy of bronchial asthma consists of anti-inflammatory and bronchodilator drugs, but their use is generally associated with various side-effects, refractoriness/ relapse and high treatment cost. As a result, there has always been a search for newer therapeutic strategies for the treatment of bronchial asthma.

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