

2012-13

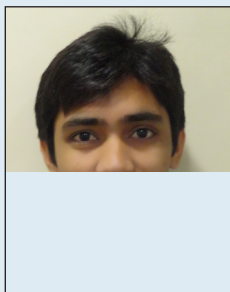
RUNNER-UP

Rajnibhai V. Patel

**PharmInnova
Award**

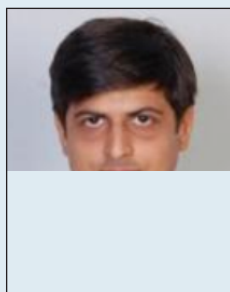
Best M. Pharm Thesis

Runner-Up



Mr. Vishal R Agravat

Research Guide



Dr. Bhavin Vyas

Subject:
Pharmacology

Thesis Title :
Effectiveness of sitagliptin in diabetic hypertensive rats

College:
Maliba Pharmacy College, Surat

Role of Sitagliptin in reduction of blood pressure in patients with diabetes

Outcome of Research

Sitagliptin is the drug indicated for control of blood sugar in diabetes. Sitagliptin has also been shown to reduce blood pressure in diabetic patients. This study investigated a possible mechanism of the drug -sitagliptin, in reducing blood pressure in hypertensive rats, in which diabetes is produced by injecting Streptozotocin (a drug which destroys pancreatic insulin producing cells). Significant reduction in blood pressure and blood glucose levels were noticed after seven days of sitagliptin treatment. Sitagliptin was found to block α_2 - adrenergic receptor (receptor which generally stimulates sympathetic nervous system; mainly responsible for fight and flight response). Based on this, Sitagliptin can be recommended for patients having hypertension associated with diabetes.

Thesis Title: Effectiveness of Sitagliptin in Diabetic Hypertensive Rats

ABSTRACT

Objective:

This study was designed to investigate possible mechanism of sitagliptin to reduce blood pressure in diabetic hypertensive rat.

Material and Method:

Induction of diabetes, freshly prepared solution of streptozotocin (60 mg/kg) in 0.1 M citrate buffer (pH 4.5) was injected intraperitoneally to overnight fasted rats. After eight weeks, Fasting blood glucose level measurement and systolic blood pressure was recorded. Fructose treated rats was given 10%-fructose solution to drink ad libitum for 10 weeks. Measurement of fasting blood glucose level, triglyceride, total cholesterol, systolic blood pressure and pulse rate of the rats were measured before the start of fructose treatment (week 0), at weeks 1, 2, 3, 5, 7, 9, 10 during the period of fructose treatment. In vitro and ex vivo studies have also been done to assess the mechanism of sitagliptin in reduction of blood pressure.

Result:

PASS (Prediction of Activity Spectra for Substances) has been used for estimating the probabilities for sitagliptin to exhibit antihypertensive effect. It was shown that sitagliptin having probability to be active (Pa) of 80% antihypertensive activity. Docking study showed that sitagliptin having more binding affinity with β 2-adrenergic receptor (-9.6 kcal/mol). Following Docking study and PASS online study, it can be predicted that sitagliptin have β 2-adrenergic receptor blocking action. There was significant ($p < 0.05$) reduction in the blood pressure and blood glucose level was observed after 7 days Sitagliptin (100 mg/kg, p.o.) treatment in STZ and Fructose treated rats.

Conclusion:

Our data suggest that Sitagliptin reduced elevated blood pressure and hyperglycemia. Sitagliptin have β 2-adrenergic receptor blocking action. It can thus be useful as drug in hypertension associated with diabetes mellitus.