

# Evaluation of Hypoglycemic Activity of Tramadol in Streptozotocin Induced Diabetic Rats

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## Research Article

**Abstract: Objective:** To evaluate the hypoglycemic activity of Tramadol in streptozotocin induced diabetic rats. **Methods:** In this study, 18 albino rats (Three groups each containing six rats) were included for the study. After 4 days of streptozotocin injection those rats that develop fasting blood sugar >200mg/dl will be selected for the study. The study groups will be divided as follows, Group-1 (CONTROL): Distilled water 0.5ml (oral), Group-2 (STANDARD): Streptozotocin (60mg/kg) i.v. and Group-3 (TEST): Streptozotocin(60mg/kg) i.v.+ Tramadol(0.45mg/kg). Fasting blood glucose levels from experimental animals will be measured on 1, 3, 7, 14 and 28th day by capillary blood glucose method by using glucometer(ACUCHEK). **Results:** In this study after inducing diabetes with streptozotocin(60mg/kg) diabetes was induced and test drug has showed significant hypoglycemic activity comparing to standard drug Glimperide.

**Keywords:** Hypoglycemic Activity, Streptozotocin.

## Introduction

**Background:** Diabetes mellitus is a metabolic disorder characterized by hyperglycemia and disturbance of carbohydrate, protein, and fat metabolism along with long-term complications affecting the retina, kidney, and nervous system<sup>1</sup>. Since Insulin and antidiabetic drugs can cause hypoglycemia so it's necessary to know the hypoglycemic effect of other commonly used drugs in diabetes like tramadol. Tramadol induces hypoglycemia by 2 acceptable complementary mechanisms by binding to mu opioid receptors (MOR) and inhibition of reuptake of noradrenaline and serotonin<sup>2</sup>.

## Objective

To evaluate the hypoglycemic activity of Tramadol in streptozotocin induced diabetic rats.

## Materials and Methods

### Source of Data

- Swiss albino rats weighing around 150 g – 200g of either sex are randomly selected from central animal facility, J S S Medical College, Mysore.

## Inclusion Criteria

- Swiss albino rat weighing 200 g-300g of either sex.
- Animals acclimatized to the conditions of experiments 24 hours prior to the experimentation.

## Exclusion Criteria

- Pregnant animals.
- Diseased animals.

## Chemicals Used

Tramadol, Streptozotocin, Glimperide, Distilled water

## Instruments

Glucometer(ACUCHEK)<sup>4</sup>, Syringe.

## Methodology

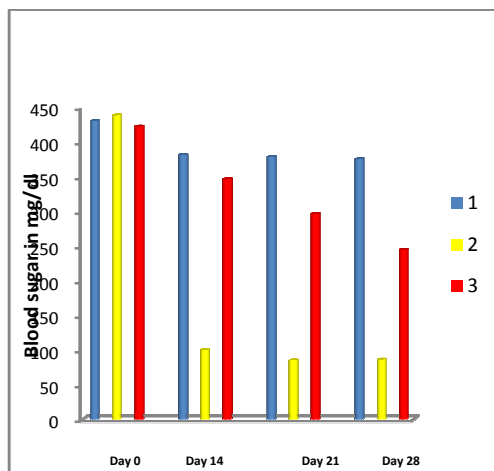
In this study, 18 albino rats (Three groups each containing six rats) were taken from Central animal Facility JSSMC, Mysore. After 4 days of streptozotocin ip injection rats whose blood glucose level was >200mg/dl were selected for the study. The study groups was divided as follows, Group-1 (CONTROL): Distilled water 0.5ml (oral), Group-2 (STANDARD) :Streptozotocin (60mg/kg)<sup>3</sup> i.p +Glimperide0.4mg/kg) p.o and Group-3 (TEST): Streptozotocin (60mg/kg) i.p.+ Tramadol(0.45mg/kg) i.p. Fasting blood glucose levels of experimental animals were measured on 7, 14 and 28th day by using glucometer(ACUCHEK).The results were expressed in mg/dl.

## Result analysis

The effect of the drug under study was presented by calculating mean and SD of the outcome parameters. One way Anova was applied to see the differences between any two groups at a time. Test of significance were carried out at 5%level.SPSS for windows (version 21) was applied in the statistical analysis.

**Table 1:** Hypoglycemic activity of Tramadol in different rat groups

	Mean±SD Day 1	Day 14	Day 21	Day 28
Control	430.8±49.18	381.5±62.05	378.83±79.25	375.66±31.36
Standard	438±94.03	100±13.79	85±9.57	86.5±13.66
Test	429±56.1	346.1±87.82	296.8±57.35	244.65±40.02

**Figure 1:** Blood sugar level in different groups in different days

## Discussion

Tramadol is the most commonly used analgesic in Diabetes<sup>5</sup>. The hypoglycemic activity of Tramadol is compared to the standard drug Glimpiride. Tramadol shows hypoglycemic activity by acting on binding to mu opioid receptors (MOR) and inhibition of reuptake of noradrenaline and serotonin. Glimpiride is a standard drug to which tramadol is compared. Tramadol shows maximum of 55% of hypoglycemic activity of Glimpiride on day 28th. This proves that tramadol can be a good analgesic substitute in Diabetics with minimal adverse effects meanwhile has to be given carefully in patients with risk of hypoglycemia.

## Conclusion

In this study after inducing diabetes with streptozotocin (60mg/kg) diabetes was induced and test drug has showed significant hypoglycemic activity comparing to standard drug Glimpiride. So the results conclude that Tramadol has hypoglycemic activity which should be carefully substituted in diabetics.

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