

# Pioglitazone, right for the body or right for the lab?



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## Abstract

Pioglitazone is a thiazolidinedione (TZDs)(class of medicine). It's important because it is used to treat patients with Type 2 Diabetes. To gauge its efficacy, researchers conducted double-blind studies where they checked how long the drug would last in the system of septic patients, and they later tested what effect pioglitazone had on Parkinson's patients. The results for both these studies were that the scientists found pioglitazone to reduce inflammation in the septic patients, but there was no observable benefit for its use in Parkinson's patients. The results were then collated to describe the effects pioglitazone had on its patients, and how dosage affected their bodies. More research needs to be done on this drug to truly determine its efficacy.

Key words: pioglitazone, diabetes, clinical trials, safety, efficacy

## Introduction

Type 2 Diabetes is a chronic condition that affects an individual's ability to metabolize glucose (Mayo Clinic, 2019). As an agonist of the Peroxisome proliferator-activated receptor gamma (PPAR $\gamma$ ) (a receptor that acts as a transcription factor), pioglitazone effectively increases insulin sensitivity (Bogacka, I., Xie, H., Bray, G.A., & Smith, S.R., 2005, p. 1). For patients with Type 2 Diabetes, this is crucial, since it helps their body metabolize glucose and obtain a safe blood-sugar level. With the prevalent use of pioglitazone in diabetes treatment a possible link between the drug and bladder cancer has arisen. This brings up a few questions:

- Is it ethical to prescribe pioglitazone to patients despite its purported link to bladder cancer?
- Why is treatment so expensive for diabetes when it's so prevalent?

The purpose of our analysis will be to determine the ethics concerning the aforementioned questions.

## Clinical Trials

### Pre Clinicals

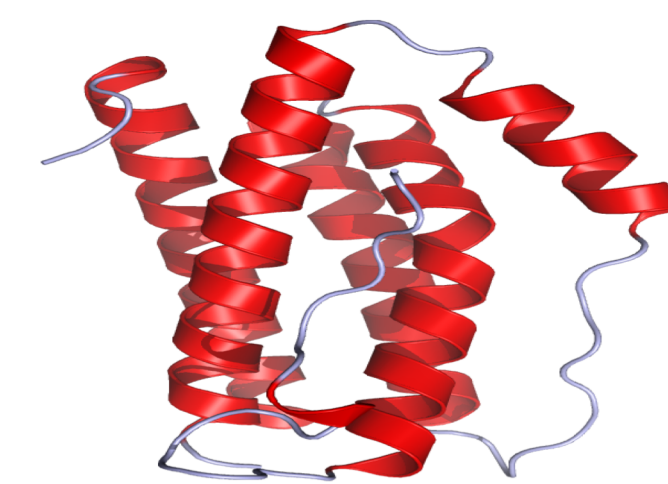
(FDA, 1999) findings:

- 33 to 35 pregnant rats received pioglitazone through gastric intubation
- Rats were assigned to dosage groups where they received doses of 0, 20, 40 and 80 mg/kg/day of pioglitazone
- Rats that received 40 or 80 mg/kg of pioglitazone saw adverse effects in offspring (i.e. stillbirths or weight loss)

### Phase 1:

(Kaplan et al., 2018) findings:

- Randomized, placebo-controlled study
- 12 Pediatric intensive care unit (PICU) septic patients between 30 kg and 90 kg received pioglitazone every 24 hours for 5 days
- Pioglitazone was found to reduce expression of pro-inflammatory proteins (e.g., IL-6)



IL-6 a pro-inflammatory protein

### Phase 2:

(The Lancet Neurology, 2015) findings:

- Double blind placebo control group experiment
- Pioglitazone was found to have no real positive effect on Parkinson's disease based on the Unified Parkinson's Disease Rating Scale)
- Since TZDs are known to have neuroprotective compatibilities, Pioglitazone could still be used for

## Results

- Pioglitazone did not have a major effect on Parkinson's disease but there is still potential for treatment against neurological disease
- In Septic patients, pioglitazone reduced inflammation by reducing the expression of pro-inflammatory proteins
- Pioglitazone helped diabetic patients better metabolize glucose

## Discussion

- Diabetes is a very common disease with about 10.1% of adults that are diagnosed
- The medication price upkeep for diabetes is very demanding with high expenses.
- Prices for diabetes medication should be lowered in order to better the lives of patients.
- Link between pioglitazone is inconclusive
- Ethnicity plays a role in risk of getting bladder cancer when taking pioglitazone
- Pioglitazone is an effective therapeutic that should still be prescribed to patients

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