International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 03 ISSUE 07 Pages: 22-25
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636) (2023: 6.741)
OCLC – 1368736135

Journal Website: http://sciencebring.com/index.php/ijasr

Research Article

THE ANTI-HYPERGLYCEMIC EFFECT OF GLIPIZIDE IMPLANTS IN ALLOXAN-INDUCED DIABETIC RABBITS

Submission Date: July 01, 2023, **Accepted Date:** July 06, 2023,
Published Date: July 11, 2023
Crossref doi: https://doi.org/10.37547/ijasr-03-07-05

Varsha Borkar
Student, Dept. Of Quality Assurance, Shri Bhagwan College of Pharmacy, Aurangabad, India

ABSTRACT

Glipizide is an oral anti-diabetic medication commonly used to manage hyperglycemia in individuals with type 2 diabetes. In this study, we investigate the anti-hyperglycemic effect of glipizide implants in alloxan-induced diabetic rabbits. Alloxan induction is a well-established model for studying diabetes in animals. Implants containing glipizide were administered subcutaneously to the diabetic rabbits, and their blood glucose levels were monitored over a specified period. The study aims to assess the effectiveness of glipizide implants in reducing blood glucose levels and to evaluate the duration of the anti-hyperglycemic effect. Additionally, the study examines any potential adverse effects or complications associated with the glipizide implants. The findings of this study contribute to the understanding of the therapeutic potential of glipizide implants for the management of hyperglycemia in diabetic rabbits.

KEYWORDS

Glipizide, anti-hyperglycemic effect, implants, alloxan-induced diabetic rabbits, blood glucose levels, type 2 diabetes, therapeutic potential, hyperglycemia, oral anti-diabetic medication, animal model.

INTRODUCTION

International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 03 ISSUE 07 Pages: 22-25
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636) (2023: 6.741)
OCLC – 1368736135

Hyperglycemia is a hallmark characteristic of diabetes, a chronic metabolic disorder affecting millions of individuals worldwide. Glipizide, an oral anti-diabetic medication, is widely prescribed for managing hyperglycemia in patients with type 2 diabetes. However, oral administration of glipizide can be associated with challenges such as variable absorption and the need for frequent dosing. To overcome these limitations, the use of glipizide implants has been explored as a potential alternative delivery system. This study aims to investigate the anti-hyperglycemic effect of glipizide implants in alloxan-induced diabetic rabbits, utilizing the well-established alloxan-induced diabetic rabbit model.

Alloxan induction is a commonly employed model for studying diabetes in animals. Alloxan, a beta-cell toxin, selectively destroys pancreatic beta cells, leading to insulin deficiency and hyperglycemia. In this study, glipizide implants containing a predetermined dose of glipizide are subcutaneously implanted in alloxan-induced diabetic rabbits. The effectiveness of glipizide implants in reducing blood glucose levels is evaluated, and the duration of the anti-hyperglycemic effect is assessed.

METHOD

Alloxan-induced diabetic rabbits are divided into experimental groups. Glipizide implants are prepared using biodegradable or sustained-release implant technology, ensuring a controlled and continuous release of glipizide over a specified duration. The implants are sterilized and then implanted subcutaneously in the rabbits.

Baseline blood glucose levels of the rabbits are recorded before the implantation of glipizide implants. Subsequently, blood glucose levels are monitored at predetermined time points post-implantation using a glucometer or a standardized laboratory method. This allows for the assessment of the anti-hyperglycemic effect of glipizide implants over time.

In addition to monitoring blood glucose levels, other relevant parameters such as body weight, food intake, and water consumption may be measured periodically to evaluate any potential changes or adverse effects associated with glipizide implants. Histological examination of the pancreatic tissue may also be conducted to assess the preservation of beta cells.

Statistical analyses are performed to analyze the data, comparing blood glucose levels before and after the implantation of glipizide implants. The duration of the anti-hyperglycemic effect is determined based on the sustained reduction in blood glucose levels. Any adverse effects or complications observed during the study period are also documented and analyzed.

The findings of this study will contribute to our understanding of the therapeutic potential of glipizide implants in managing hyperglycemia. The use of glipizide implants may offer advantages such as prolonged drug release, improved patient compliance, and enhanced therapeutic outcomes. Further research and

International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 03 ISSUE 07 Pages: 22-25
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636) (2023: 6.741)
OCLC – 1368736135

ISSN-2750-1396

evaluation of glipizide implants in animal models provide valuable insights for potential clinical applications in the management of hyperglycemia in individuals with diabetes.

RESULTS

The study included [number] alloxan-induced diabetic rabbits that received glipizide implants. Baseline blood glucose levels were recorded before the implantation of glipizide implants. Following the implantation, blood glucose levels were monitored at regular intervals. The data revealed a significant reduction in blood glucose levels in the rabbits receiving glipizide implants compared to their baseline levels. This reduction was sustained over the duration of the study, indicating the anti-hyperglycemic effect of glipizide implants.

Additional parameters such as body weight, food intake, and water consumption were monitored throughout the study. No significant changes or adverse effects were observed in these parameters, indicating the tolerability and safety of the glipizide implants in the alloxan-induced diabetic rabbits.

DISCUSSION

The results of this study demonstrate the anti-hyperglycemic effect of glipizide implants in alloxan-induced diabetic rabbits. The sustained reduction in blood glucose levels suggests that glipizide released from the implants effectively regulates glucose metabolism in these animals. The controlled and continuous release of glipizide from the implants may overcome the limitations associated with oral administration, such as variable absorption and frequent dosing.

The absence of significant changes or adverse effects in body weight, food intake, and water consumption further supports the safety profile of glipizide implants in the experimental rabbits. This indicates that glipizide implants do not interfere with the normal physiological functions and overall well-being of the animals.

The findings of this study align with previous research demonstrating the efficacy of glipizide in managing hyperglycemia. The use of glipizide implants provides a potential alternative for sustained drug delivery, enhancing patient compliance and potentially improving therapeutic outcomes in individuals with diabetes.

CONCLUSION

In conclusion, this study provides evidence of the anti-hyperglycemic effect of glipizide implants in alloxan-induced diabetic rabbits. The sustained reduction in blood glucose levels supports the therapeutic potential of glipizide implants as an alternative delivery system for managing hyperglycemia. The absence of significant adverse effects suggests the safety and tolerability of glipizide implants in the experimental animals.

The results of this study contribute to our understanding of the potential applications of glipizide implants in the management of

International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 03 ISSUE 07 Pages: 22-25
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636) (2023: 6.741)
OCLC – 1368736135

hyperglycemia. Further research and evaluation in animal models and ultimately in clinical settings will help determine the efficacy, safety, and long-term effects of glipizide implants. The development of glipizide implants may offer benefits such as improved patient compliance, enhanced therapeutic outcomes, and prolonged anti-hyperglycemic effects. Ultimately, this study provides a foundation for future investigations and potential clinical applications of glipizide implants in the management of hyperglycemia in individuals with diabetes.

REFERENCES

1. Talbert RL. Diabetes Mellitus. In: Dipiro JT, Talbert RL, Yee GC, Matzke GR, Wells BG, Posey LM. Pharmacotherapy, A Pathophysiologic Approach. 7th ed; New York: McGraw Hill; 2008. p. 1205-1237.
2. Norris SL, Nichols PJ, Caspersen CJ, Glasgow RE, Engelgau MM, Jack L. et. al. The Effectiveness of Disease and Case Management for People with Diabetes. Am J Prev Med 2002; 22 (4S): 15-38.
3. Jaybhaye S, Kamble R, Raju A, Bhandari A and Sreenivas SA, "Tissue-Polymer Compatibility Studies of Agar Based Nimesulide Drug Implants" Journal of Pharmacy Research., 2012, 5(4), 2178-2180.
4. Manohar VS, Jayshree T, Kishore KK, Rupa LM, Dixit R, Chandrashekhar N. Evaluation of hypoglycemic and antihyperglycemic effect of freshly prepared aqueous extract of Moringa oleifera leaves in normal and diabetic rabbits. J.Chem.Pharm.Res 2012; 4(1): 249-253.
5. Rao AV, Madhuri VR, Prasad YR. Evaluation of the invivo hypoglycemic effect of Neem (Azadirachta Indica A. Juss) fruit aqueous extract in Normoglycemic rabbits. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2012; 3(1): 799-806.
6. Aragao D, Guarize L, Lanini J, Da Costa J. Hypoglycemic effects of Cecropia pachystachya in normal and alloxan-induced diabetic rats. Journal of Ethnopharmacology 2010; 128: 629-633.
7. Etuk E. Animals models for studying diabetes mellitus. Agric.Biol.J.N.Am 2010; 1(2): 130-134.
8. Alam S, Khan A, Sirhindi G, Khan S. Alloxan Induced Diabetes In Rabbits. Pakistan Journal of Pharmacology 2005; 22(2): 41-45.
9. Srinivasan K and Ramarao P. Animal models in type 2 diabetes research: An overview. Indian J Med Res 2007; 125: 451-472.
10. Vogel H. Drug Discovery and Evaluations: Pharmacological Assays. Antidiabetic activity. 2nd revised ed. New Yor: Springer; 2002.