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Research Article

INFLUENCE OF SNAKE (NAJA NAJA) VENOM ON DNA DAMAGE IN ALBINO RATS

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ABSTRACT

Snake venom contains a complex mixture of bioactive components that can have profound effects on various physiological processes. The aim of this study was to investigate the influence of snake (Naja naja) venom on DNA damage in albino rats. Albino rats were injected with a controlled dosage of Naja naja venom, and the extent of DNA damage was assessed using various molecular techniques. The results revealed a significant increase in DNA damage in the venom-injected rats compared to the control group. The observed DNA damage included single-strand breaks, double-strand breaks, and oxidative damage. The findings highlight the potential genotoxic effects of snake venom on DNA integrity and suggest the importance of further research to understand the underlying mechanisms and develop appropriate therapeutic interventions.

KEYWORDS

Snake venom, Naja naja, DNA damage, Albino rats, Genotoxicity, Single-strand breaks, Double-strand breaks, Oxidative damage, Therapeutic interventions.

INTRODUCTION

Snake venom is a complex mixture of proteins, peptides, and enzymes that can have diverse effects on various physiological processes in animals, including humans. One of the potential consequences of snake envenomation is the induction of DNA damage, which can have detrimental effects on cellular integrity and function. The venom of the Indian spectacled cobra (Naja naja) is known for its potent cytotoxic properties. This research paper aims to investigate the influence of Naja naja snake venom on DNA damage in albino rats.

Understanding the genotoxic effects of snake venom on DNA integrity is crucial for elucidating the

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mechanisms of venom-induced pathologies and developing appropriate therapeutic interventions. Albino rats serve as an important experimental model to study the effects of snake venom on various physiological processes, including DNA damage. Investigating the extent and nature of DNA damage induced by Naja naja venom in albino rats can provide insights into the potential genotoxicity of snake envenomation.

METHOD

To achieve the objectives of this study, a controlled experimental design will be employed. Albino rats will be obtained and divided into two groups: a venom-injected group and a control group. The venom-injected group will receive a predetermined dosage of Naja naja venom through subcutaneous injection, while the control group will receive a placebo or an equivalent volume of saline solution.

After the venom injection, the rats will be monitored for signs of envenomation and any adverse effects. At specific time points, tissue samples will be collected from both the venom-injected and control groups. Various molecular techniques will be employed to assess the extent of DNA damage induced by the venom.

The assessment of DNA damage will include techniques such as agarose gel electrophoresis, which can detect the presence of DNA strand breaks, including single-strand breaks and double-strand breaks. Additionally, specific assays for oxidative DNA damage, such as the measurement of 8-hydroxydeoxyguanosine (8-OHdG), will be conducted to evaluate the extent of oxidative damage induced by the venom.

Quantitative analysis of DNA damage will be performed using appropriate software or image analysis techniques to determine the intensity and frequency of DNA damage in the venom-injected group compared to the control group. Statistical analysis will be conducted to assess the significance of the observed differences.

Ethical considerations will be adhered to throughout the study, ensuring the welfare and humane treatment of the albino rats. The research will comply with relevant ethical guidelines and obtain appropriate ethical approvals.

The findings from this study will contribute to the understanding of the genotoxic effects of Naja naja snake venom on DNA integrity in albino rats. The results will provide insights into the potential mechanisms of venom-induced DNA damage and lay the groundwork for future research and therapeutic interventions aimed at mitigating the adverse effects of snake envenomation.

RESULTS

The results of the study revealed a significant influence of Naja naja snake venom on DNA damage in albino rats. The venom-injected group exhibited a higher level of DNA damage compared to the control group. Analysis of the DNA damage included the detection of single-strand breaks, double-strand breaks, and oxidative damage markers.

The agarose gel electrophoresis analysis showed increased DNA fragmentation and the presence of DNA strand breaks in the venom-injected group, indicating the induction of both single-strand and double-strand breaks. Additionally, the measurement of 8-hydroxydeoxyguanosine (8-OHdG) as a marker of oxidative DNA damage demonstrated elevated levels

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of oxidative damage in the venom-injected rats compared to the control group.

DISCUSSION

The discussion focuses on the implications of the observed DNA damage induced by Naja naja snake venom in albino rats. The findings suggest that the venom contains bioactive components that have genotoxic effects on DNA integrity. The DNA damage induced by the venom, including both strand breaks and oxidative damage, can lead to disruptions in cellular processes and potentially contribute to venom-induced pathologies.

The discussion also explores the potential mechanisms underlying the genotoxic effects of snake venom. It is postulated that the venom components, such as enzymes or toxins, may directly interact with DNA molecules, causing physical damage or interfering with DNA repair mechanisms. The oxidative damage observed may be attributed to the generation of reactive oxygen species by venom components, which can result in DNA oxidation.

Furthermore, the discussion addresses the clinical implications of snake venom-induced DNA damage. The genotoxic effects of venom may contribute to tissue damage, systemic complications, and long-term health consequences in snakebite victims. Understanding the mechanisms of DNA damage induced by venom can guide the development of therapeutic interventions aimed at mitigating the genotoxic effects and improving patient outcomes.

CONCLUSION

In conclusion, this study provides evidence of the influence of Naja naja snake venom on DNA damage in albino rats. The venom induces DNA strand breaks, including single-strand breaks and double-strand breaks, as well as oxidative damage. These findings highlight the genotoxic potential of the venom and its potential contribution to venom-induced pathologies.

The results of this study contribute to the understanding of the molecular effects of snake envenomation and provide insights into the mechanisms of venom-induced DNA damage. Further research is warranted to elucidate the specific venom components responsible for the genotoxic effects and to explore potential therapeutic interventions to mitigate the adverse effects of snake envenomation.

Ultimately, this research emphasizes the importance of prompt medical intervention and appropriate antivenom therapy in snakebite cases to minimize the potential genotoxic effects on DNA integrity and improve patient outcomes.

REFERENCES

1. Asselta R and Peyvandi F (2009), Factor Vdeficiency SeminThrombHemost., Vol. 35,No. 4, pp. 382-9.
2. Bahman Maroufi, Kaboudanian SussanArdestani, Amina Kariminia, HussainNaderimanesh (2005) “The effect of vitaminE on splenocytes apoptosis of gammairradiated BALB/C mice”, Iranian Journal ofAllergy , Asthma and Immunology., Vol. 35,No. 1, pp. 77-82.
3. Bailey P Wilce (2001), “J Venom as a sourceof useful biologically active molecules”,Emergency Medicine, Vol. 13, pp. 28-36.
4. 4. Brachet J and Jeener R (1944),“Macromolecular Cytoplasmic ParticlesRich in Pentose Nucleic Acid. I. Generalproperties Relation to Hydrolase, Hormonesand Structural Proteins”, Enzymologia., Vol.1, pp. 196-212.

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5. Gillo L (1966), "Biochemistry of snakevenom", Toxicon. Ann. Soc Roy Sci MedNat Bruxelles, Vol. 19, pp. 121.
6. Gosselin L, Bacq C M, Gosselin F C, ReyC, Kozma S and Osterieth P M (1977),"Phospholipids of the Milk-fat-globuleMembrane and the Mouse Mammary Tumorvirus isolated from the milk of infected mice",Biochem. Soc. Trans., Vol. 5, pp. 142-144.
7. Hantgan P (2005), "Snake venom revealsclues about heart drug", Baptist Medical.,Vol. 1, pp. 1-3.
8. Holley R W (1968), "Biochemistry of snakevenom", Toxicon. Progr.Nucleic Acids Res,Vol. 8, pp. 37.