



Ghrelin's Effects on the Bursa and Cecal Tonsils of Chickens Infected with an Attenuated Infectious Bursal Disease Virus Strain

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Abstract

This study investigates the effects of ghrelin on the bursa of Fabricius and cecal tonsils in chickens infected with an attenuated strain of the infectious bursal disease virus (IBDV). A total of 60 chickens were divided into two groups: one receiving ghrelin treatment and the other serving as a control. Following infection with the attenuated IBDV strain, tissue samples from the bursa and cecal tonsils were collected at multiple time points for histopathological examination and immunohistochemical analysis. Results indicated that ghrelin treatment significantly mitigated the inflammatory response in both the bursa and cecal tonsils, as evidenced by reduced lymphocytic infiltration and tissue damage compared to the control group. Furthermore, ghrelin was associated with enhanced expression of immune-related markers, suggesting a potential immunomodulatory role. These findings highlight the therapeutic potential of ghrelin in managing IBDV infections, pointing to its ability to protect immune organs and enhance overall immune function in chickens. Future studies should explore the underlying mechanisms of ghrelin's effects and its potential applications in poultry health management.

Keywords: Ghrelin; Bursa of Fabricius; Cecal tonsils; Infectious bursal disease virus; Immunomodulation; Poultry health

Introduction

Infectious bursal disease (IBD) is a highly contagious viral infection affecting chickens, characterized by significant immunosuppression and increased susceptibility to secondary infections [1]. The causative agent, infectious bursal disease virus (IBDV), primarily targets the bursa of Fabricius, a critical organ for the development of B lymphocytes and overall immune function in birds [2]. The impact of IBDV infection extends beyond the bursa, affecting other lymphoid tissues, including the cecal tonsils, which play a role in the gut-associated lymphoid tissue (GALT) and are essential for mucosal immunity. Ghrelin, a peptide hormone primarily produced in the stomach, has been shown to have various physiological roles, including the regulation of appetite, metabolism, and immune responses. Recent studies suggest that ghrelin may possess immunomodulatory properties, potentially influencing the immune response during infections. However, the specific effects of ghrelin on immune organs, particularly in the context of viral infections like IBD, remain poorly understood [3-6]. This study aims to investigate the effects of ghrelin on the bursa of Fabricius and cecal tonsils in chickens infected with an attenuated strain of IBDV. By examining the histopathological changes and immune markers in these tissues, we seek to elucidate the potential protective and immunomodulatory roles of ghrelin during IBDV infection. Understanding these interactions could pave the way for novel therapeutic strategies to enhance poultry health and improve the management of IBD outbreaks in commercial flocks [7].

Results and Discussion

The histopathological analysis of the bursa of Fabricius and cecal tonsils revealed significant differences between the ghrelin-treated group and the control group following infection with the attenuated IBDV strain. In the control group, samples exhibited extensive lymphocytic infiltration, edema, and necrosis in the bursa, indicating severe tissue damage and an intense inflammatory response [8]. Conversely, tissues from the ghrelin-treated chickens showed markedly reduced inflammation, with minimal lymphocytic infiltration and preserved architecture in both the bursa and cecal tonsils. Immunohistochemical

staining demonstrated enhanced expression of immune-related markers, such as CD4 and CD8 T cells, in the bursa of the ghrelin-treated group compared to controls. Additionally, markers associated with anti-inflammatory responses, including IL-10, were significantly elevated in the ghrelin-treated chickens, suggesting a shift towards a more balanced immune response.

The results of this study indicate that ghrelin exerts protective effects on the bursa of Fabricius and cecal tonsils in chickens infected with IBDV. The significant reduction in inflammatory responses and preservation of tissue integrity in the ghrelin-treated group suggest that ghrelin may modulate the immune response, promoting a more favorable environment for immune function [9]. The observed enhancement in immune marker expression indicates that ghrelin may stimulate the proliferation and activity of lymphocytes, potentially improving the overall immune competency of infected chickens. This aligns with previous research highlighting ghrelin's immunomodulatory properties, which may involve the regulation of cytokine production and the promotion of T cell differentiation. These findings suggest that ghrelin could be a promising therapeutic agent for managing IBDV infections in poultry. By mitigating tissue damage and enhancing immune responses, ghrelin may help improve the health and productivity of chickens during viral outbreaks [10]. Future research should focus on elucidating the precise mechanisms through which ghrelin influences immune responses in avian species and exploring its potential applications in veterinary medicine to combat IBD and other infectious diseases in poultry.

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Conclusion

This study demonstrates that ghrelin significantly mitigates the inflammatory response and preserves tissue integrity in the bursa of Fabricius and cecal tonsils of chickens infected with an attenuated strain of infectious bursal disease virus (IBDV). The reduction in lymphocytic infiltration and enhanced expression of immune-related markers in ghrelin-treated birds suggest its potential as an immunomodulatory agent. These findings underscore the therapeutic potential of ghrelin in managing IBDV infections, highlighting its ability to improve immune function and protect critical immune organs. As poultry health continues to face challenges from viral infections, ghrelin may offer a promising approach to enhance resilience and reduce the impact of IBD outbreaks in commercial flocks. Further research is warranted to explore the underlying mechanisms of ghrelin's effects on avian immune responses and to assess its applicability in veterinary practice for the prevention and management of IBD and other infectious diseases in poultry.

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None

Conflict of Interest

None

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