

Betaendorphins: Immune-Stimulatory Activity

Shrihari TG*

Assistant Professor, Department of Oral Medicine and Oral Oncology, Krishna Devaraya College of Dental Sciences and Hospital, Bangalore, Karnataka, India

***Corresponding Author:** Shrihari TG, Assistant Professor, Department of Oral Medicine and Oral Oncology, Krishna Devaraya College of Dental Sciences and Hospital, Bangalore, Karnataka, India.

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Abstract

Endorphins are endogenous morphine, produced in pituitary gland response to stress. There are three types of endorphins beta endorphins, enkephalins, and dynorphins binds to mu, kappa, and delta receptors situated on nervous system and immune cells. Betaendorphins are an abundant endorphins, has immune stimulatory activity by activation of immune cells and inhibition of chronic psychological stress induced NF-KB key transcription factor involved in immune modulation by release of pro-inflammatory cytokines. This article highlights about the basic research findings of betaendorphins and its immune-stimulatory activity.

Keywords: HPA-axis; Immune Modulation; Neuropeptides; Cortisol; NF-KB; IL-1; IL-6; COX-2; TNF- α

Introduction

Endorphins are endogenous morphine produced in pituitary gland response to stress and pain. There are three types of endorphins betaendorphins, enkephalins, and dynorphins binds with mu, kappa and delta receptors situated on nervous system and immune cells. Betaendorphins are an abundant endorphins, more potent than morphine, synthesized and stored in the anterior pituitary gland, precursor of POMC (Proopiomelanocortin). During stress the endorphin receptors are increased and bind abruptly with endorphins.

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Endorphin receptors are situated on most innate and adaptive immune cells. Binding of betaendorphins to the mu receptors situated on innate and adaptive immune cells such as neutrophils, macrophages, dendritic cells, natural killer cells, T cells, B cells, and mast cells, results in activation of immune cells (immune-stimulatory activity), produce opsonin, granzyme-B, IFN- γ and antibodies involved in anti-inflammatory activity, antiviral activity, antibacterial activity and antitumor activity [1-20].

Beta endorphins inhibits immune modulation by inhibiting chronic psychological stress induced activation of a NF-KB a key transcription factor induce inflammatory mediators by inhibiting HPA-axis mediated release of cortisol, ACTH and noradrenaline neuropeptides through autonomic nervous system results in activation of inflammatory mediators such as IL-1 β , IL-6, TNF- α and COX-2 which activates NF-KB a key transcription factor involved in chronic inflammation induced immune modulation by releasing pro-inflammatory cytokines such as IL-4, IL-5, IL-10, IL-13, IL-17 and TGF- β [22,24,26].

Beta-endorphins inhibits chronic psychological stress induced activation of NF-KB a key transcription factor involved in chronic inflammation, tumor progression, which antagonize P53 tumor suppressor gene, a guardian of the genome rather than gene, involved in immunesurveillance, mutated in more than 50% of all cancers. mutated in more than 50% of all cancers involved in immune surveillance by inflammatory mediators such as NO (nitric oxide), ROS (Reactive oxygen species), and RNS (Reactive nitrogen species) free radicals, AID (Activation induced cytidine deaminase) enzyme expressed by NF-KB transcription factor [20-27].

Endorphins are produced during yoga, pranayama, mindful meditation, intense physical exercise, Love, Tender, care, acupuncture, music therapy, pranic healing, sympathy and empathy in caring the patient [5-10].

Conclusion and Future Perspective

Beta-endorphins are an abundant endorphins synthesized and stored in the anterior pituitary gland. It has got immune-stimulatory activity and inhibits chronic psychological stress induced activation of NF-KB a key transcription factor mediated immune modulation. Beta endorphins can be used in holistic preventive and therapeutic applications in treatment of various diseases such as cancer and infectious diseases without adverse effects and inexpensive. Thorough understanding of beta-endorphins, mechanism of action and it's immune-stimulatory activity, dose dependent duration of action, prognosis related to disease helpful for future therapeutic applications.

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