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BETA – Endorphins – A Novel Natural Holistic Healer

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Abstract

Endorphins are endogenous morphine synthesized and stored in the anterior pituitary gland in response to pain and stress. There are three types of endorphins such as β-endorphins, dynorphins and enkephalins, has receptors on brain, nervous system and immune cells. Beta-endorphins are abundant endorphins involved in immune-stimulatory activity, stress buster, anti-inflammatory and analgesic activity used for therapeutic, promotive, palliative, preventive, holistic approach of treating diseases such as infectious diseases, cancer, auto-immune diseases. This article briefs about the role of Beta-endorphins and it's mechanism of actions on various diseases.

Keywords: Stress; IL-1: Interleukin 1; IL-6: Interleukin 6; TNF-œ: Tumor necrosis factor-alpha; NF-kB: Nuclear Factor-kappa B receptor; HPA axis, Corticotrophic releasing hormone (CRH)

Abbreviations: IL-1: Interleukin 1; IL-2: Interleukin 2; IL-6: Interleukin 6; IL-12: Interleukin-12; TNF-œ: Tumor Necrosis Factor-Alpha; NF-kB: Nuclear Factor-Kappa B Receptor; STAT-3: Signal Transducer and Activator of Transcription-3; Th1: Type 1 Helper Cells; Th2: Type 2 Helper Cells; mmp-2,9: Matrix-Metallo Proteases 2,9; Tregs: Regulatory T-cells; IL-18: Interleukin 18; IFN-γ: Interferon Gamma; IL-10: Interleukin 10

Introduction

Holistic healing is a whole person healing, human body works as a whole. Human body has a capacity to heal by itself yields better results without any adverse effects, inexpensive, has preventive, therapeutic, promotive and palliative role in treatment of various diseases. One of the holistic method of healing is by endorphins [1,2].

Endorphins are natural opioids, potent endogenous morhine, neuropeptide, synthesized and stored in the anterior pituitary gland in response to stress and pain, through release of corticotrophic releasing hormone (CRH) from hypothalamus. Endorphins are of three types, β-endorphins, dynorphins, enkephalins has an affinity for mu, delta, kappa receptors present on nervous system, brain and on immune cells [3-6]. Beta-endorphins are abundant endorphins, in inflammation receptors of endorphins are increased in peripheral nerves, binding of β-endorphins produced by immune cells to any of the receptors such as mu, kappa, delta on peripheral nerves activate anti-inflammatory cytokines such as IL-18, IL-10, IFN-Gamma [6-10].

Factors responsible for release of endorphins

Physical exercise, pranayama, meditation, yoga, music therapy, acupuncture involved in endorphins release [3-5,11-20].

Mechanism of action of beta-endorphins related to disease

Beta-endorphins have an anti-carcinogenic activity by activating IFN-gamma, perforin, granzyme-B, by NK cells and macrophages, which involve in antiviral activity, apoptotic activity, decrease cellular proliferation, mindful meditation alters the environment of gene expression in tumor microenvironment [2,12,15,21,22]. Anti-inflammatory activity of Beta-endorphins by activating anti-inflammatory cytokines such as IL-18, IL-10, IFN-Gamma and decreasing pro-inflammatory cytokines such as IL-1, IL-6 and INF-α mediated release of COX-2 inflammatory mediator activates key transcription factors NF-KB and STAT-3 involved in tumor progression by cellular proliferation (cyclin D, C-myc, P21), cell survival (BCL-2, BCL-XL, CFLIP, survivin), angiogenesis (IL-8, VEGF, COX-2), genomic instability(ROS, RNS, NO), immune suppression(TGF-Beta,IL-10, iNOS), invasion and metastasis (MMP-2, 9, E-selectin, CXCR4, uPA, Fibronectin, ICAM-1, ELAM-1,VCAM-1). NF-KB transcription factor antagonize the action of P53 tumor suppressor gene, which is altered in more than 50% of all cancers. Beta-endorphins suppress NF-KB transcription factor activity, there by inhibiting the mutation and suppression of P53 tumor suppressor gene. It also involved in epithelial expression of E-Cadherin induced cell adhesion, loss of E-Cadherin involved in epithelial to mesenchymal transition induced tumor invasion [12,13,16,21-23].

Opioid receptors are present on most of all immune cells such as neutrophils, T-lymphocytes, B-lymphocytes, macrophages, NK cells, dendritic cells binds with Beta-endorphins results in activation of innate and adaptive immune cells such as NK cells, macrophages, T cell proliferation, B cells results in release of IFN-Gamma, perforin, granzyme-B and antibodies [2,5,24].

In the peripheral nervous system, beta-endorphins binds to mu opioid receptors results in decreased release of substance P, a neurotransmitter of pain and inflammation results in analgesic activity and reduce inflammation [2,21,22,24].

In the central nervous system, beta endorphins binds to mu receptors results in decrease GABA neuro-inhibitory transmitter and release of dopamine neurostimulatory neurotransmitter results in analgesic, euphoric, self-reward, cognitive development and tranquility of mind. It has a stress buster activity by suppressing hypothalamic pituitary adrenal (HPA)-axis activated in response to stress, anger, hatred, jealousy, frustration, depression, release corticotrophic releasing hormone and norepinephrine neuropeptide's through sympathetic nervous system activity, which belong to autonomic nervous system mediated release of inflammatory mediators such as IL-1, IL-6,

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TNF-α and COX-2 inflammatory mediators activates a key NF-KB transcription factor involved in chronic inflammation, conversion of Th1 to Th2 lymphocyte type, immunemodulation by alteration of T reg cells (T regulatory cells), which otherwise involved in self-tolerance and immune homeostasis, later results in tissue damage and cellular changes by activating matrix-metalloproteases (mmp-2,9) leads to auto-immune diseases [2,5,17,18,24-26].

It also has an anti-aging activity by decreasing release of free radicals (ROS, RNS) from immune cells such as neutrophils, macrophages, dendritic cells and cytokines such as IL-1, IL-8, TNF-α during oxidative burst, which is involved in DNA damage, genetic mutation, cell aging, cell death and beta-endorphins involved in lengthening of telomeres, which otherwise shorten with aging [2,24].

Conclusion

Endorphins are neuropeptides synthesized from anterior pituitary gland in response to stress from hypothalamus through releasing corticotrophic releasing hormone and noradrenaline neuropeptide's. Beta-endorphins is one of the abundant type of endorphins has various activities such as immunostimulatory, analgesic, stress buster and anti-inflammatory activity. Thorough understanding of beta-endorphins and their dose dependent action is helpful for future preventive, therapeutic, promotive, palliative holistic treatment of various diseases such as autoimmune diseases, cancer and infectious diseases without adverse drug effects and which is inexpensive.

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