

## Beta-Endorphin- Antiviral Activity

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### Opinion

Endorphins are endomorphines, neuropeptides, produced in response to pain and stress in the pituitary gland. Endorphins are of three types betaendorphin, enkephalin, dynorphin binds with  $\mu$ ,  $k$  and  $\delta$  receptors respectively located on the nervous system and immune cells. Betaendorphine is a most abundant endorphine, synthesized and stored in the anterior pituitary gland, precursor of POMC (Proopiomelanocortin) is a large protein released in response to CRH during stress. POMC cleaved into MSH, ACTH, and betaendorphine. Most immune cells produce endorphins because it possesses m-RNA transcripts for POMC [1-4].

Binding of betaendorphine to the  $\mu$  receptors situated on the innate and adaptive immune cells such as neutrophils, macrophages, mast cells, T cells, B cells, NK cells, dendritic cells, results in activation of innate and adaptive immune cells (immunestimulatory activity) release IFN- $\gamma$ , opsonin, granzyme-B and antibodies and inhibition of inflammatory mediators such as IL-1, TNF- $\alpha$ , IL-6 involve in analgesic activity, anti-inflammatory activity, anti-viral activity, and anti-tumor activity.

Betaendorphine produced during mindful meditation, pranayama, intense physical exercise creates a psychological relaxed state known as "RUNNER'S HIGH", music therapy, Love, Tender, care, sex, massage therapy, acupuncture, singing, dancing, sympathy and empathy in caring the patient [3-8]. Betaendorphin is an abundant endorphine has got anti-viral activity by activating immune cells. It can be used in holistic preventive, therapeutic approach in management of viral diseases without adverse effects and inexpensive. Thorough understanding of betaendorphin, its mechanisms of actions particularly to antiviral activity, dose dependent duration of action helpful for future therapeutic purpose.

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