EFFECT OF ELECTROACUPUNCTURE (EA) AND MELATONIN (MT) ON IMPROVING THE IMMUNE FUNCTION OF THE BODY AND ITS MECHANISM

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ABSTRACT

As we know trauma stress is a well-known entity and may be defined as a threat to the immune function. The pineal neurohormone melatonin (MT) is able to exert modulating effects on immune function. The present study was to observe the effect of melatonin (MT) or electroacupuncture (EA) or EA+MT on the immunosuppression induced by trauma stress; and to evaluate the role of β-endorphin (β-EP), adrenocorticotrophin (ACTH) in immunomodulation of traumatized rats.

Effect of EA or/and MT on immune function in traumatized rats

EA stimulation of Zusanli (St. 36) and Lanwei (Extra 37) points or 5mg/kg MT alone could antagonize the depressed lymphocyte proliferation, natural killer (NK) cell activity and ConA induced IL-2 production induced by trauma stress. EA combined with MT 5mg/kg could further antagonize the depressed immune function.

Effect of EA or/and MT on the synthesis and release of β-EP and ACTH in hypothalamo-pituitary axis in traumatized rats

Hypothalamo-pituitary axis is able to modulate immune function by releasing neuropeptides such as β-EP and ACTH, which are closely related to immunomodulation, to peripheral circulation. Using pituitary culture, radioimmunoassay, ELISA and RT-PCR to investigate the effects of EA or/and MT on pre-opiomelanocortin (POMC) derived peptides synthesis and release in hypothalamus and pituitary in traumatized rats. It was shown that POMC mRNA synthesis and β-EP and ACTH contents in hypothalamus were enhanced after surgical trauma. EA or MT 5mg/kg alone could inhibit the expression of POMC mRNA and decrease the β-EP.
and ACTH contents in hypothalamus. EA and MT 5mg/kg together could further inhibit the expression of POMC mRNA and further depress the ACTH content in hypothalamus. But β-EP and ACTH contents in pituitary were decreased in traumatizes rats. EA or MT alone could increase the β-EP and ACTH contents in pituitary, which were further increased by EA+MT. After trauma in pituitary β-EP and ACTH release was increased. MT or EA could depress the pituitary β-EP and ACTH release.

It suggested that EA combined with MT could depress the activity of POMC-derived peptides stimulated by trauma stress, and were capable of collaborating each other to inhibit the synthesis and release of β-EP and ACTH in the pituitary.

**Effect of EA and MT on plasma β-EP and ACTH in traumatized rats**

As β-EP and ACTH released from the pituitary could reach the lymphocyte to modulate the immune function through peripheral blood circulation. The IL-2 production of normal rats was markedly decreased when splenocytes were incubated in the culture medium of the pituitaries from traumatized rats. EA treated pituitary culture medium could partially reverse this effect. It suggested that there was a relationship between the immune function and the change of pituitary release.

EA or MT 5mg/kg could depress β-EP and ACTH contents in plasma. EA+MT 5mg/kg could further decrease β-EP and ACTH contents in plasma compared with EA or MT alone.

It indicated that EA and MT could change the level of β-EP and ACTH in peripheral blood circulation, thereby relieve the immunosuppression induced by the activated POMC system in traumatized rats.

**Effect of EA and MT on the synthesis and release of β-EP and ACTH in lymphocytes of spleen in traumatized rats**

The β-EP and ACTH contents in spleen lymphocyte were markedly enhanced after trauma. EA or MT 5mg/kg alone could depress β-EP and ACTH contents. EA combined with MT could further decrease lymphocyte β-EP and ACTH contents. POMC mRNA expression had the similar tendency with β-EP and ACTH contents.

It suggested that EA and MT could not only affect the synthesis and release of β-EP and ACTH in the pituitary, but also collaborate each other to exert an effect on POMC molecular in lymphocyte.

The above results indicated that EA and MT could collaborate each other to enhance the immune function in traumatized rats, β-EP and ACTH in hypothalamo-pituitary axis played an important role in the immunoregulation mediated by EA and MT in traumatized rats.