Does acupuncture modulate anti-inflammatory via haemorphin in obesity?

Obesity is a worldwide epidemic and has become a public health priority for which there is a need for effective treatments. It is recognised as a condition of low-grade systemic inflammation. Acupuncture may be a cost-effective approach to the treatment of obesity. However, the question of how acupuncture mechanistically exerts beneficial effects on obesity remains unanswered.

A recent report provides evidence of decreased serum haemorphin-7 in obese subjects. Haemorphin is a family of endogenous bioactive peptides whose amino acid sequences match the conserved regions of the haemoglobin β-chain. Acupuncture could enhance the local release of erythrocyte-derived haemorphins which may be reabsorbed into the bloodstream. There has been much interest in the role of haemorphin in inflammation. Using the inflammatory theory, a mechanism by which haemorphin is involved in effective acupuncture treatment for obesity might be elucidated.

Haemorphin-7 in physiological concentrations can inhibit the response of inflammation in acute injury conditions. The inhibition of inflammation by haemorphin is mediated by activation of opioid receptors. Fat tissue secretes adipokines such as tumour necrosis factor α (TNF-α), which contributes to the complications of obesity. TNF-α is the first key step in the inflammatory cascade. Experimental evidence indicates that haemorphin-7 restrains the increased plasma levels of TNF-α in response to lipopolysaccharide-induced stress. IVV-haemorphin-4, also known as spinorphin, is an endogenous anti-inflammatory regulator which blocks N-formylpeptide N-formylmethionylleucylphenyalanine-induced chemotaxis of neutrophils by acting as a specific antagonist for the formylpeptide receptor, thereby limiting the inflammatory response. Identification of susceptible genes for acupuncture indicates that the haemoglobin β-chain, a precursor of haemorphin, has low expression in non-responders. It is reasonable to infer that haemorphin is probably involved in the acupuncture response. Acupuncture is more likely to facilitate the performance of the anti-inflammatory function through the enhanced release of haemorphin into the plasma. As no clinical data are available to confirm the relevant changes in the haemorphin concentration during acupuncture, there are some limitations to the abovementioned hypothesis.

In conclusion, we speculate on the role of haemorphin in our understanding of the links between anti-inflammatory activity and the effectiveness of acupuncture for obesity treatment, and may uncover a new acupuncture mechanism for the prevention and treatment of obesity.

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Contributors CZS conceived the project. All the authors wrote the manuscript.

Competing interests None.

Provenance and peer review Not commissioned; internally peer reviewed.

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Acupunct Med  published online March 5, 2014

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