

The effects of acupuncture on the regional blood flow of various organs

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Acupuncture has been used to improve disturbances of visceral autonomic functions. Recent acupuncture studies in animals have demonstrated that acupuncture-like stimulation delivered to anesthetized animals produced reflex responses of various visceral functions, such as gastric motility, bladder contraction, cardiovascular responses, and adrenal medullary hormonal function. These acupuncture-like stimulation-induced responses have been proven to be reflexes whose afferents are cutaneous and muscle somatic afferent nerves, and whose efferents are autonomic efferent nerves (see reviews by Sato et al., 1994; 2002).

Disturbances in blood flow of organs may cause several dysfunctions of those organs. For example, disturbances in cerebral blood flow (CBF) may cause dysfunction of consciousness, motor functions, etc. Acupuncture has been used to improve these dysfunctions caused by disturbances in CBF, but the mechanism of this improvement has remained unknown. Recent studies by Sato's group (see review by Sato and Sato, 1992) have shown that cortical CBF is regulated by an intracranial cholinergic vasodilative system. We recently found that acupuncture-like stimulation increased CBF via excitation of this intracranial cholinergic vasodilative system, and we will describe our study (Uchida et al., 2000).

Disturbances in regional blood flow of skeletal muscles and peripheral nerves may cause localized muscle ache and localized peripheral nerve numbness. It is very likely that acupuncture stimulates muscle or nerve afferent fibers, either antidromically or by axon reflex mechanism, and releases a vasodilative substance to produce vasodilation and a subsequent increase in blood flow of local muscles and nerves. This possibility has been proposed for many years, but there has been no experimental proof. Recently, our laboratory demonstrated that antidromic activation of somatic afferent nerves produced vasodilative action in skeletal muscles and nerves via calcitonin gene-related peptide (CGRP).

In our presentation, we would like to discuss basic research on acupuncture effects on blood flow of various visceral organs performed by Japanese scientists, mainly by our laboratory.

Key words: Cerebral cortical blood flow, muscle blood flow, nerve blood flow, somato autonomic reflex, axon reflex