

# Prolonged acetylcholine-induced vasodilatation in the peripheral microcirculation of patients with chronic fatigue syndrome

**Authors:** Khan F, Spence V, Kennedy G and Belch JFF

**Institution:** Vascular Diseases Research Unit, Department of Medicine, University of Dundee

**Background:** Although the aetiology of chronic fatigue syndrome (CFS) is unknown, there have been a number of reports of blood flow abnormalities within the cerebral circulation and systemic blood pressure defects manifesting as orthostatic intolerance. Neither of these phenomena has been explained adequately, but recent reports have linked cerebral hypoperfusion to abnormalities in cholinergic metabolism. Our group has previously reported enhanced skin vasodilatation in response to cumulative doses of transdermally applied acetylcholine (ACh), implying an alteration of peripheral cholinergic function.

**Methods and Results:** To investigate this further, we studied the time course of ACh-induced vasodilatation following a single dose of ACh in 30 patients with CFS and 30 age and gender-matched healthy control subjects. No differences in peak blood flow were seen between patients and controls, but the time taken for the ACh response to recover to baseline was significantly longer in the CFS patients than in control subjects. The time taken to decay to 75% of the peak response in patients and controls was  $13.7 \pm 11.3$  vs.  $8.9 \pm 3.7$  min ( $P=0.03$ ), respectively, and the time taken to decay to 50% of the peak response was  $24.5 \pm 18.8$  vs.  $15.1 \pm 8.9$  min ( $P=0.03$ ), respectively.

**Conclusions:** Prolongation of ACh-induced vasodilatation is suggestive of a disturbance to cholinergic pathways, perhaps within the vascular endothelium of patients with CFS, and might be related to some of the unusual vascular symptoms, such as hypotension and orthostatic intolerance, which are characteristic of the condition.

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