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Autoantibodies against muscarinic cholinergic receptor in chronic fatigue syndrome

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Abstract

The disturbance of the central nervous system and immunological abnormalities have been suggested in patients with chronic fatigue syndrome (CFS). We focused on immunological abnormalities against neurotransmitter receptors in CFS. Using a sensitive radioligand assay, we examined serum autoantibodies to recombinant human muscarinic cholinergic receptor 1 (CHRM1), mu-opioid receptor (OPRM1), 5-hydroxytryptamine receptor 1A (HTR1A), and dopamine receptor D2 (DRD2) in patients with CFS (n=60) and results were compared with those in patients with autoimmune disease (n=33) and in healthy controls (n=30). The mean anti-CHRM1 antibody index was significantly higher in patients with CFS ($p<0.0001$) and autoimmune disease ($p<0.05$) than that in healthy controls, and positive reaction was found in 53.3% of patients with CFS. Anti-OPRM1 antibodies, anti-HTR1A antibodies, and anti-DRD2 antibodies were found in 15.2, 1.7, and 5.0% of patients with CFS, respectively. Anti-nuclear antibodies were found in 56.7% (34/60) of patients with CFS, but anti-nuclear antibody titers did not correlate with the activities of the above four autoantibodies. The patients with positive autoantibodies to CHRM1 had a significantly higher mean score (1.81) of 'feeling of muscle weakness' than negative patients (1.18) among CFS patients ($p<0.01$). Higher scores on 'painful node', 'forgetfulness', and 'difficulty thinking' were also found in CFS patients with anti-CHRM1 antibodies but did not reach statistical significance. In conclusion, autoantibodies to CHRM1 were detected in a large number of CFS patients and were related to CFS symptoms. Our findings suggested that subgroups of CFS are associated with autoimmune abnormalities of CHRM1.