Neuronal plasticity is the physiological correlate of learning and memory. In animal experiments, synaptic (i.e. long-term potentiation (LTP) and depression (LTD)) and intrinsic plasticity are distinguished. In human motor cortex, cortical plasticity can be demonstrated using transcranial magnetic stimulation (TMS). Changes in motor-evoked potential (MEP) amplitudes most likely represent synaptic plasticity and are thus termed LTP-like and LTD-like plasticity. We investigated the role of changes of motor threshold and their relation to changes of MEP amplitudes. We induced plasticity by paired associative stimulation (PAS) with 25 ms or 10 ms inter-stimulus interval or by motor practice (MP) in 64 healthy subjects aged 18-31 years (median 24.0). We observed changes of MEP amplitudes and motor threshold after PAS[25], PAS[10] and MP. In all three protocols, long-term individual changes in MEP amplitude were inversely correlated to changes in motor threshold (PAS[25]: P = .003, n = 36; PAS[10]: P = .038, n = 19; MP: P = .041, n = 19). We conclude that changes of MEP amplitudes and MT represent two indices of motor cortex plasticity. Whereas increases and decreases in MEP amplitude are assumed to represent LTP-like or LTD-like synaptic plasticity of motor cortex output neurons, changes of MT may be considered as a correlate of intrinsic plasticity.
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