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Training-induced auditory plasticity measured using auditory steady-state responses

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Re-mapping of the primary auditory cortex may be induced by extensive training. For example, training of monkeys to perform frequency discrimination (FD) at one carrier frequency expands the representation of that frequency region in the auditory cortex. This study was intended to demonstrate training-induced auditory plasticity using auditory steady-state responses (ASSRs) in humans. Right-handed, non-musicians underwent FD training in their left ear only at 1 kHz. ASSRs were recorded to 1- and 2-kHz amplitude modulated tones (100 % AM depth at rates of 41, 83 and 45, 87 Hz, across two conditions). ASSRs recorded at the start of the experiment were compared with the ASSRs recorded after three two-hour sessions of FD training scheduled 24 hours apart. The results revealed significant increase in the amplitude of ASSRs recorded to 41- and 45-Hz AM tones (at 1 kHz only) presented to the trained left ear. There was no significant change in the amplitude of ASSRs recorded to the 2-kHz tones or to any stimuli presented to the un-trained right ear. As expected FD training had no effect on 83- and 87-Hz ASSRs (which are generated mainly in the brainstem). These results support the idea of training-induced reorganization of the auditory cortex.