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# Early Integration of Bilateral Touch in the Primary Somatosensory Cortex

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## Abstract

Animal, as well as behavioural and neuroimaging studies in humans have documented integration of bilateral tactile information at the level of primary somatosensory cortex (SI). However, it is still debated whether integration in SI occurs early or late during tactile processing, and whether it is somatotopically organized. To address both the spatial and temporal aspects of bilateral tactile processing we used magnetoencephalography in a tactile repetition-suppression paradigm. We examined somatosensory evoked-responses produced by probe stimuli preceded by an adaptor, as a function of the relative position of adaptor and probe (probe always at the left index finger; adaptor at the index or middle finger of the left or right hand) and as a function of the delay between adaptor and probe (0, 25, or 125 ms). Percentage of response-amplitude suppression was computed by comparing paired (adaptor1probe) with single stimulations of adaptor and probe. Results show that response suppression varies differentially in SI and SII as a function of both spatial and temporal features of the stimuli. Remarkably, repetition suppression of SI activity emerged early in time, regardless of whether the adaptor stimulus was presented on the same and the opposite body side with respect to the probe. These novel findings support the notion of an early and somatotopically organized inter-hemispheric integration of tactile information in SI.