Public Abstract
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Fast optical signal detected in the prefrontal lobe with near-infrared spectroscopy during sleep
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If near-infrared spectroscopy (NIRS) is to be used in clinical applications such as the localization of epileptic foci, it must be capable of recording large amplitude transients of which only a few samples are available. With this in mind, we attempted to record the NIRS correlate of isolated delta waves during normal human sleep. Large-amplitude, isolated delta waves in the electroencephalogram (EEG) were selected and the corresponding optical responses were measured. Signal-averaging trials of delta waves revealed fast optical intensity changes ranging from 0.05% to 0.3% but of unstable morphology. Measuring from the positive peak of the delta wave to the nadir of the individual optical responses, we were able to detect a latency of approximately 130 to 180 ms in 75% of the channels. The findings from this study could help us to understand the basic mechanism of near-infrared spectroscopy and test its potential for clinical applications in the future.