

Electroconvulsive Therapy Modulates Loudness Dependence of Auditory Evoked Potential: an MEG study

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Abstract

Objective

- ❖ Determine the effect of electroconvulsive therapy on serotonin (5-hydroxy-tryptamine, 5-HT) function within subjects with major depressive disorder (MDD).

ECT

- ❖ “Gold” standard of treatments for MDD
- ❖ Ultra brief pulse right unilateral protocol
- ❖ Stimulus strength exceeds threshold required to induce generalized seizure in anesthetized patients
- ❖ Alters several 5-HT-receptor subtypes’ functions in the central nervous system

Patient Characteristics

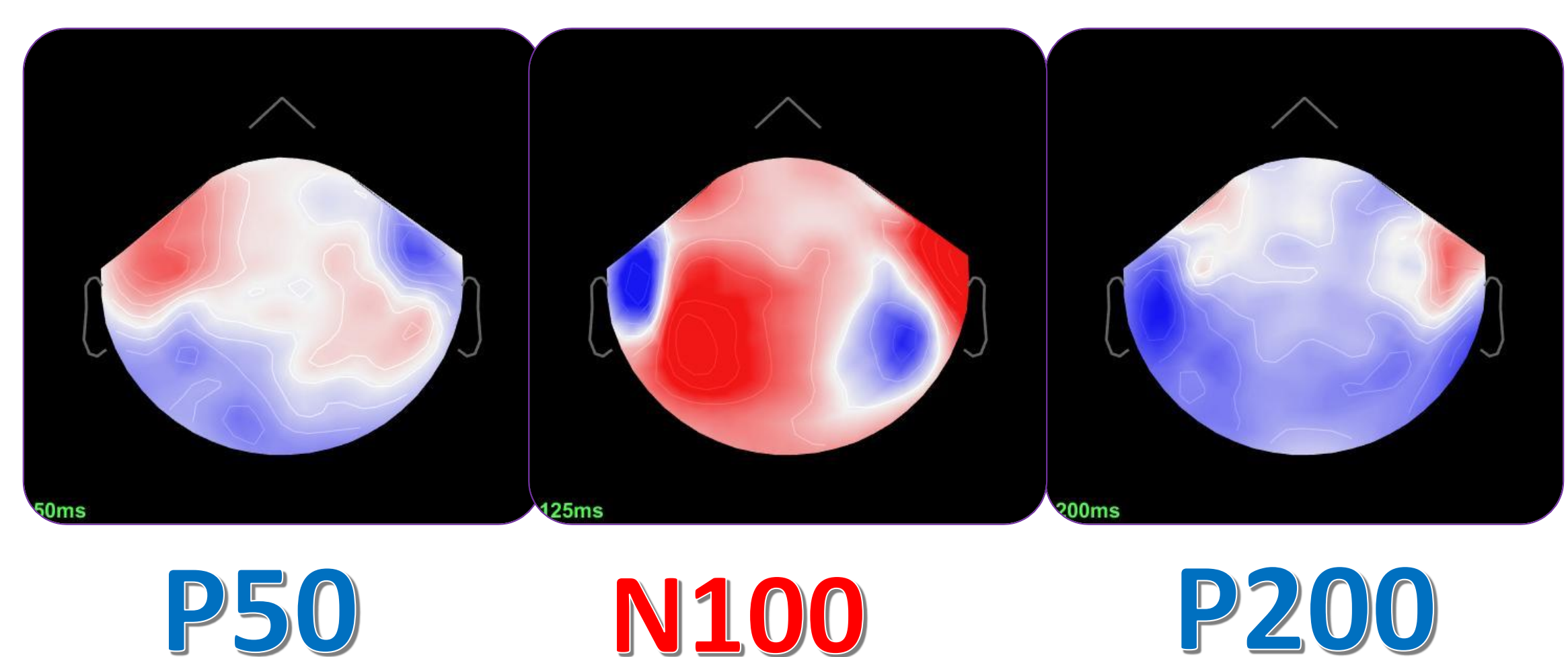
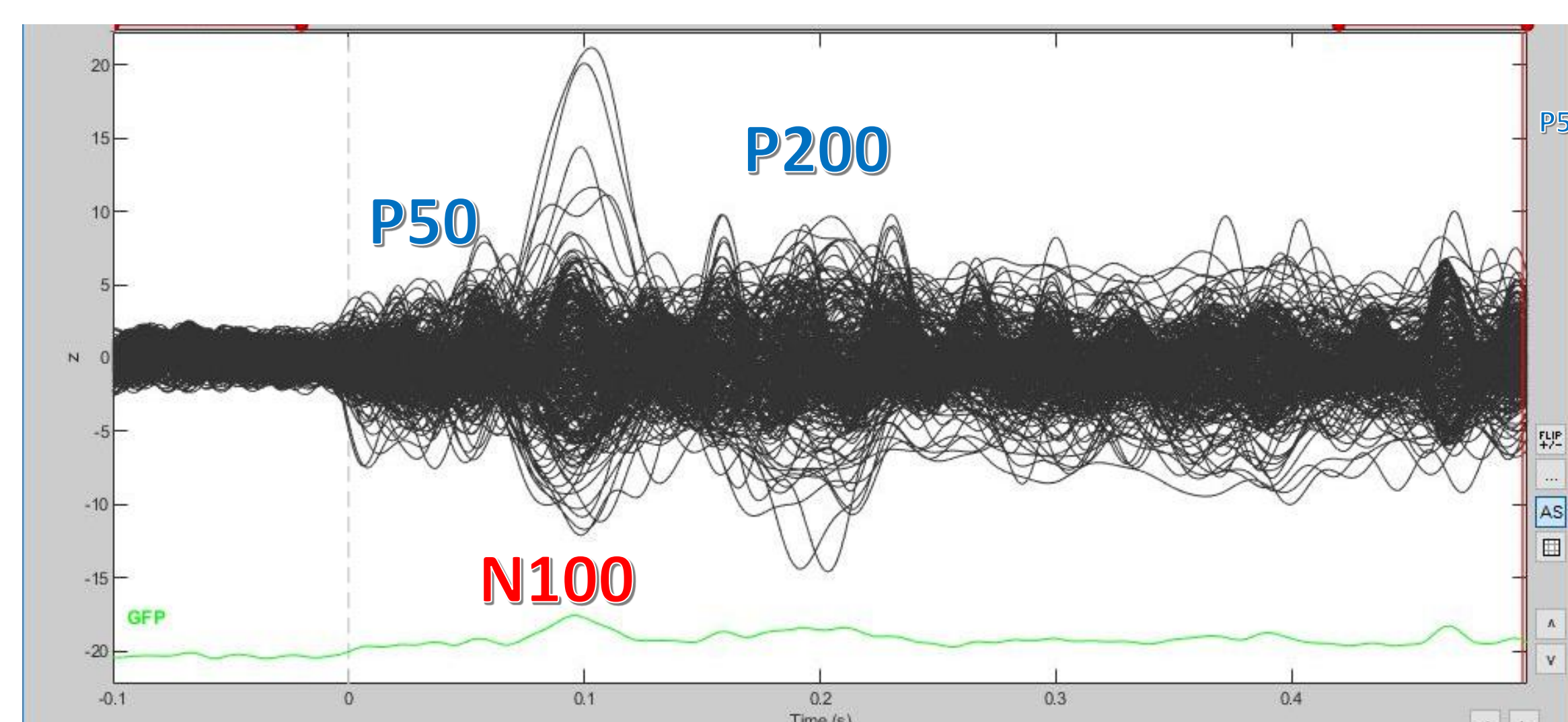
- ❖ 9 patients (6 females) with major depressive disorder
- ❖ Age = 68.1 ± 10.7
- ❖ Baseline HAM24 = 37.2 ± 12.8
- ❖ Post ECT HAM24 = 9.1 ± 7.6 (6 responders)

LDAEP

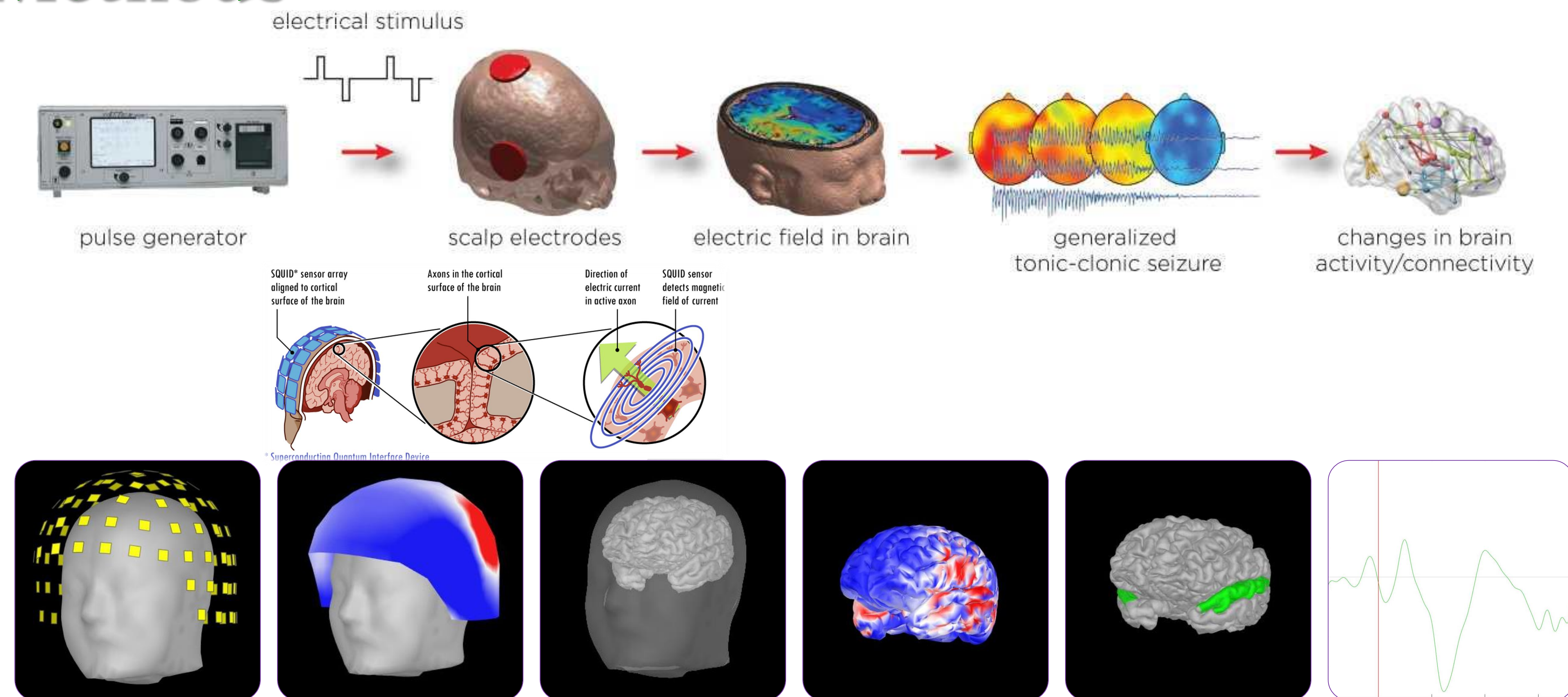
- ❖ Loudness Dependence of Auditory Evoked Potential: indicates change in amplitude of N100/P200 component as a function of sound intensity (dB)
- ❖ Correlate of central serotonergic neurotransmission (CSN)
- ❖ Concept: CSN modulates sensitivity of cortical neurons in PAC
- ❖ High LDAEP reflects low CSN ; low LDAEP reflects high CSN

Data Processing

- ❖ Performed on Brainstorm 3 (channel removal, heartbeat/eyeblick detection, independent component analysis, signal space projection, bandpass/notch filter, linearly constrained minimum variance, z-score normalization)

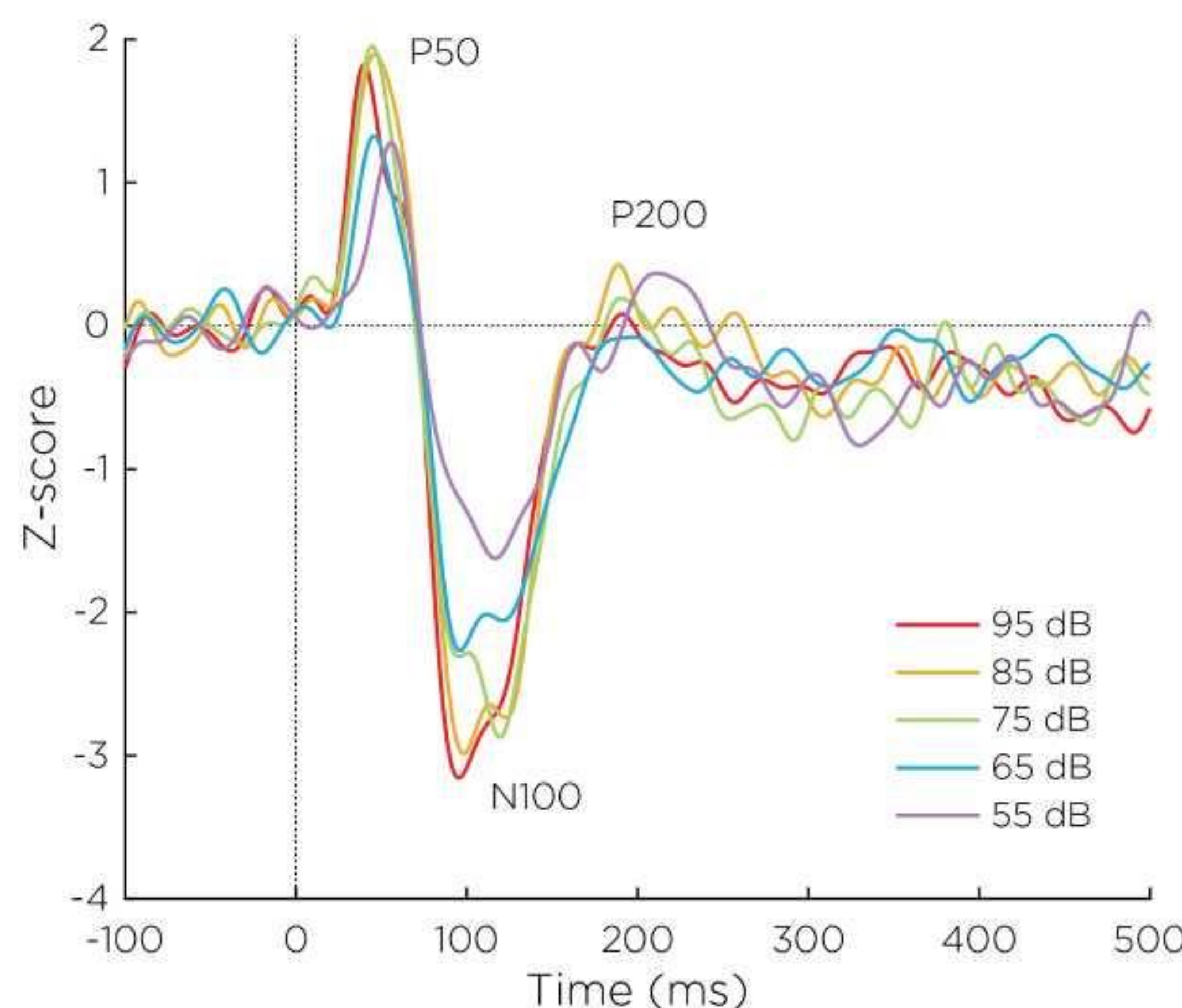


Methods

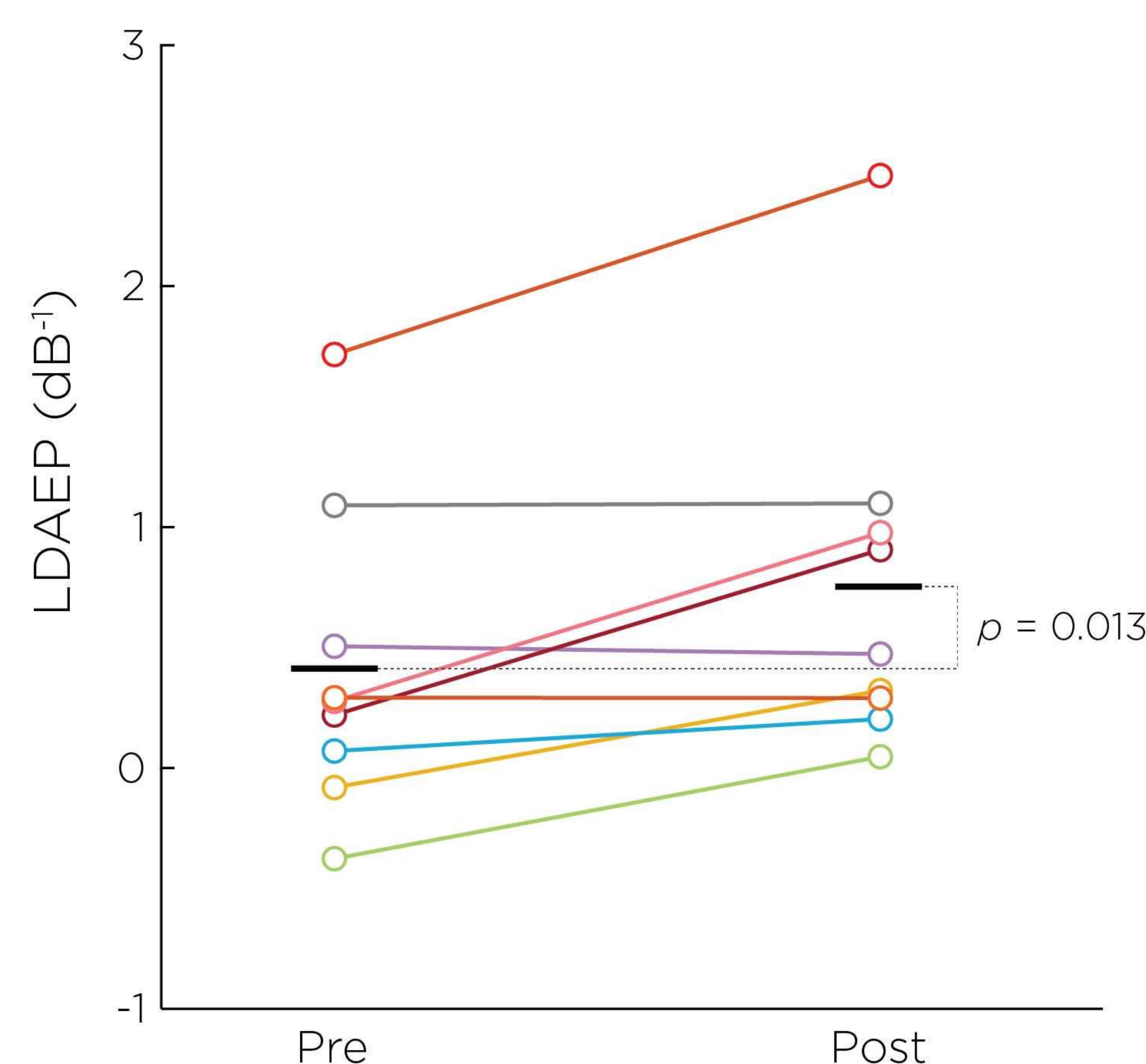
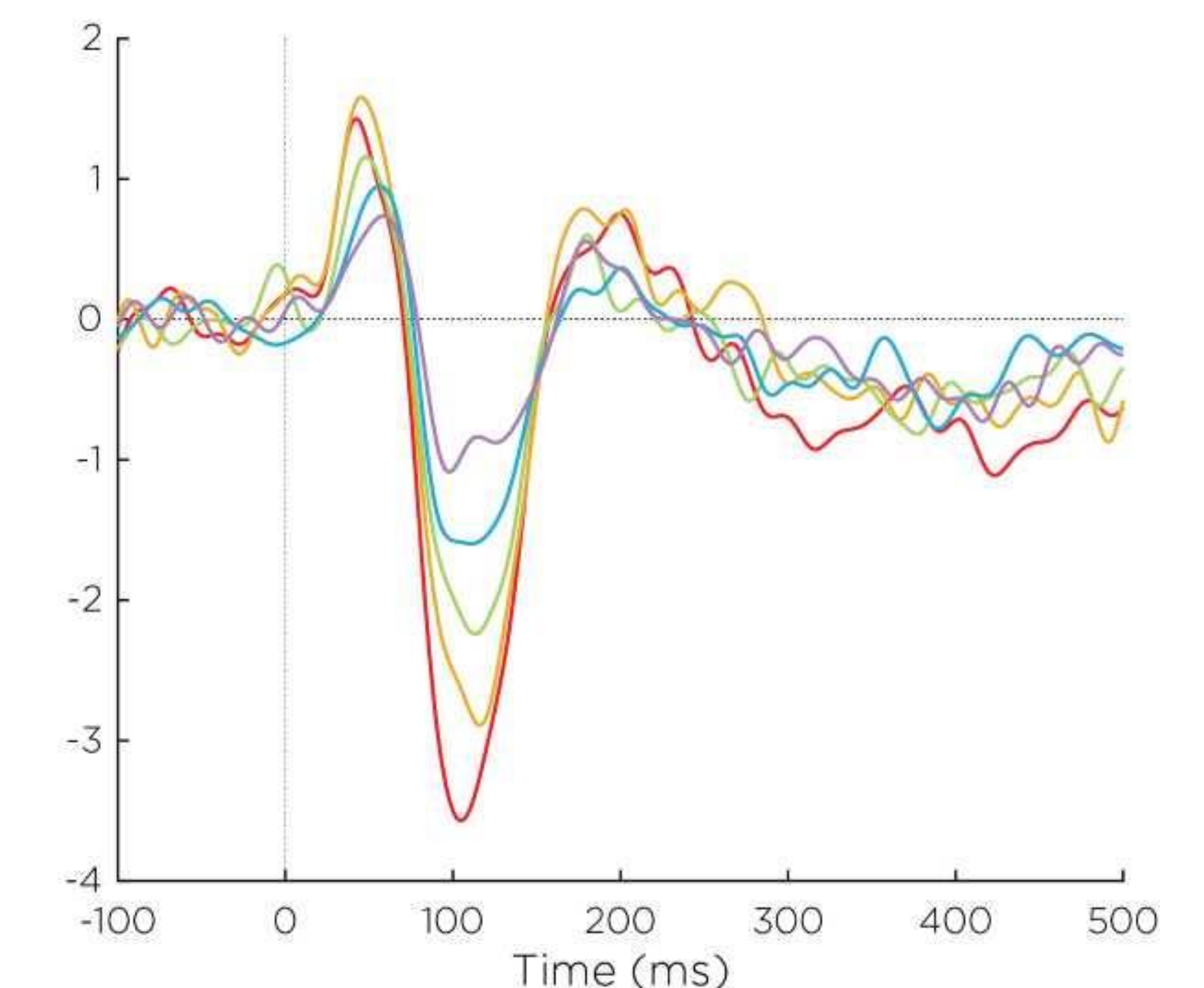


Results

A. Baseline



B. Post ECT



Discussion

- ❖ Previous research has established an inverse relationship between LDAEP and CSN, ECT increases CSN
- ❖ We hypothesized ECT would decrease LDAEP
- ❖ Although ECT was successful in treating MDD, we found that it *increases* LDAEP
- ❖ Research also shows that LDAEP is positively correlated with dopamine neurotransmission
- ❖ Alternative hypothesis: the antidepressant effect of ECT may be mediated via increased dopamine neurotransmission