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### Perception mechanism of itch

Itch is an unpleasant sensation with a desire to scratch. fMRI and PET studies have observed itch stimulus-related neural activations in several brain regions such as the somatosensory cortex, insula, cingulate cortex, parietal cortex, prefrontal cortex, supplementary motor area, premotor cortex, and cerebellum. However, no study has investigated the temporal aspect of itch stimulus-related brain processing. Here this issue was investigated using high temporal resolution (i.e., EEG and MEG). Since the itch stimulus used in previous fMRI and PET studies (i.e., histamine) is not useful for EEG and MEG recordings, we developed a new itch stimulus (i.e., electrical itch stimulus). We confirmed that the electrical itch stimulus evoked itch sensation and that itch stimulus-related brain response can be observed using EEG and the stimulus. In addition, the conduction velocity related to the electrical itch stimulus estimated by EEG data was about 1 m / s, indicating that the itch sensation evoked by the electrical itch stimulus would be associated with C-fibers. We also performed MEG recording using the electrical itch stimulus and observed parts of the temporal aspect of itch stimulus-related brain processing. In detail, neural information related to the electrical itch stimulus was transmitted from the contralateral secondary somatosensory cortex (SII) to the ipsilateral SII. In addition, we also observed the activation of medial parietal cortex (i.e., precuneus) which was not observed in previous pain studies using EEG and MEG, speculating that this region may be selective for itch. These findings indicate that EEG and MEG recordings using the electrical itch stimulus would be useful to investigate the temporal aspect of the brain mechanism of an itch.

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### References

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### CV

2000 – 2004	Graduate School of Medicine, Tohoku University, Japan
2004 – 2007	National Institute for Neuroscience, NCNP, Japan (Postdoc)
2007 – 2009	Department of Integrative Physiology, NIPS, Japan (Postdoc)
2009 – 2011	Department of Neurophysiology, CBTM, Heidelberg University, Germany (Research fellow funded by the Alexander von Humboldt foundation)
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