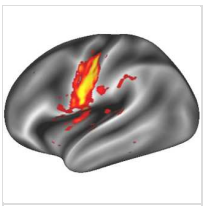

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Functional Magnetic Resonance Imaging Under Swallowing Task in Healthy Human Subjects and Gastroparetic Patients

Kun-Han Lu[1], Kristine Mosier[2], John Wo[2], Terry Powley[1]

[1]Purdue University; [2]Indiana University School of Medicine

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SPARC
Tech. support email: info@neuinfo.org

Kun-Han Lu

This protocol described the steps to acquire and analyze functional magnetic resonance imaging data under a swallowing task in healthy human subjects and patients with gastroparesis.

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Subjects

1 Eight healthy subjects (6 females; 2 males) and 3 gastroparetic patients (2 females; 1 male) participated in this study under research protocols approved by the Institutional Review Board at Indiana University School of Medicine. All healthy subjects did not have a prior diagnosis of neurological, psychiatric, or gastrointestinal (GI) disorders. All gastroparetic patients had documented delayed gastric emptying by a standardized 4-h gastric emptying scintigraphy test (Tougas et al., 2000). Written informed consent was obtained from all participants. Standard MRI exclusion criteria were applied.

Experiment design

2 Every subject underwent 3 fMRI sessions. Each subject first had a 5-min, eyes-closed, resting-state fMRI scan. Then, the subject was instructed to perform a 30-sec ON, 30-sec OFF swallowing task during a 5-min fMRI scan. The subject was asked to continuously swallow boluses of water during each 30-sec ON period via a silastic tube and stop swallowing during the 30-sec OFF period. After the swallowing fMRI scan, the subject had another 5-min, eyes-closed, resting-state fMRI scan.

MRI acquisition

3 T1 and T2-weighted MRI and fMRI data were acquired in a 3T MRI system (Siemens, Magnetom Prisma, Germany) with a 64-channel receive-only phased-array head/neck coil. The fMRI data were acquired with 2 mm isotropic spatial resolution and 1s temporal resolution by using a gradient-recalled echo-planar imaging sequence (multiband = 8, 72 interleaved axial slices, TR = 1000 ms, TE = 31 ms, flip angle = 52°, field-of-view = 21 cm × 21 cm). MRI/fMRI images were preprocessed using a similar pipeline as in the Human Connectome Project (Glasser et al., 2013). Briefly, all fMRI images were corrected for motion and slice timing, aligned to structural images, and normalized to the Montreal Neurological Institute (MNI) space.

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