

High field single subject brain mapping of genital touch and pelvic floor motor control. A 7-Tesla fMRI study.

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Aim of the study

To acquire neural representations of male genital touch and pelvic floor motor control in the whole brain, at both single subject and group level.

Methods

Subject: 17 healthy right-handed male subjects (age 20 -47) were scanned in a 7T MRI scanner (Philips achieva), of which 4 subjects were excluded due to motion artefacts. All subjects completed the same scanning protocol.

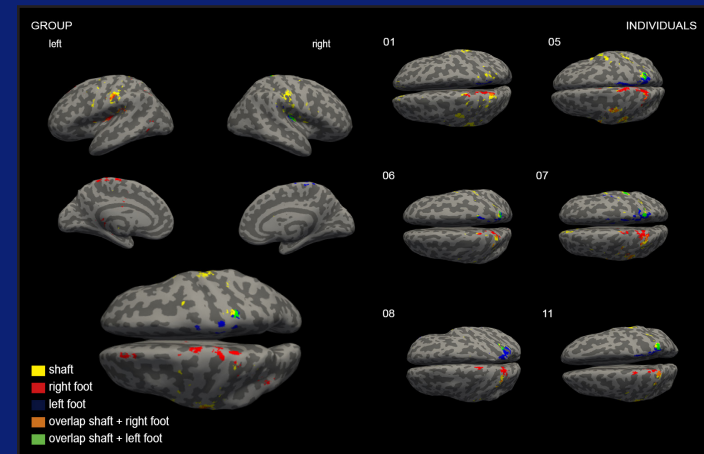
Scan: 4 functional runs (2 sensory task; 2 motor tasks) using a multiband echo planar imaging sequence (voxel size 1.77x1.77x1.75mm³; matrix size 104x127; FOV 184x223mm²; number of slices =70; TR/TE =2000/25ms), block paradigm, followed by a T1 weighted anatomical scan.

Task: Sensory tasks: tactile stimulation of the penile shaft, control task; tactile stimulation of the feet. Motor tasks: performing repetitive pelvic floor contractions, control task; tongue movements.

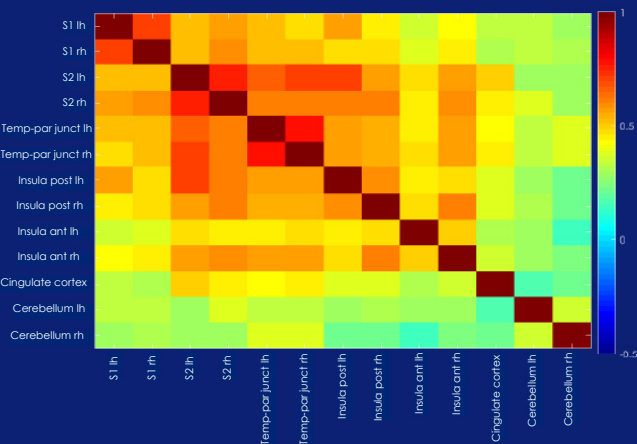
Data: Activation maps were generated using the General Linear Model (GLM). Single subject threshold: $p < 0.05$ FWE, projected on inflated cortical surfaces of individual anatomical data. Group activation threshold: $p < 0.005$ uncorrected and projected on an inflated cortical surface of the MNI-template. Connectivity analyses were performed by calculating correlations of time-series of different ROI's.

Results

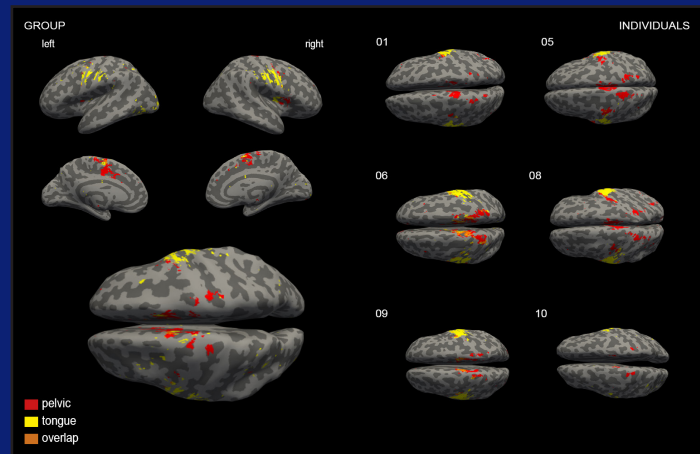
Sensory



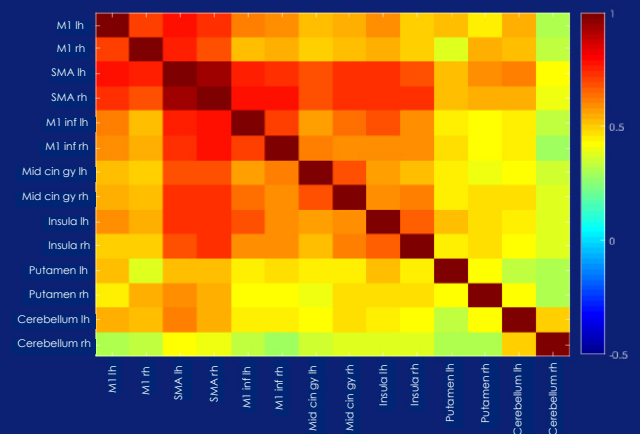
Group analysis results: S1, S2, anterior and posterior insula, posterior cingulate gyrus and anterior lobe of the cerebellum.



Motor



Group analysis results: M1, SMA, anterior insula, putamen, thalamus and the anterior lobe of the cerebellum.



Discussion

- This study defined the neural representations of genital touch and pelvic floor motor control.
- Both in group analyses as in single subjects.
- Strong connectivity in somatosensory and somato-motor pathway.

7 Tesla fMRI:

- Reproducible results in single subjects.

Future perspective:

- Define pathophysiology OAB/BPS/CPSP
- Use 7T in daily clinic