

Neural correlates of tDCS & repeated stimulations

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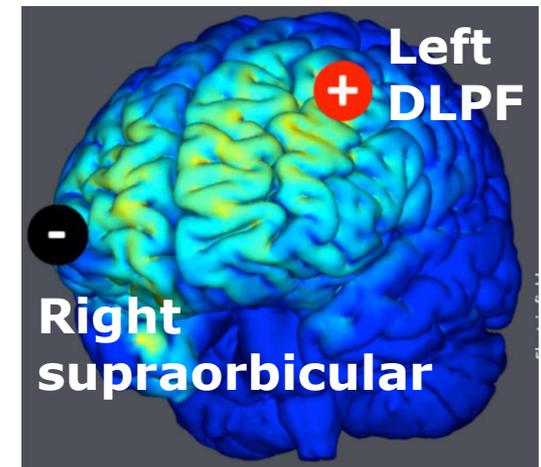
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tDCS single session – first study

- Randomized double blind sham controlled cross-over
 - Direct current; 2 mA; 20 min
 - 55 patients included
(25 VS/UWS; 30 MCS;
35 chronic; 25 TBI; $43 \pm 18y$)
 - **CRS-R improvement for MCS**
(43% responders) - no change for UWS
- 57% non-responders & temporary effects



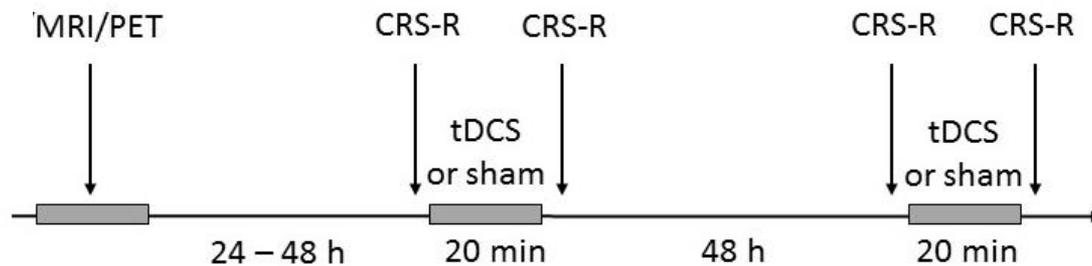
Neural correlates – Aim

Can functional brain activity & grey matter atrophy predict tDCS clinical response?

→ Characterize functional (FDG-PET) and structural (voxel-based morphometry – VBM) brain pattern of responders

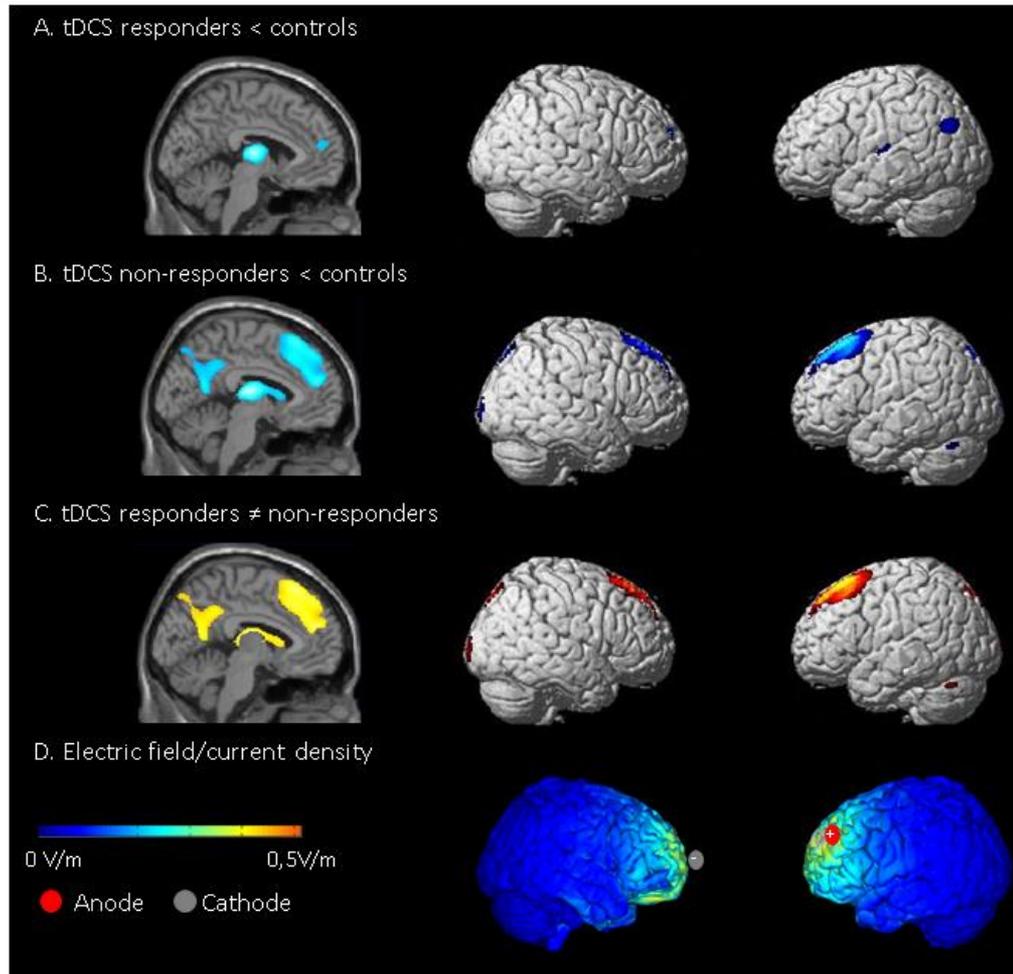
Neural correlates – Method

- Data from study 1 – chronic MCS
- FDG-PET – MRI(VBM)
- 8 tDCS responders (4 TBI, mean age: 38 ± 19 y)
13 tDCS non-responders (8 TBI, mean age: 36 ± 14 y)
- SPM: responders & non-responders versus controls



Neural correlates – Results

FDG-PET

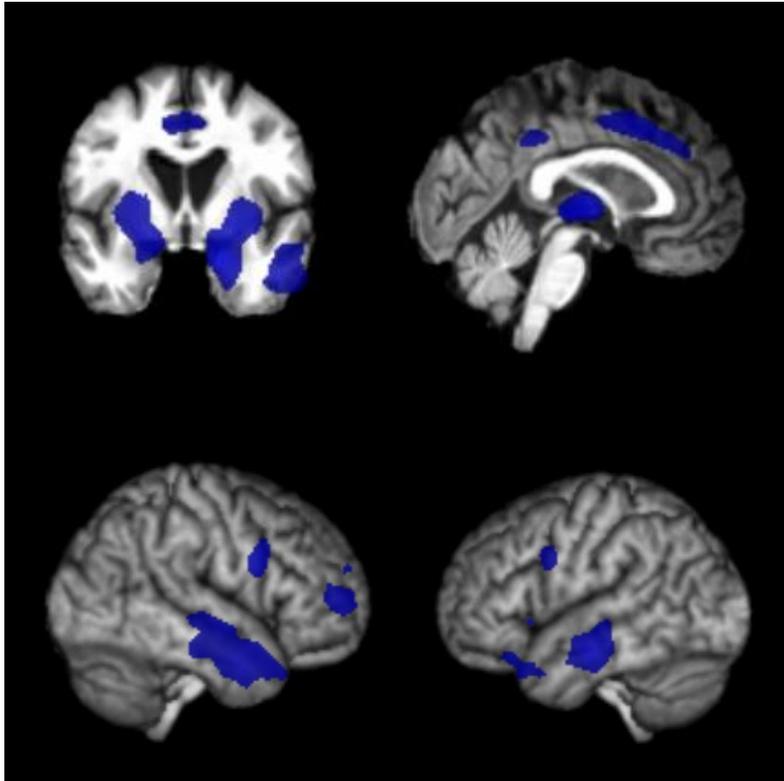


● hypometabolic
● preserved
p<0.05

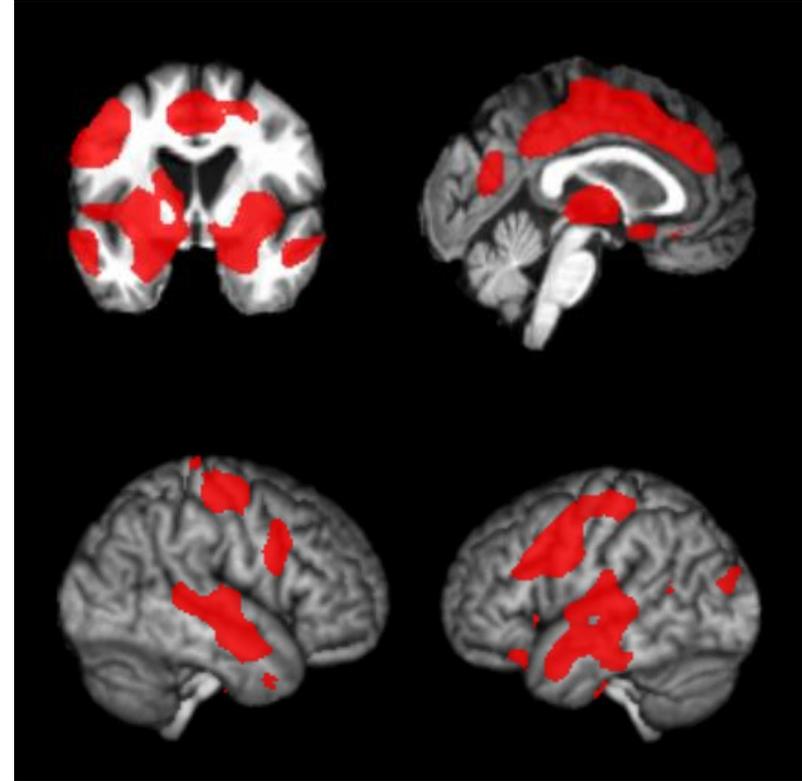
Neural correlates – Results

Voxel-Based Morphometry

● atrophy in responders > controls



● atrophy in non-responders > controls



p<0.05

Repeated stimulations – Aim

Single stimulation: effects \pm 60 min (Nische & Paulus, 2001)
→ short-lasting improvements, back to initial state

1. Increase the duration of the effect
2. Increase the number of responders

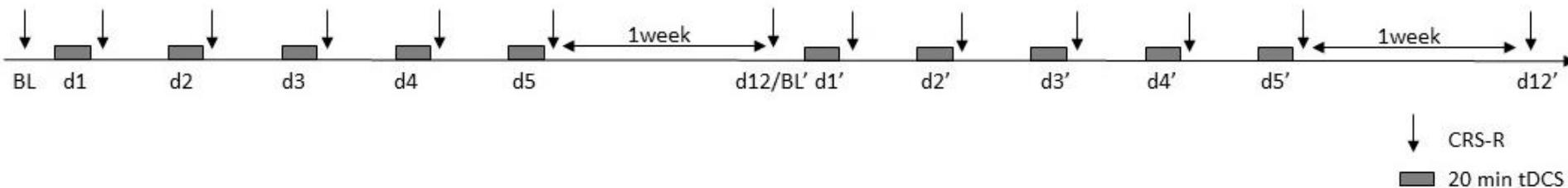
Daily stimulations for 5 days (Antal et al, 2010)

Repeated stimulations – Method

- Randomized sham controlled double blind cross-over
- 16 patients included in chronic MCS (12 TBI; mean age 47 ± 16 y)
- CRS-R after tDCS (d1-5) & 1 week later (d12)

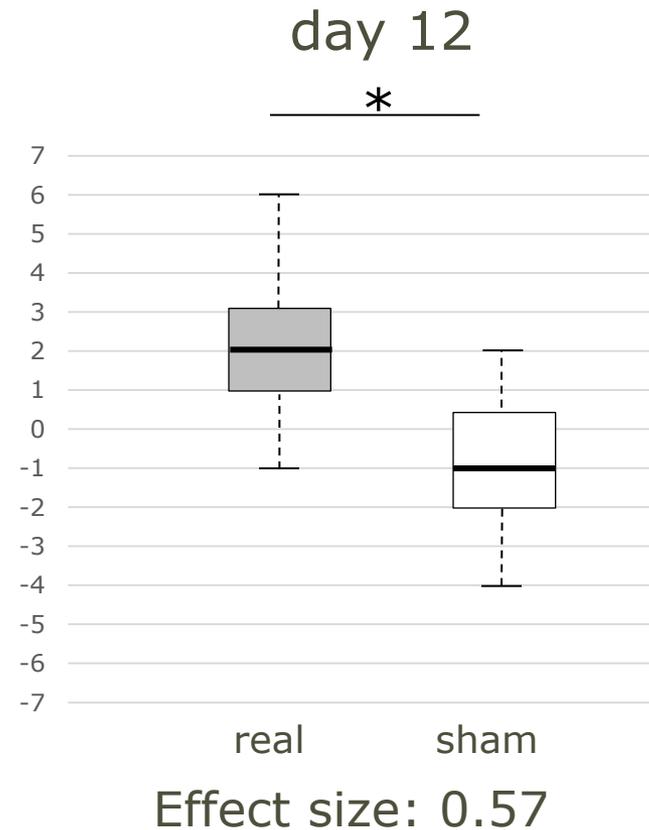
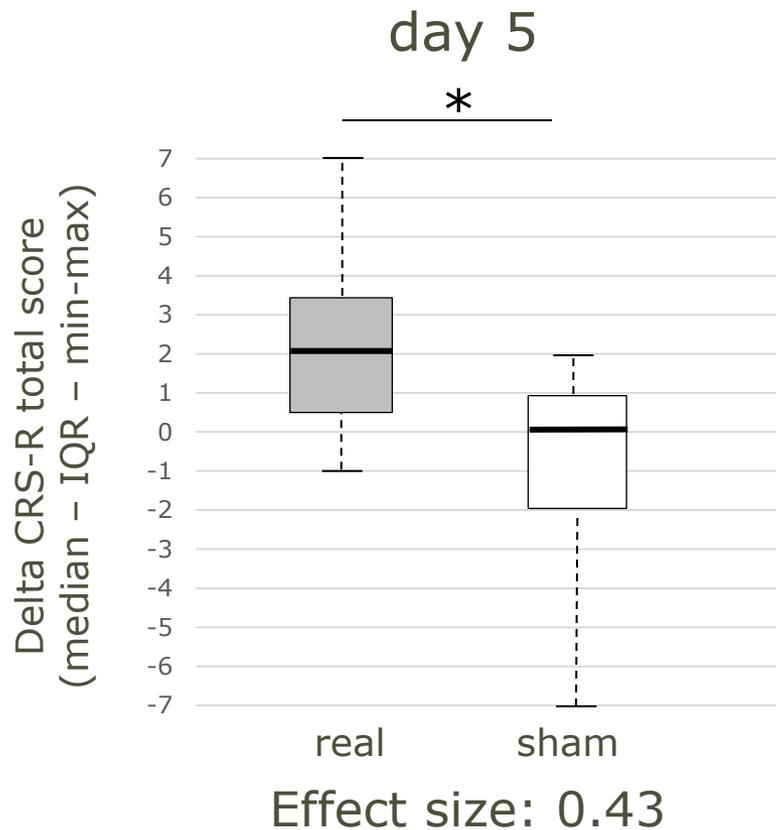
session 1: real or sham

session 1: sham or real



Repeated stimulations – Results

Treatment effect: delta CRS-R day 5 & day 12

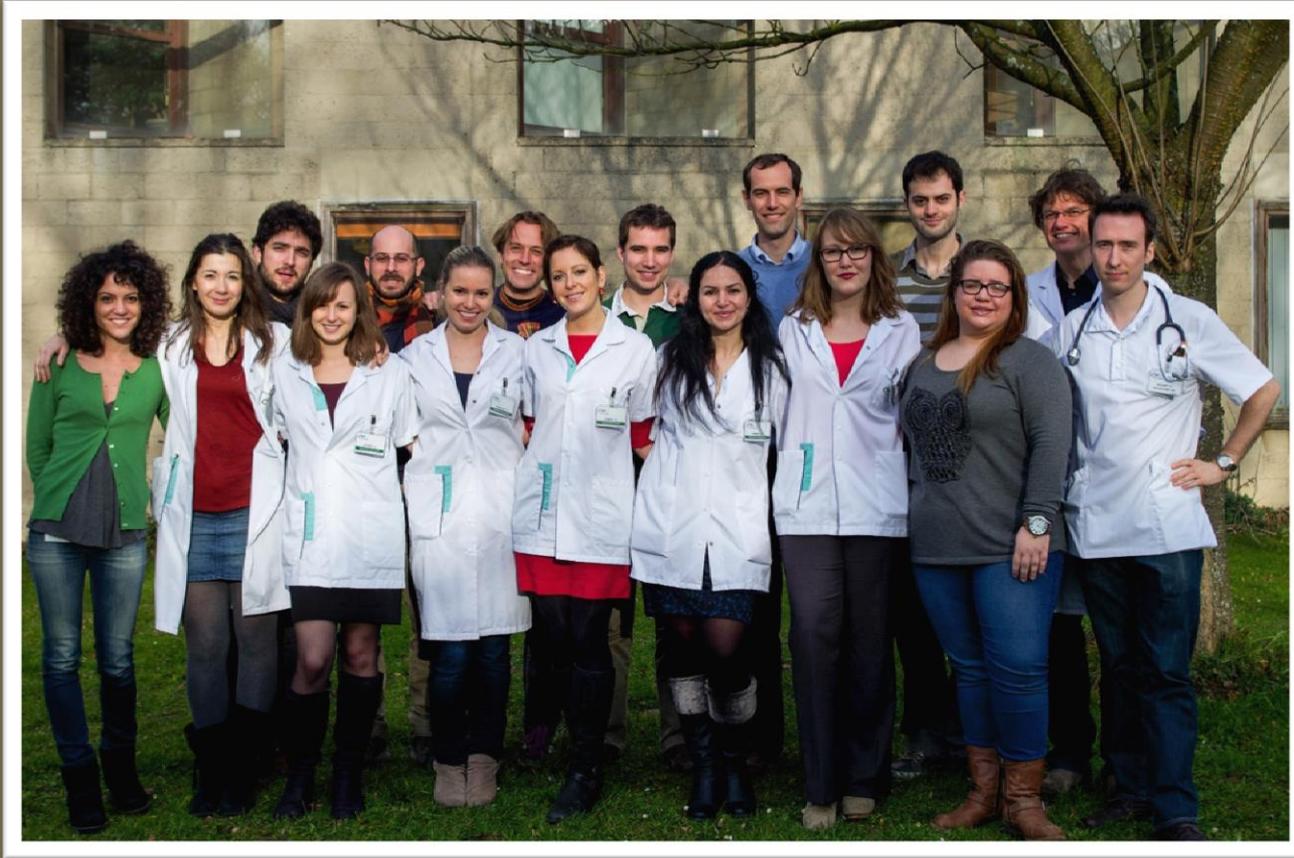


* $p < 0.05$

Perspectives: Clinical use

- Feasibility of tDCS for daily use
 - By relatives/caregivers
 - Repeated tDCS 4 weeks

THANK YOU



James S. McDonnell Foundation



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