

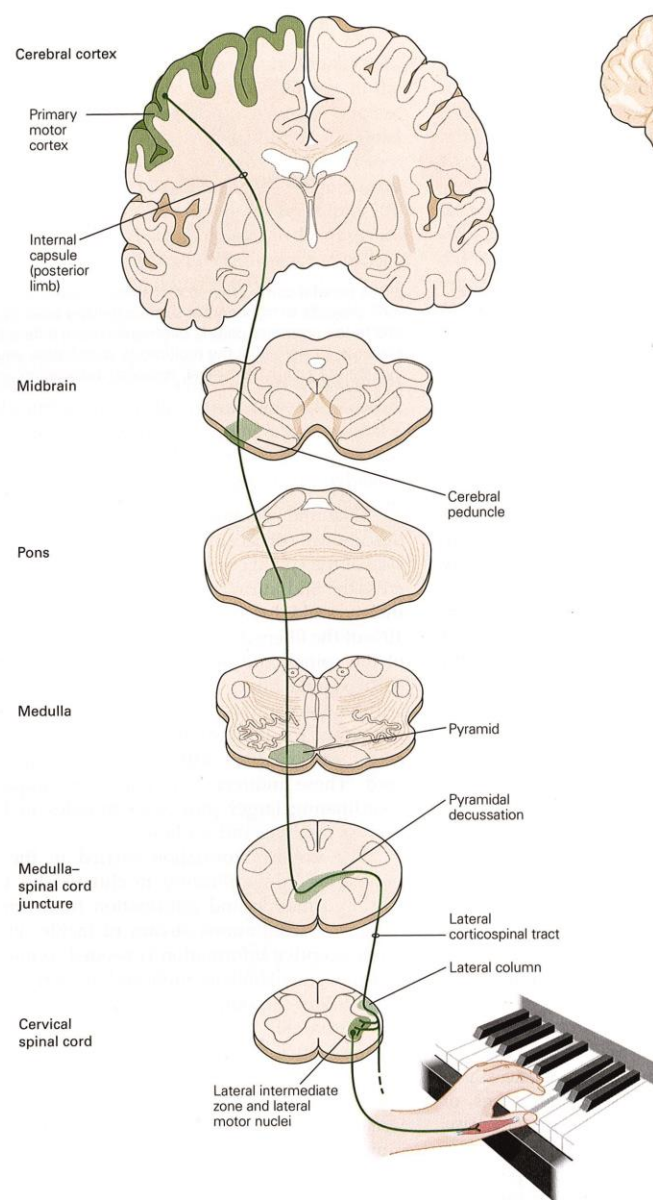
Interhemispheric imbalance of pyramidal neurons' distribution in the supplementary motor area (SMA) following unilateral primary motor cortex (M1) lesion in adult macaques: connectional or functional recovery origin?

Contestabile A.#, Collanguilo R.#, Gindrat A. D., Hamadjida A., Kaeser M., Savidan J., Wyss A. F., Rouiller E. M. and Schmidlin E.

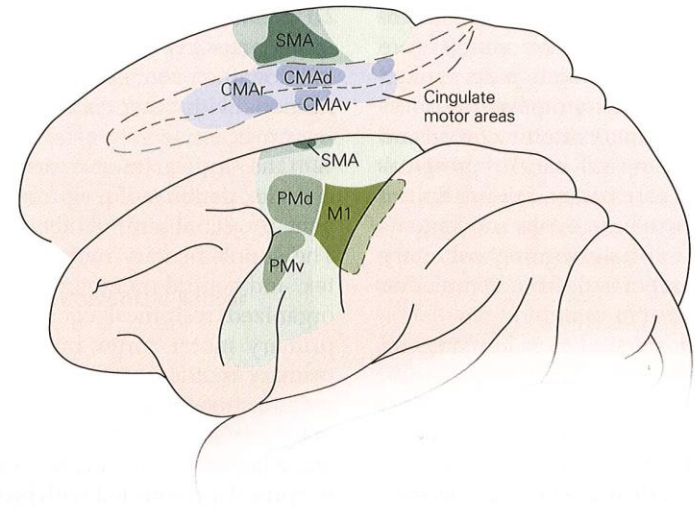
Day of Cognition in Fribourg , 7th of Octobre 2015

Organisation of motor system in primates

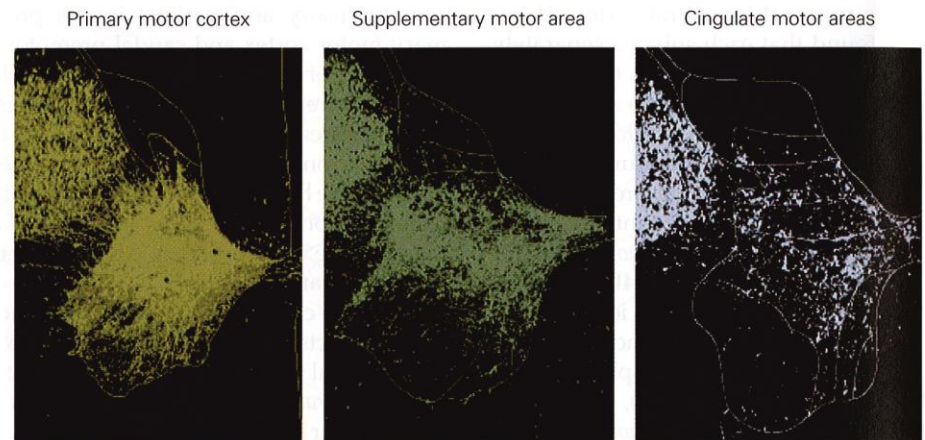
Descending lateral corticospinal pathway



A

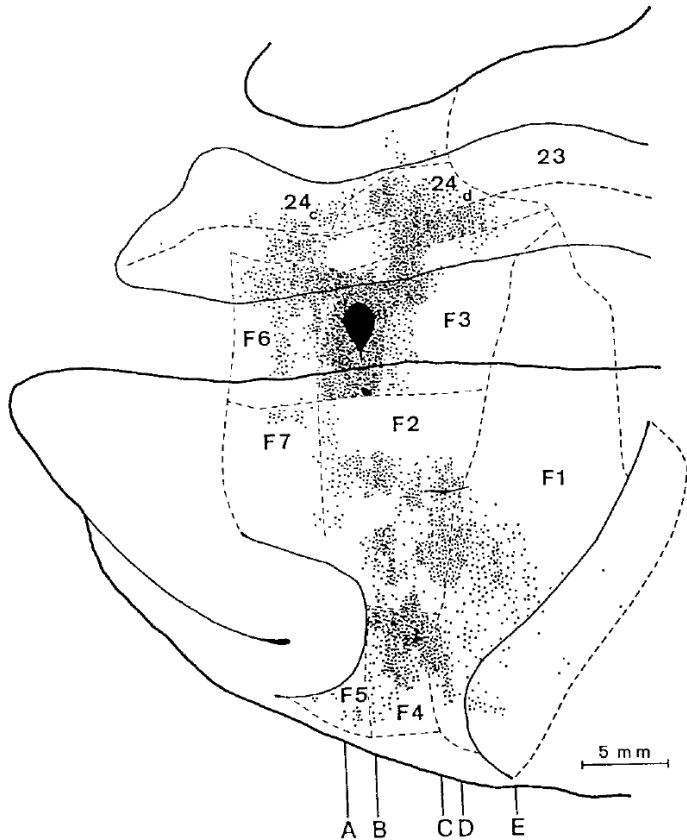


B



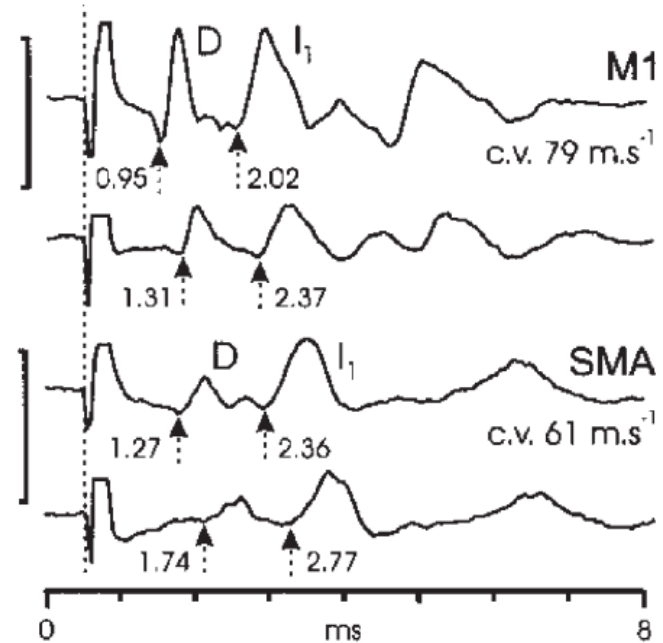
Functional role of Supplementary Motor Area (SMA)

Cortico-cortical connections between SMA and M1



Luppino et al., 1993

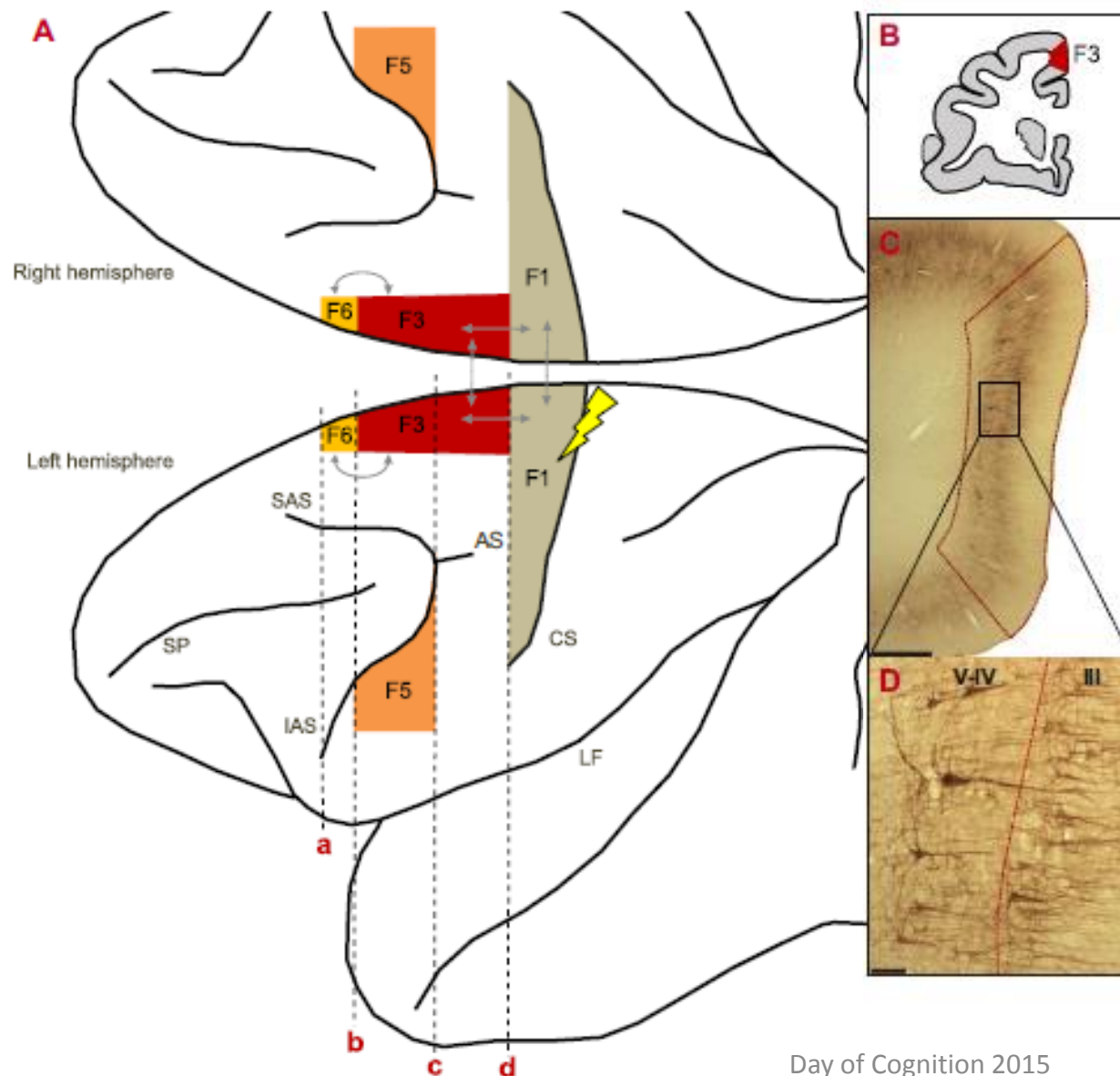
Comparison of corticospinal output from M1 and SMA



D: direct volleys recorded at spinal level
I: Indirect volleys

Maier et al., 2002

Experimental design



Criteria for cell inclusion:

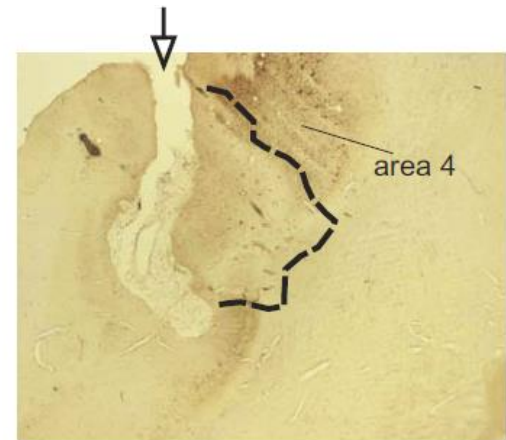
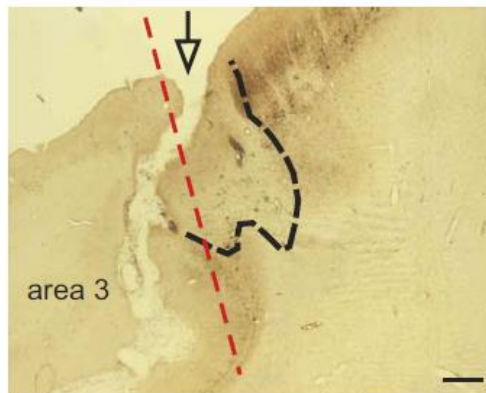
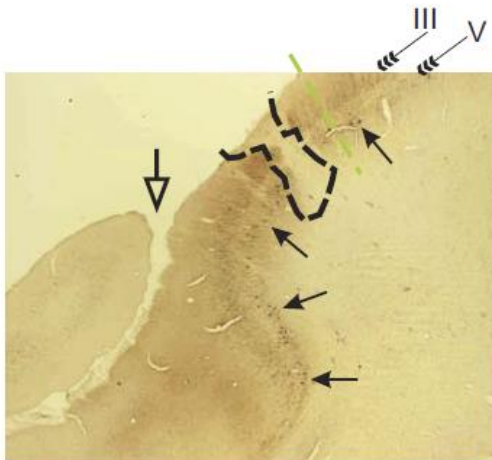
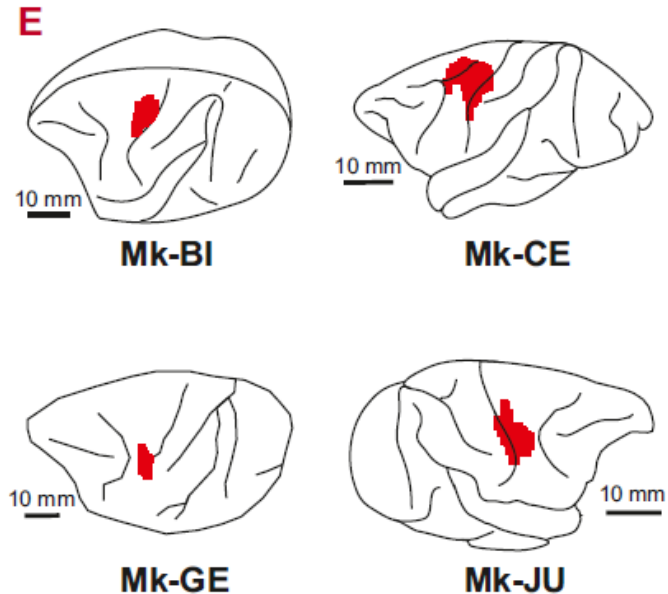
- Located in layer III or V
- Soma, Nucleus and more than three dendrites visible
- SMI-32 positiv

Working hypothesis:

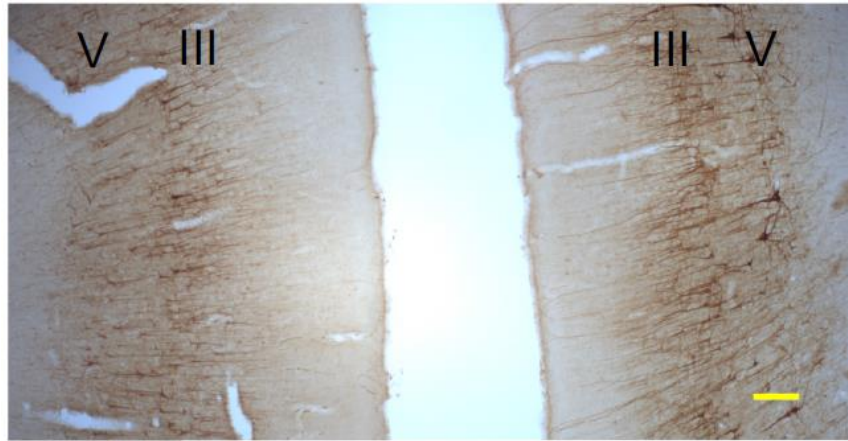
As cortico-cortical connections denser **intra**hemispheric as compared to **inter**hemispheric, effect on ipsilesional SMA: apoptosis??

Unilateral cortical lesion

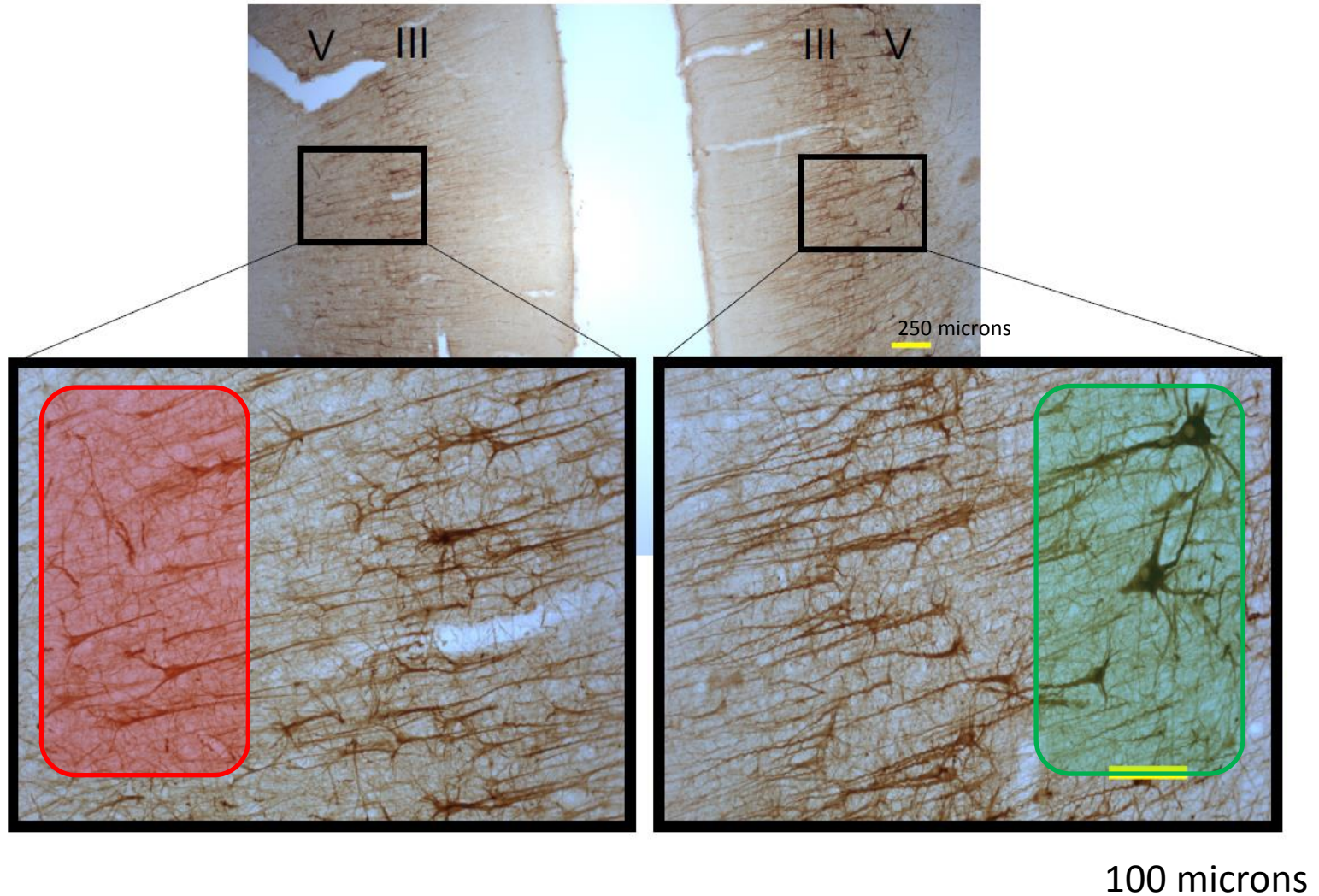
Microinfusion of Ibotenic acid in M1



Direct comparison between both hemispheres



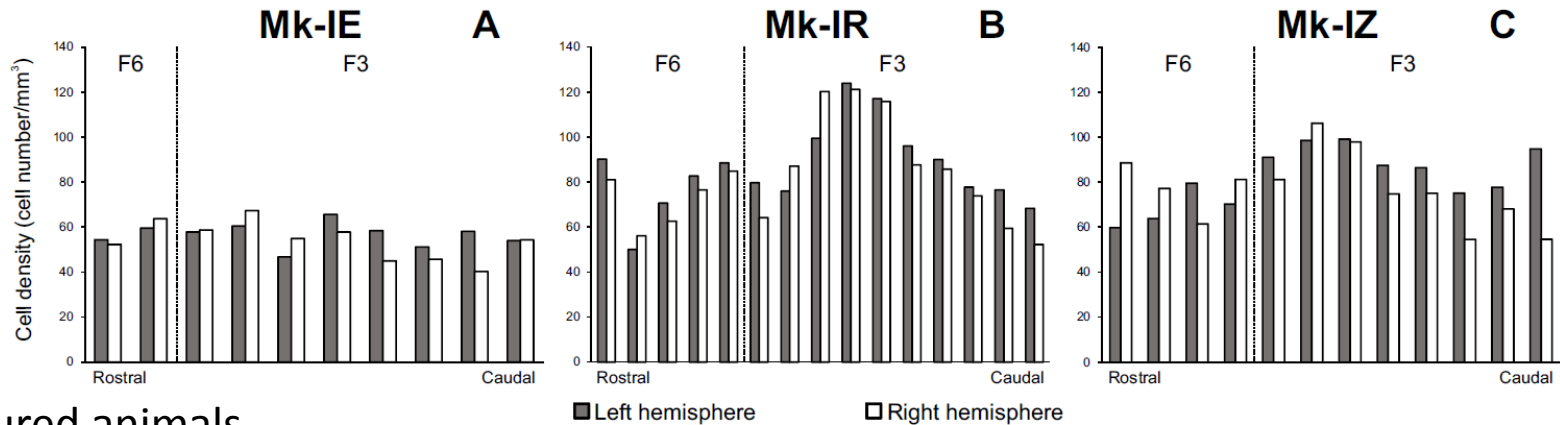
Direct comparison between both hemispheres



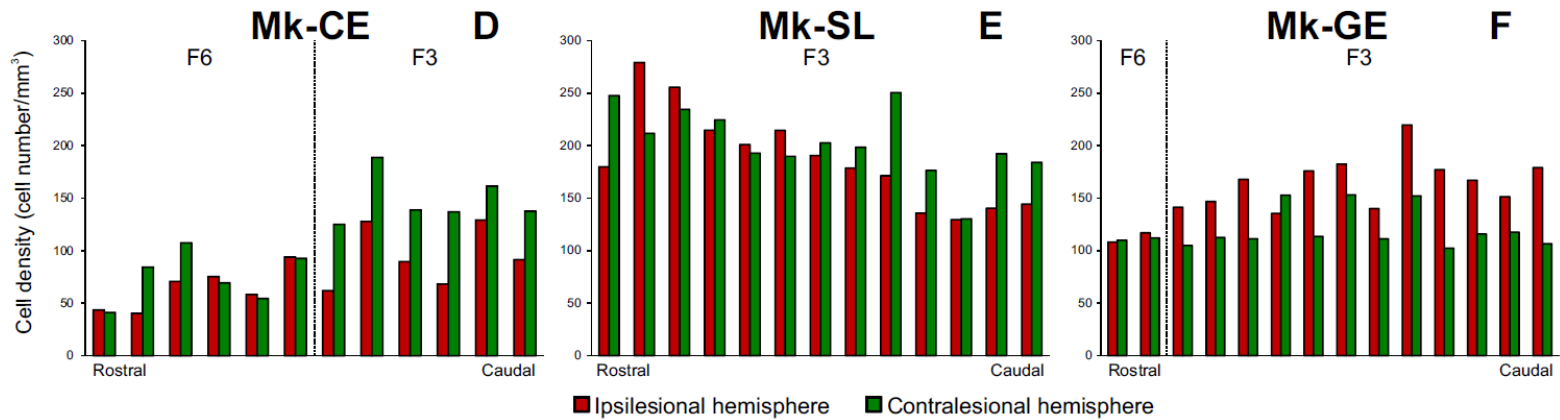
Cell density:

section per section in the rostro caudal axis

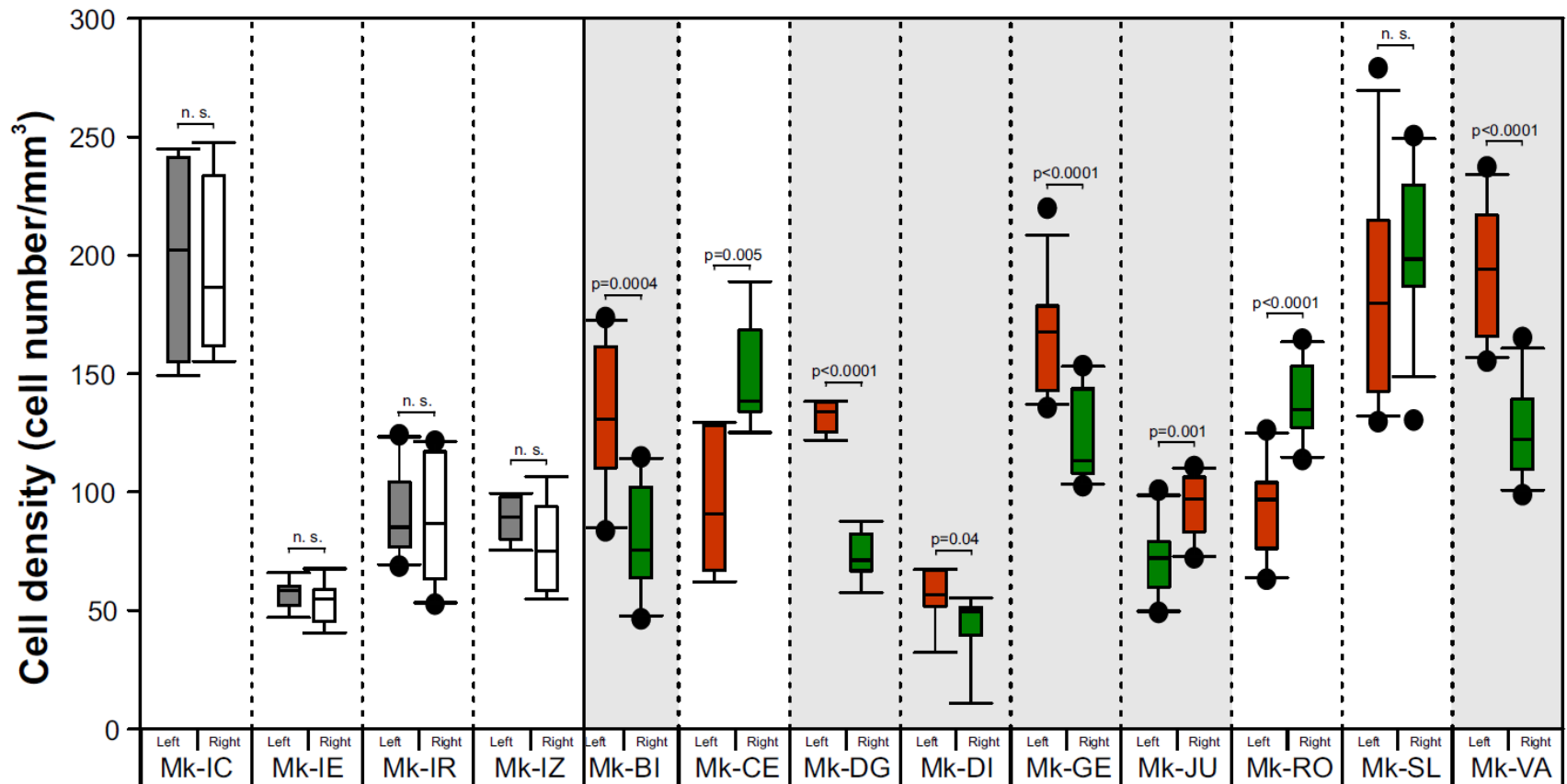
Intact animals



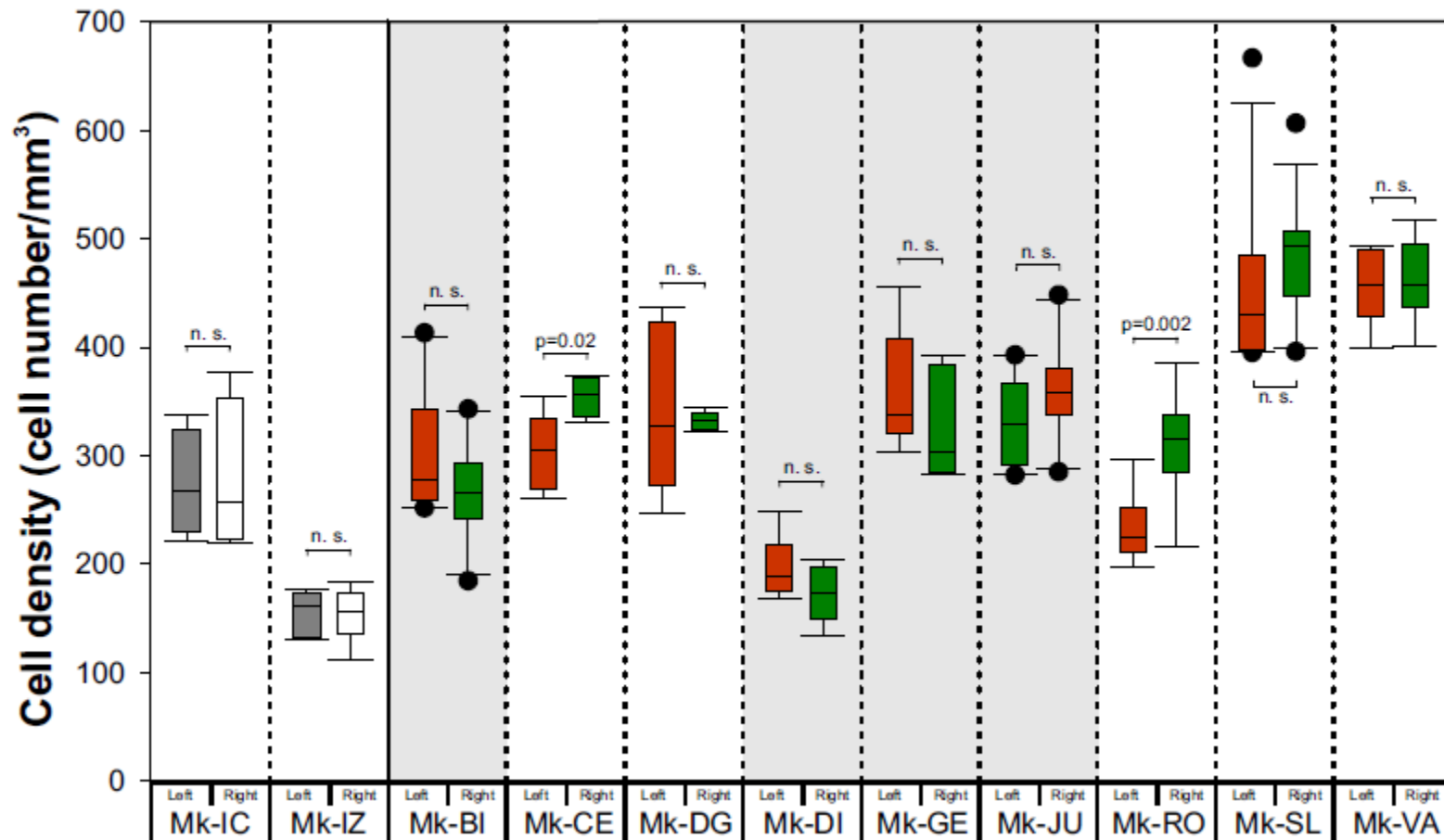
M1 injured animals



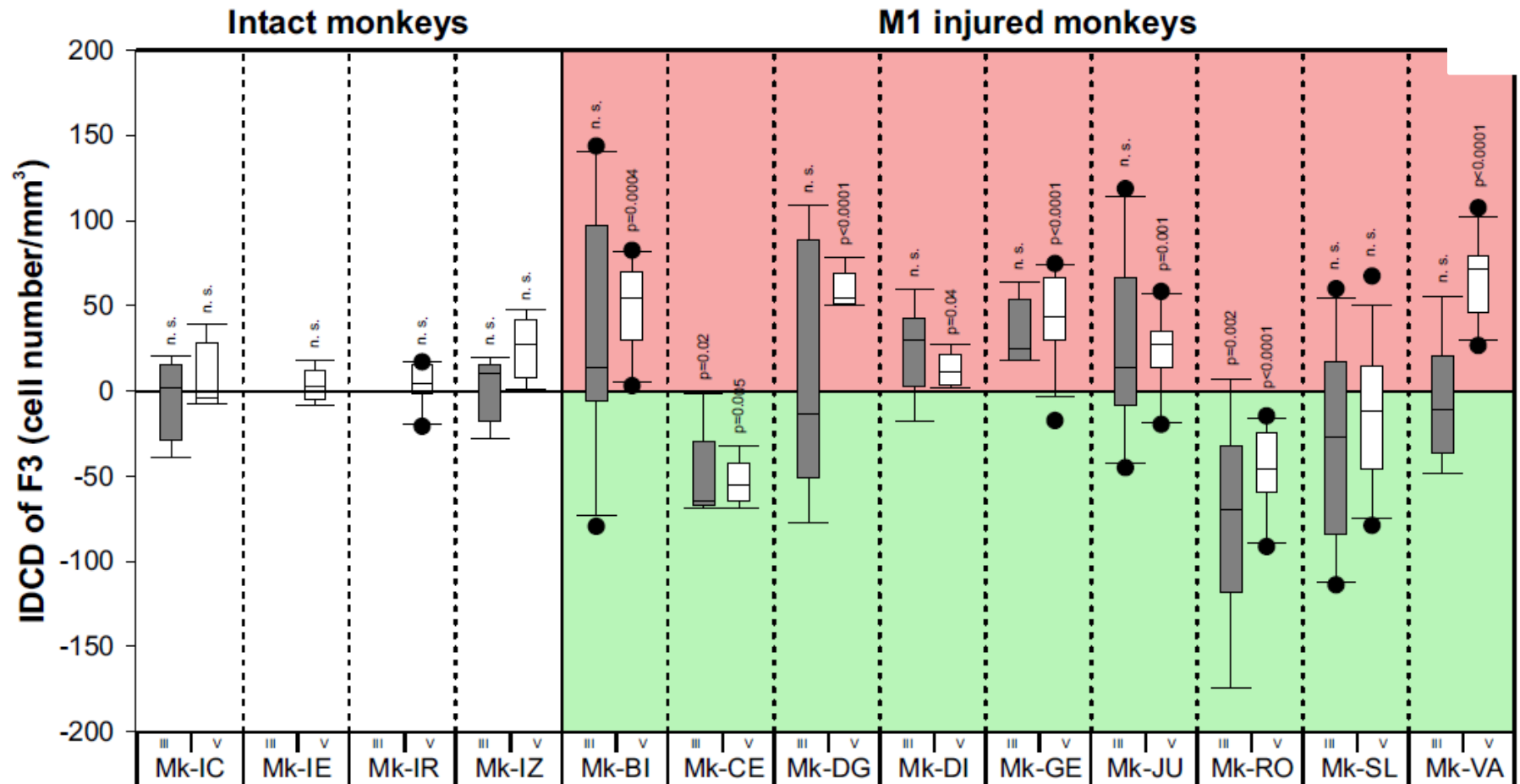
Cell density in layer V in SMA



Cell density in layer III in SMA



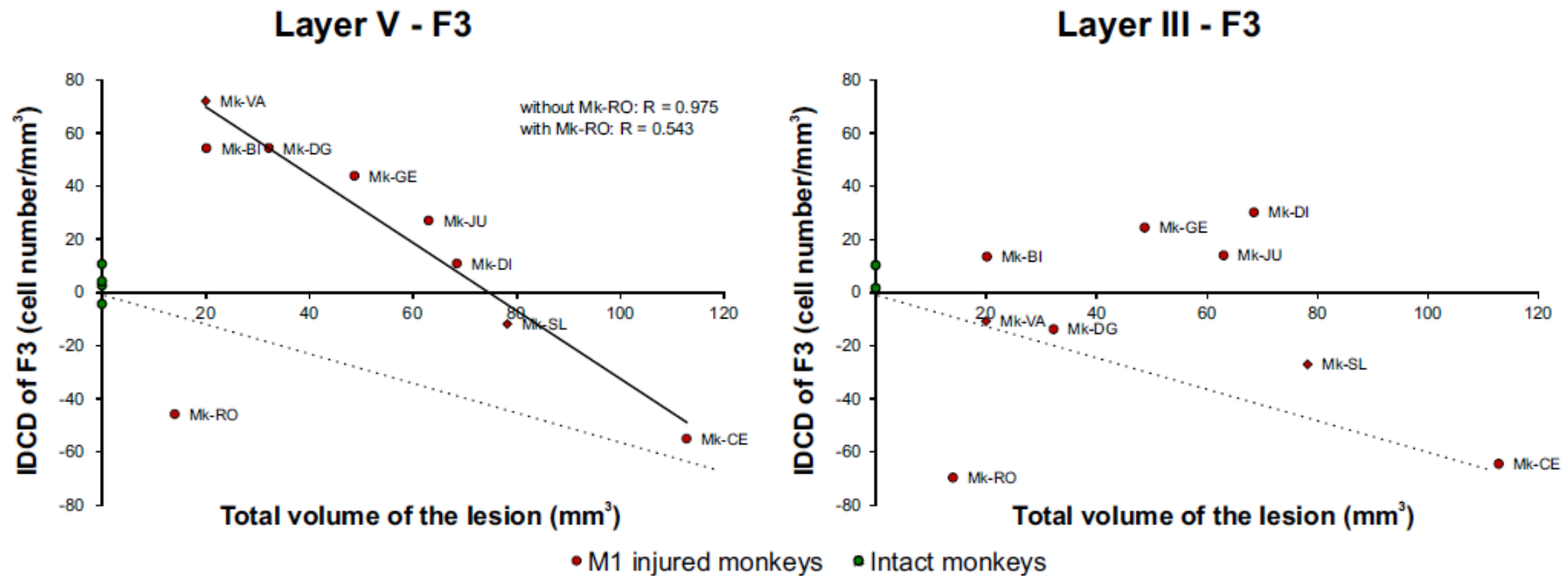
Interhemispheric cell density



IDCD < 0: more cells in the ipsilesional SMA

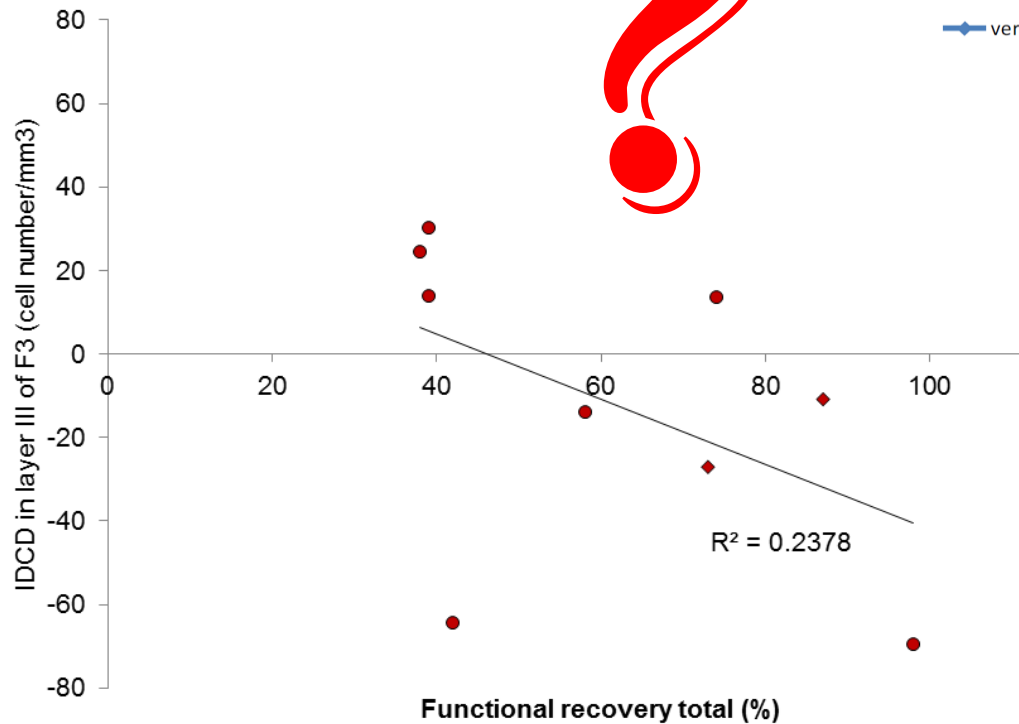
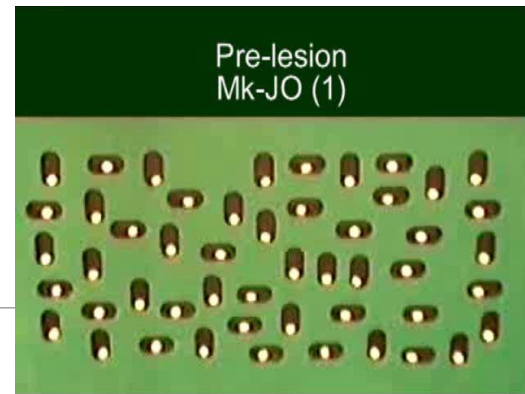
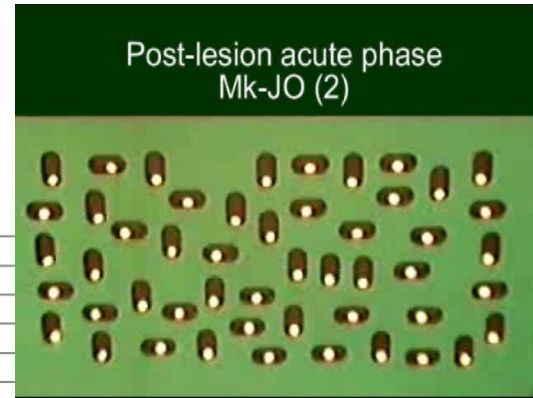
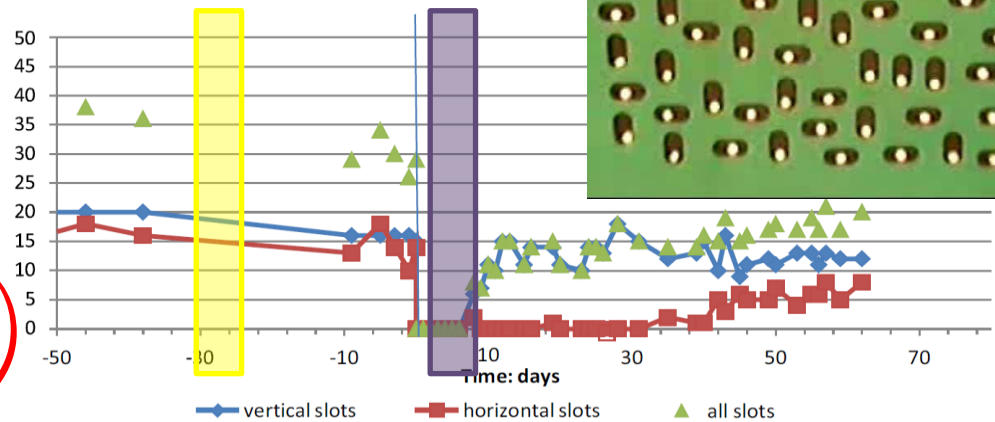
IDCD > 0: more cells in the contralesional SMA

Interhemispheric density correlated to the volume of the cortical lesion



Possible correlation between IDCD and manual dexterity

- Behavioral effect of cortical lesion in M1



Acknowledgments

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