

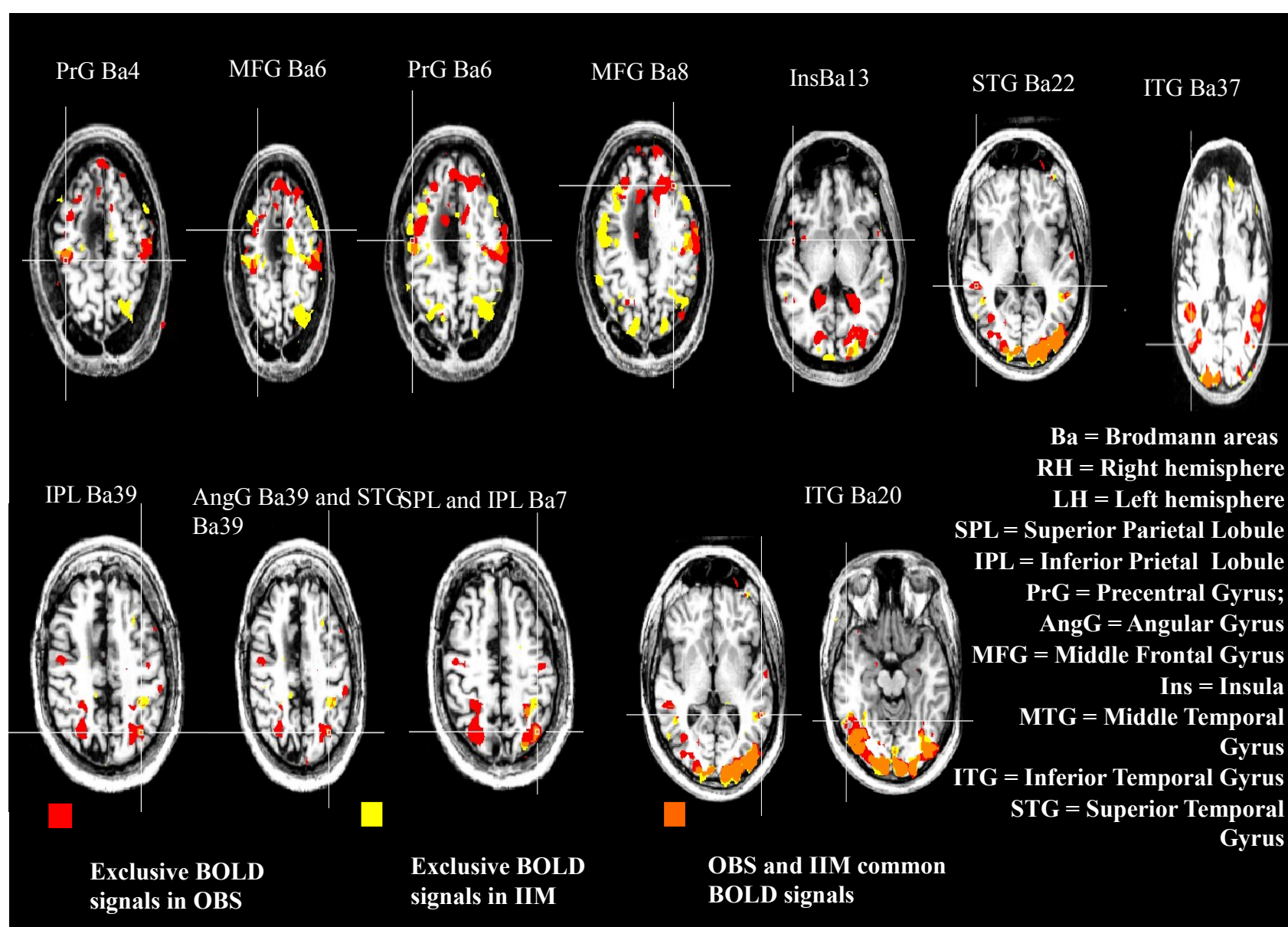
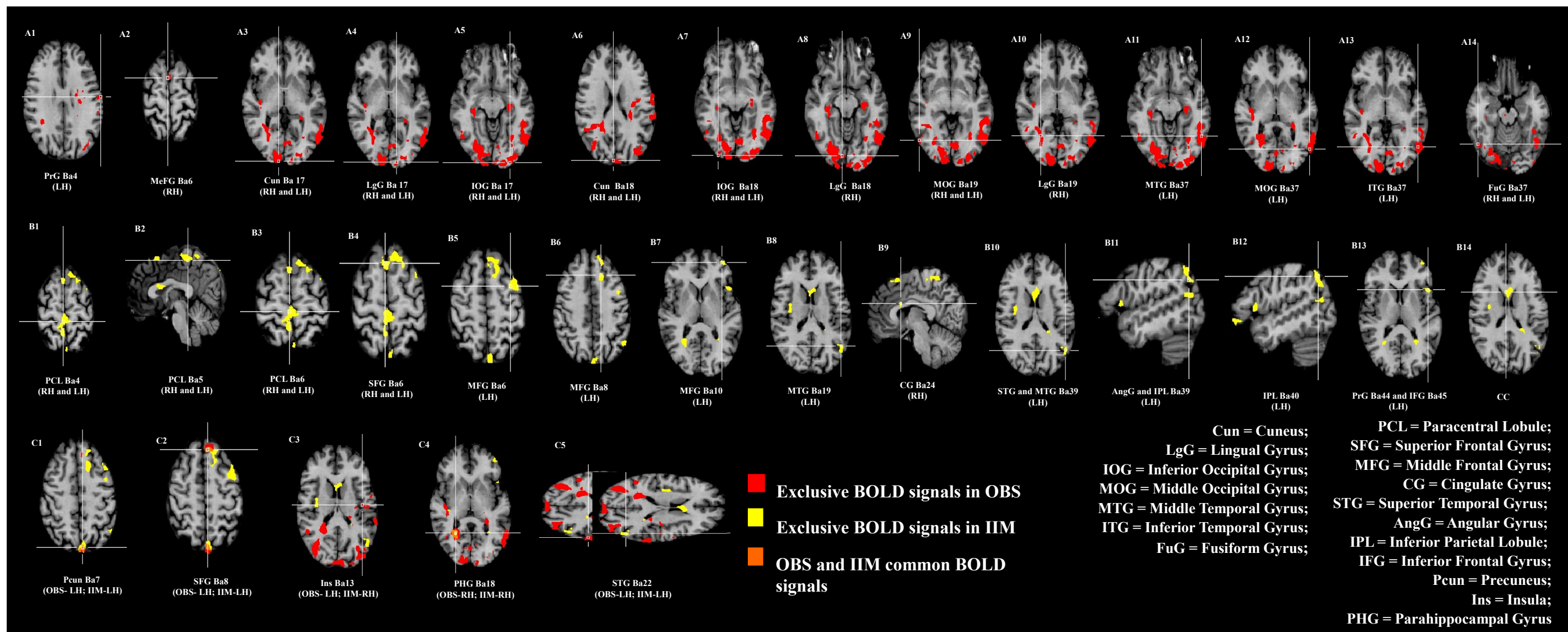
Neural correlates of imitative behavior in callosotomized subjects

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Background and aim: When subjects are free to reproduce gesture observed (free imitation), imitation occurs mainly in mirror mode in healthy and callosotomized subjects; when asked to use the same or the opposite limb as the model (driven imitation), controls imitate in anatomical mode while patients in mirror mode.^{1,2} The aim of this study was to investigate the neural correlates of the imitative perspective in callosotomized patients.

Materials and methods: Brain functional imaging study was performed in healthy controls and callosotomized subjects. Functional MR images were acquired using a 1.5 T MRI scanner; data were analyzed using BrainVoyager QX 2.3 software (Copyright © Rainer Goebel). Blood oxygenation level-dependent (BOLD) cortical activation was assessed in two experimental conditions: gesture observation (Observe) and imagery of gesture imitation (Imagine to imitate).



Results: Data revealed differences in BOLD signals between functional runs and between groups. Areas of increased activity versus resting baseline were in the occipital (visual areas), frontal (area 6), parietal (inferior and superior parietal lobule), and temporal lobes in all subjects for both Observe and Imagine conditions. In controls, in Imagine condition the activations in Ba4 of the left hemisphere, and in supramarginal (Ba 40), precentral (Ba44) and middle frontal gyri (Ba6) of both hemispheres were observed. In patients the bilateral activation of area 4 was found both in Observe and Imagine conditions.

Conclusions: Our data suggest that the distinct neural recruitment leading patients to perform differently from controls correlates with the structure of the corpus callosum.

References

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2. Jackson PL, Meltzoff AN, Decety J. Neural circuits involved in imitation and perspective-taking. *Neuroimage*. 2006;31:429-439.

