Review of: "Multisensory integration in neurons of the medial pulvinar of macaque monkey"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

Title: “Multisensory integration in neurons of the medial pulvinar of macaque monkey”

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In the paper “Multisensory integration in neurons of the medial pulvinar of macaque monkey”, the authors are interested to verify under the functional point of view the role of pulvinar, and in particular the medial part of it, in the multisensory integration. This scientific question starts by the fact that the pulvinar could be an ideal candidate to perform this kind of integration because it is strongly connected with different cortical and sub-cortical regions, both unisensory and also polysensory structures. The authors test single pulvinar neurons during a fixation task in which the monkeys keeping the fixation of a central point, receive an auditory, visual or audiovisual stimulus for 250 ms to obtain the reward.

The results revealed auditory, visual and multisensory neurons in the medial pulvinar. It also revealed multisensory integration in this structure, mainly subadditive and suppressive. These findings confirm that the medial pulvinar is involved in multisensory integration.

The paper is clear and well written and and it could be appropriate for publication.

I have only some suggestions here listed:

- Introduction: in the initial section relative to the involvment of associative cortical areas of parietal lobe (area 7 of Brodmann), the references didn't take into account more recently publications. Please add Breveglieri et al., 2008 and Gamberini et al., 2018 (Breveglieri R., et al. (2008). Visual, somatosensory, and bimodal activities in the macaque parietal area PEc. Cereb Cortex,18(4):806-16; Gamberini M., et al. (2018) Sensory properties of the caudal aspect of the macaque`s superior parietal lobule. Brain Struct Funct.2018; 223:1863-1879).

Later on, considering the sub-cortical-cortical circuits of polisensory areas please add Gamberini et al., 2016 and Impieri et al., 2018 (Gamberini M., et al. (2016). Thalamic projections to visual and visuomotor areas (V6 and V6A) in the Rostral Bank of the parieto-occipital sulcus of the Macaque. Brain Struct Funct (2016) 221:1573–1589; Impieri D., et al. (2018) Thalamo-cortical projections to the macaque superior parietal lobule areas PEc and PE. J Comp Neurol. 2018;526:1041–1056).

- Figure 8: I suggest to add also a 3D reconstruction of the pulvinar together with the 2D map.

- pag11, line 7: spelling "alore" instead "alone"

- pag11, Future study: Good suggestion for future experiments. I also suggest to try uncongruent stimuli between visual and acustic like a monkey face with a noise sound to discriminate the efficacy of the different stimulation; secondly I suggest to use different monkey expressions (sad, smiling, aggressive...) to better test the emotional role of pulvinar.