



AB015. Interocular normalization in monkey primary visual cortex (V1)

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Background: The two images, slightly different, seen by the two eyes allow the brain to build a 3D representation of the world. Monocular signals enter the primary visual cortex through layer 4, where they are segregated and organized in ocular dominance stripes. They are later combined in upper layers. In order to study the integration of the information coming from the two eyes at this mesoscale in V1,

we use optical imaging in anaesthetized macaque monkey.

Methods: Ocular dominance maps have been obtained with intrinsic optical imaging. Dichoptic interactions have then been studied with voltage-sensitive dye imaging (VSDI) with a frequency-tagging paradigm. Visual stimuli with different contrasts were respectively presented at 6 and 10 Hz to the two eyes, independently or simultaneously with a passive 3D screen. Frequency analysis thus allowed to identify each eye's contribution to the signal.

Results: We observed that V1 population activity generated by one eye stimulation is suppressed when the other eye is stimulated too. This integration of monocular signals at the population level can be accurately modeled with an interocular normalization model.

Conclusions: This approach and this model confirm V1 implication in combining the signals coming from the two eyes. The mechanisms underlying this interocular normalization, through local, feedforward, feedback or long-range connections, are still to be determined.

Keywords: Binocular vision; macaque monkey; normalisation; optical imaging

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