RUHR-UNIVERSITÄT BOCHUM

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IGSN - SYMPOSIUM

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Brain Dynamics in Behavior and Stimulation

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Visual stimulation quenches global alpha range activity in awake primate V4: a case study

Increasing evidence suggests that sensory stimulation not only changes the level of cortical activity with respect to baseline but also its structure. Despite having been reported in a multitude of conditions and preparations (for instance, as a quenching of intertrial variability, Churchland et al., 2010), such changes remain relatively poorly characterized. Here, we used optical imaging of voltage-sensitive dyes to explore, in V4 of an awake macaque, the spatiotemporal characteristics of both visually evoked and spontaneously ongoing neuronal activity, focusing on their variability, the "noise signal". With respect to the spontaneous case, we detected a reduction in its large-scale component (cortical extent > 1 mm) in the alpha range (5 to 12.5 Hz) during sensory inflow, accompanied by a decrease in pairwise correlations. Moreover, the spatial patterns of "noise"-correlation obtained with the different visual stimuli were more similar one to another than they were to that obtained in the absence of stimulation. Finally, these observed changes in variability dynamics approached saturation already at very low stimulus contrasts, unlike the progressive near-linear increase of the mean raw evoked responses over a wide range of contrast values, which could indicate a specific switching in the presence of a sensory inflow.

Host:

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