Emergence of deviance detection along the auditory neuroaxis and beyond: A neuronal correlate for predictive coding?

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Abstract:

S*timulus-specific adaptation (SSA)* is the reduction in the responses to a common sound relative to the same sound when rare and was originally described in the primary auditory cortex as the neuronal correlate of the mismatch negativity (MMN). The neural sources of MMN have been located mainly within non-primary auditory cortex in humans and animal models. Moreover, SSA is also present as early as in the auditory midbrain and thalamus (IC and MGB).

In this talk, I will show our recent findings on recordings from single neurons in the IC, MGB and auditory cortex (AC) of anaesthetized rats and awake mouse to an *oddball* paradigm similar to that used for MMN studies. Our data demonstrate that most neurons in the non-lemnical divisions of the auditory brain show strong SSA and that there is a hierarchical emergence of prediction error signals along the central auditory system.

Taken together our results unify three coexisting views of perceptual deviance detection at different levels of description: neuronal physiology, cognitive neuroscience and the theoretical predictive coding framework.

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