

Combinatorial Representation of Color in Visual Cortex

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The responses of many neurons in primary visual cortex of monkeys are selective for the color of homogeneous color patches in their receptive fields presented on a neutral gray background. When stimuli were presented on colored backgrounds, chromatic tuning was different in most neurons, and the changes in the tuning curves depended on the chromatic contrast between stimulus and background. Although the response tuning curves and their modulation by the background color do not appear to be separable, the likelihood of the ratio of spike counts can be fit by a product of two terms one of which depends only on the color in the receptive field and the second only on the color in the nonclassical receptive field. This type of separability may be a general mechanism that the cortex uses to combine information from different contexts. Non-classical receptive field surrounds are found in many cortical neurons and these results suggest that they are an efficient way to combine context information with feature information within a Bayesian framework.