The perception of visual patterns emerges from neuronal activity in a cascade of areas in the primate cerebral cortex. Neurons in the primary visual cortex, V1, represent information about the local orientation and scale of image elements, but visual representations in downstream areas V2 and V4 are more enigmatic. We have probed the early stages of this cascade with “naturalistic” texture stimuli designed to capture key statistical features of natural images. Neurons in the primary visual cortex, V1, are relatively insensitive to the statistical information in these images. However, in the area immediately downstream, V2, cells respond more vigorously to these stimuli than to matched control stimuli. Further downstream, in area V4, cells show stronger responses to natural images of scenes and objects, which may emerge from another iteration of the same kind of neural computation.

Humans show blood-oxygen-level-dependent functional magnetic resonance imaging (BOLD fMRI responses in V1, V2 and V4) that are consistent with the neuronal measurements in macaque. These results show how information about simple visual features (“stuff”) is elaborated to create a representation of objects (“things”), in the visual cortex.

**Publication:**