

Abstract Submitted
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The primary visual cortex in the neural circuit for visual orienting¹ LI ZHAOPING, University College London — The primary visual cortex (V1) is traditionally viewed as remote from influencing brain's motor outputs. However, V1 provides the most abundant cortical inputs directly to the sensory layers of superior colliculus (SC), a midbrain structure to command visual orienting such as shifting gaze and turning heads. I will show physiological, anatomical, and behavioral data suggesting that V1 transforms visual input into a saliency map to guide a class of visual orienting that is reflexive or involuntary. In particular, V1 receives a retinotopic map of visual features, such as orientation, color, and motion direction of local visual inputs; local interactions between V1 neurons perform a local-to-global computation to arrive at a saliency map that highlights conspicuous visual locations by higher V1 responses. The conspicuous location are usually, but not always, where visual input statistics changes. The population V1 outputs to SC, which is also retinotopic, enables SC to locate, by lateral inhibition between SC neurons, the most salient location as the saccadic target. Experimental tests of this hypothesis will be shown. Variations of the neural circuit for visual orienting across animal species, with more or less V1 involvement, will be discussed.

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