

?Shepherd?s crook? neurons drive and synchronize the enhancing and suppressive mechanisms of the midbrain stimulus selection network

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© National Academy of Sciences. All rights reserved. The optic tectum (TeO), or superior colliculus, is a multisensory midbrain center that organizes spatially orienting responses to relevant stimuli. To define the stimulus with the highest priority at each moment, a network of reciprocal connections between the TeO and the isthmi promotes competition between concurrent tectal inputs. In the avian midbrain, the neurons mediating enhancement and suppression of tectal inputs are located in separate isthmic nuclei, facilitating the analysis of the neural processes that mediate competition. A specific subset of radial neurons in the intermediate tectal layers relay retinal inputs to the isthmi, but at present it is unclear whether separate neurons innervate individual nuclei or a single neural type sends a common input to several of them. In this study, we used in vitro neural tracing and cell-filling experiments in chickens to show that single neurons innervate, via axon collaterals, the