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Corollary discharge circuits for saccadic modulation of the pigeon visual system.

Yang Y, Cao P, Yang Y, Wang SR

Nat Neurosci 2008 May **11**(5):595-602 [[abstract on PubMed](#)] [[citations on Google Scholar](#)] [[related articles](#)] [[full text](#)] [[order article](#)]

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First evaluation 6 May 2008 | Latest evaluation 3 Jul 2008

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Faculty Comments

Faculty Member

Marc Sommer

University of Pittsburgh,
United States of America
NEUROSCIENCE

 New Finding

Comments

Using a variety of techniques, this study delineates an entire circuit in the avian brain. The visual telencephalon in pigeons, homologous to striate cortex in primates, exhibits a mysterious decrease in activity just prior to, and during, an eye movement. How does this visual structure know about the imminent motor act? Yang et al. used neuronal recordings in combination with reversible inactivation and antidromic/orthodromic stimulation techniques to demonstrate that a copy - or corollary discharge - of the efferent oculomotor command is conveyed from brainstem areas, through a thalamus-like structure, up to the visual telencephalon. They speculate that this circuit may help to maintain useful visual perception despite the interruptions caused by eye movements.

Competing interests: None declared

Evaluated 6 May 2008

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Dora Angelaki

Washington University
School of Medicine,
United States of America
NEUROSCIENCE

 New Finding

Using several elegant experiments, this study provides the first description of the neural circuits carrying saccade-related corollary discharge to the telencephalic hyperpallium, the avian homologue of the visual cortex. These circuits include the optokinetic nuclei and raphe complex that send corollary information to the telencephalon through the thalamus. Corollary information related to self-generated movements, like saccades, is critical in separating afference from refference and creating a reliable neural representation of the world.

Competing interests: None declared


Evaluated 12 May 2008

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Kathleen Cullen

McGill University, Canada
NEUROSCIENCE

 Hypothesis

 New Finding

In this study, the authors combine single-unit recording and inactivation experiments in multiple areas of the pigeon visual system to show that the saccadic (fast eye movement) responses of telencephalic neurons are generated via the corollary discharge signal produced by the oculomotor neurons of the brainstem. Single-unit recordings made in the pigeon homologs of the mammalian visual cortex, thalamus, optokinetic system, and oculomotor pathways revealed saccade-related activity at most levels of processing. Inactivation of the brainstem raphe complex eliminated these saccade-related responses in both the thalamic and optokinetic processing streams. Taken together, these findings provide the first direct demonstration of the mechanism underlying perisaccadic modulation of telencephalic neurons.

Competing interests: None declared

Evaluated 3 Jul 2008

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Faculty Comments

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Faculty of 1000 Biology: evaluations for Yang Y et al *Nat Neurosci* 2008 May 11 (5) :595-602 <http://www.f1000biology.com/article/id/1108141/evaluation>

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