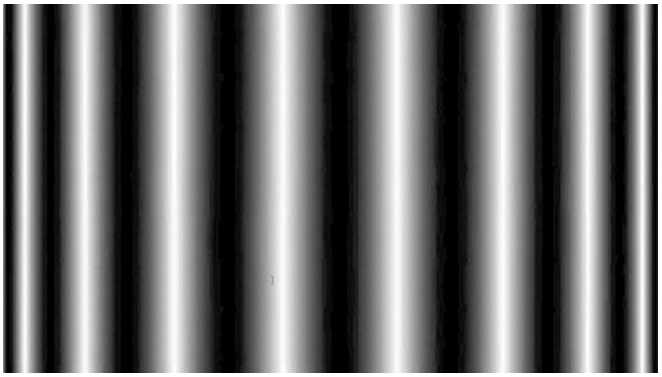
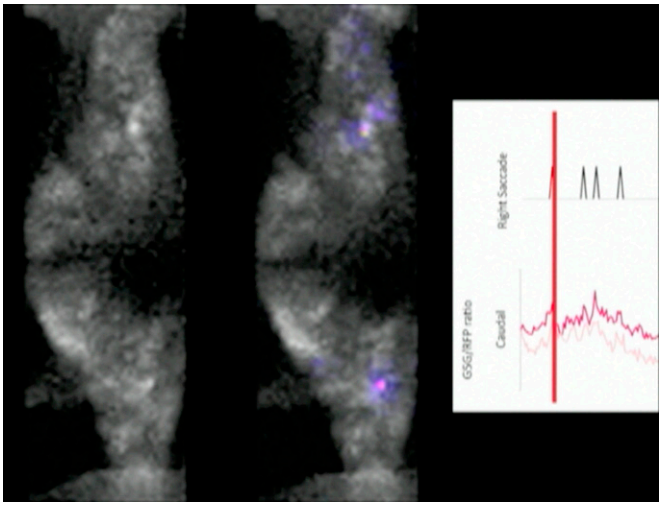
Supporting Information

Matsui et al. 10.1073/pnas.1403105111



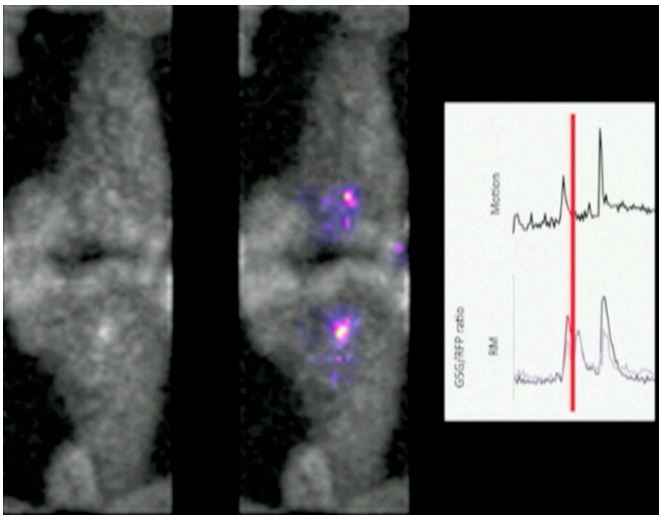
Movie S1. An example of optokinetic response (OKR) or optomotor reflex (OMR) induction. To stimulate cerebellum-dependent behaviors, such as OMR or OKR, movies were created with MatLab/Psychtoolbox-3. One example is shown.

Movie S1



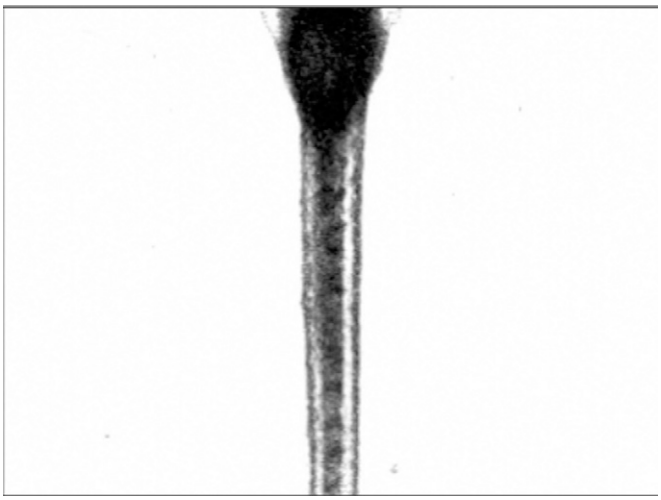
Movie S2. Purkinje cell (PC) activities during optomotor reflex (OMR). Larvae of the Tg(tagRFP-T:PC:GCaMP5G) strain were mounted on the stage of a confocal microscope and stimulated to perform OMR. Changes in GCaMP5G-derived fluorescence were recorded (275 ms/frame). The movie plays at 3.6 frames/s (fps) and represents an example of GCaMP5G signals during left-oriented OMR. *Left* shows original GCaMP5G signals, *Center* represents color-coded GCaMP5G signals subtracted by the $t = 0$ image, and *Right* shows the trace of the G5/RFP values. Fig. 3*B1* has detailed explanations. RFP, red fluorescent protein.

Movie S2



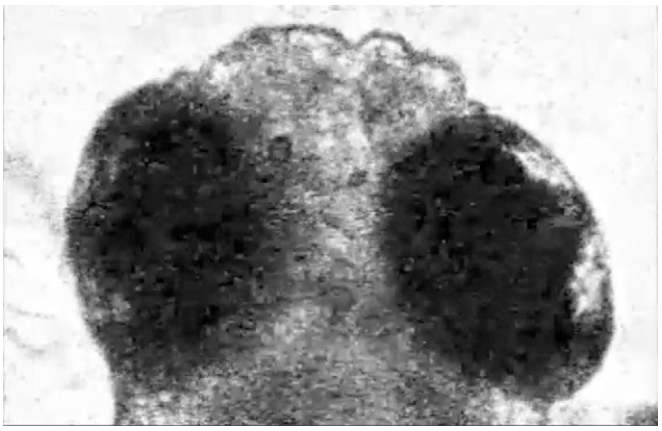
Movie S3. Purkinje cell (PC) activities during optokinetic response (OKR). Larvae of the Tg(tagRFP-T:PC:GCaMP5G) strain were mounted on the stage of a confocal microscope and stimulated to perform OKR. Changes in GCaMP5G-derived fluorescence were recorded (275 m/frame). The movie plays at 3.6 frames/s (fps) and represents an example of GCaMP5G signals during OKR evoking saccades to the right. *Left* shows original GCaMP5G signals, *Center* represents color-coded GCaMP5G signals subtracted by the $t = 0$ image, and *Right* shows the trace of the G5/RFP values. Fig. 4*A1* has detailed explanations. RFP, red fluorescent protein.

Movie S3



Movie S4. Optomotor reflex (OMR) monitoring during optogenetic inhibition/activation of Purkinje cells (PCs). Suppression of PC activity in the left or right rostromedial PC layer resulted in the decreased ratio of swimming events toward the left or right, respectively. A region outside of the PC layer (hindbrain) was illuminated as the control recording (control1). This series [recorded at 13.3 frames/s (fps); plays at 13.3 fps] shows representative examples of the control illumination for (*A*) Archaerhodopsin 3 (Arch; control1), (*B*) left rostromedial suppression, (*C*) right rostromedial suppression, (*D*) control illumination for Channelrhodopsin 2 (ChR2), (*E*) left rostromedial activation, and (*F*) right rostromedial activation. (*A*–*C*) Tg(Arch-tagRFPT:PC:GCaMP5G) larva. (*D*–*F*) Tg(ChR2-Venus:PC:RGECO-1) larva. *G* shows intact OMR when we used Tg(tagRFPT:PC:GCaMP5G) under right PC-layer illumination (561 nm). The region of interest was illuminated throughout each movie.

Movie S4



Movie S5. Optokinetic response (OKR) monitoring during optogenetic inhibition/activation of Purkinje cells (PCs). Suppression of PC activity in the left or right caudal PC layer during OKR resulted in the significant decrease of saccade events toward the right or left, respectively. Activation of PCs in the left or right caudal PC layer during OKR resulted in a significant decrease of saccade events toward the left or right, respectively. A region outside the PC layer (hindbrain) was illuminated for control recordings (control1). This series [recorded at 13.3 frames/s (fps); plays at 13.3 fps] shows representative examples of the control illumination for (*A*) Archaerhodopsin 3 (Arch; control1), (*B*) left caudal suppression, (*C*) right caudal suppression, (*D*) control illumination for Channelrhodopsin 2 (ChR2), (*E*) left caudal activation, and (*F*) right caudal activation. (*A*–*C*) Tg(Arch-tagRFPT:PC:GCaMP5G) larva. (*D*–*F*) Tg(ChR2-Venus:PC:RGECO-1) larva. *G* shows intact OKR when we illuminated (561 nm) the entire PC layer in Tg(tagRFPT:PC:GCaMP5G) larvae. The region of interest was illuminated throughout each movie.

Movie S5

Other Supporting Information Files

SI Appendix (PDF)