q1: How does the cerebellum use feedback to adjust the timing of movements in a sequence? q2: How does the cerebellum use feedback from one blink to trigger the next in a sequence? q3: How can a blink in one eye trigger a blink in the other eye? Processed summary

Planning questions

The cerebellum utilizes proprioceptive feedback to fine-tune the timing of movements in a sequence

based on previous actions.]<sup>t</sup> [Imagine the cerebellum as a coach who watches how you perform a move, then gives tips to improve the next one based on what was seen.  $]^{e_1}$  But how exactly does it achieve this?

[To investigate, we trained rabbits to blink in response to an external cue and explored whether the

cerebellum could use feedback from one blink to trigger the next. \(^1\^2\) [As expected, after learning the initial blink, the rabbits blinked again in response to their own first blink, creating a chain of movements.  $]^{e_2}$ Control experiments confirmed that each blink was initiated by the previous one rather than the original cue. Consistent patterns of brain activity during this process indicate that the cerebellum adjusts

movement based on feedback from previous actions. [Building on this, we trained rabbits to blink on cue, and they learned to initiate additional blinks in response to earlier blinks in the sequence. The further found that the rabbits could use a blink from one eye as a cue to trigger a blink in the other eye, suggesting that the same mechanism governs these movements. Pe<sub>3</sub> This raises the possibility that the cerebellum might also guide sequences of cortical activity during cognitive tasks, given its extensive connections to

the cortex, a question future experiments should explore.

Explanatory EDU