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### Neuroscience 2002 Abstract

<b>Presentation Number:</b>	565.12
<b>Abstract Title:</b>	Induction, persistence, and reversibility of motor learning in the vestibulo-ocular reflex.
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<b>Primary Theme and Topics</b>	Motor Systems - Vestibular -- Vestibular ocular reflex
<b>Secondary Theme and Topics</b>	Motor Systems - Vestibular -- Vestibular neurons, circuitry and behavior
<b>Session:</b>	565. Vestibular: ocular reflex Poster
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Different types of synaptic plasticity in the cerebellum have different kinetics and reversibility properties. In order to constrain the plasticity mechanisms that underlie vestibulo-ocular reflex (VOR) adaptation, we examined the timecourse of induction, the persistence, and the reversibility of VOR gain changes in the mouse. VOR adaptation could be reliably and rapidly induced in either the gain-up or gain-down direction, with gain changes reaching a plateau in 20 minutes. Gain changes were long-lasting, persisting for at least 6 hours. We concatenated multiple training sessions (gain-up followed by gain-down, or gain-down followed by gain-up) to assess whether learning was reversible on a short timescale. Preliminary results suggest that training gain-up, followed by gain-down, resulted in a final VOR gain similar to that from a session with gain-down alone, suggesting that the effects of the immediately preceding gain-up training session had been reversed. Similar conclusions held for the down-followed-by-up training protocol.

These experiments reveal that although mouse VOR gain changes are rapidly induced and persist for many hours, they are reversible on short time scales. These properties constrain the synaptic/cellular plasticity mechanisms that mediate learning in the VOR circuit.

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