Print this Page

Presentation Abstract

Program#/Poster#:	279.10/SS1
Title:	Feedback model of visual perceptual learning
Location:	Halls B-H
Presentation Time:	Sunday, Nov 14, 2010, 2:00 PM - 3:00 PM
Authors:	***S. MOLDAKARIMOV**[1,2], M. BAZHENOV[3], T. J. SEJNOWSKI[1,2]; [1]Salk Inst., LA JOLLA, CA; [2]UCSD, San Diego, CA; [3]UC Riverside, Riverside, CA
Abstract:	Adults show remarkable improvement of sensory discrimination after intensive practice. Behavioral aspects of such perceptual learning are well documented in the visual and other sensory modalities in mammals. However, the neural correlates of perceptual learning are poorly understood. Specificity for stimulus attributes implicates a cortical site that is at an early stage of processing, where receptive fields are small. In primary somatosensory and auditory cortices intensive training leads to stimulus specific changes of receptive field properties of neurons responding to the stimuli. In contrast, in primary visual area the changes of receptive field properties of neurons may be minimal, though there is disagreement between the conclusions from different studies. So, it is unclear if there is a general principle for perceptual learning that will apply to all primary sensory cortices. In this study we simulated a model of visual processing that reconciles inconsistencies among experimental studies and suggests a new mechanism of perceptual learning in visual system. In the model, synaptic plasticity of the feedback projections from higher cortical areas to the primary visual cortex was sufficient to explain both sharpening of the response properties of neurons after training and invariance of the cortical maps. In contrast, models based on plasticity of recurrent or feedforward connections failed to explain these experimental observations. We, therefore, predict that the neural basis of perceptual learning in the visual system may be different from perceptual learning in other sensory modalities, and specifically that perceptual learning is based on adjustment of feedback projections rather than feedforward or recurrent

connections.

Disclosures: **S. Moldakarimov:** None. **M. Bazhenov:** None. **T.J. Sejnowski:** None.

Keyword(s): VISUAL CORTEX

CORTICAL PLASTICITY

LEARNING

Support: NINDS

Swartz Foundation

HHMI

[Authors]. [Abstract Title]. Program No. XXX.XX. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010. Online.

2010 Copyright by the Society for Neuroscience all rights reserved. Permission to republish any abstract or part of any abstract in any form must be obtained in writing by SfN office prior to publication.