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## Supplemental Data

# Compression and Reflection of Visually Evoked Cortical Waves

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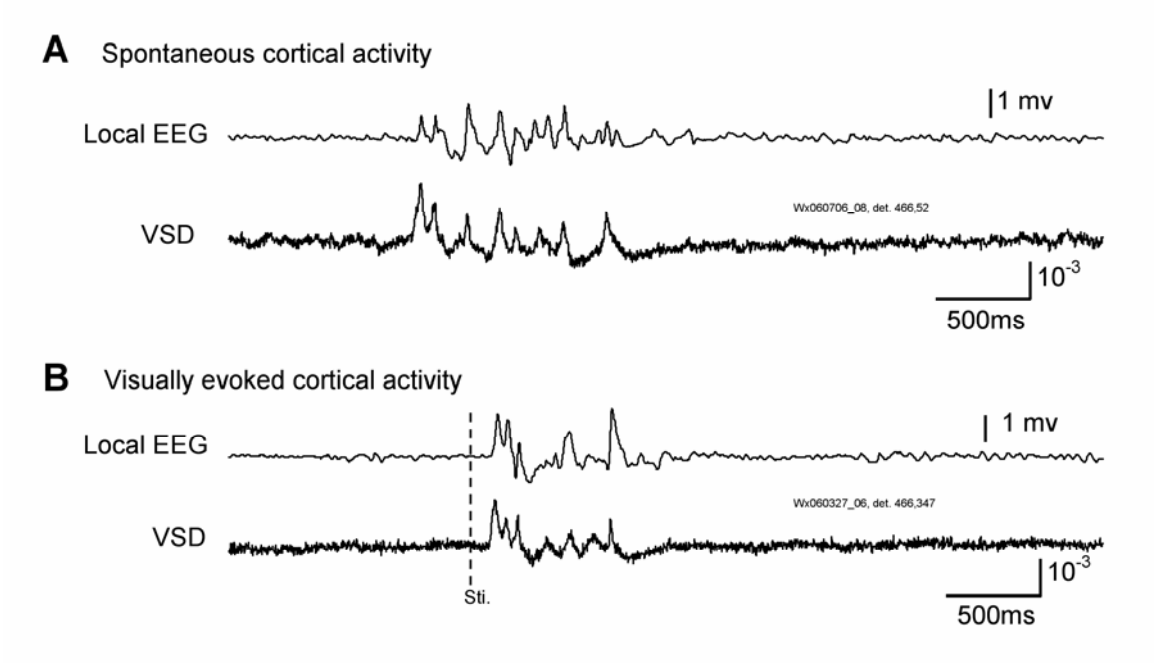
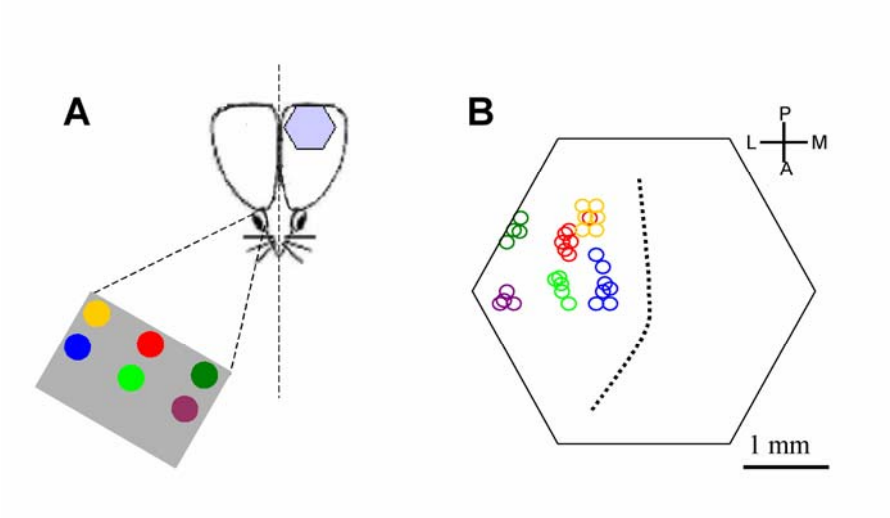



**Supplemental Figure S1. Sensitivity of voltage-sensitive dye imaging**

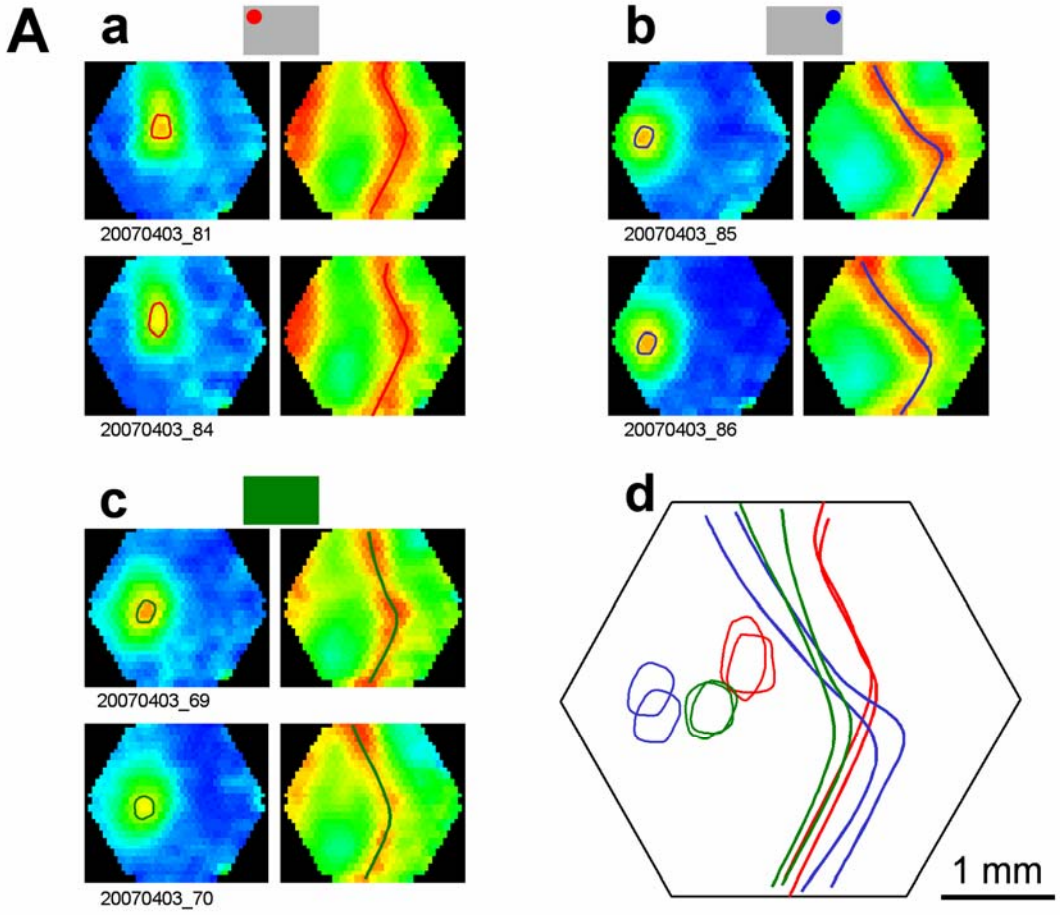
Simultaneous optical and local field potential recordings from rat visual cortex. (A) Spontaneous activity. Note that most of the peaks in the LFP can also be found in the voltage-sensitive dye recording. (B) Evoked activity. The stimulus is a drifting grating, same as that in Figure 1. Signals are filtered between 0 and 200 Hz.

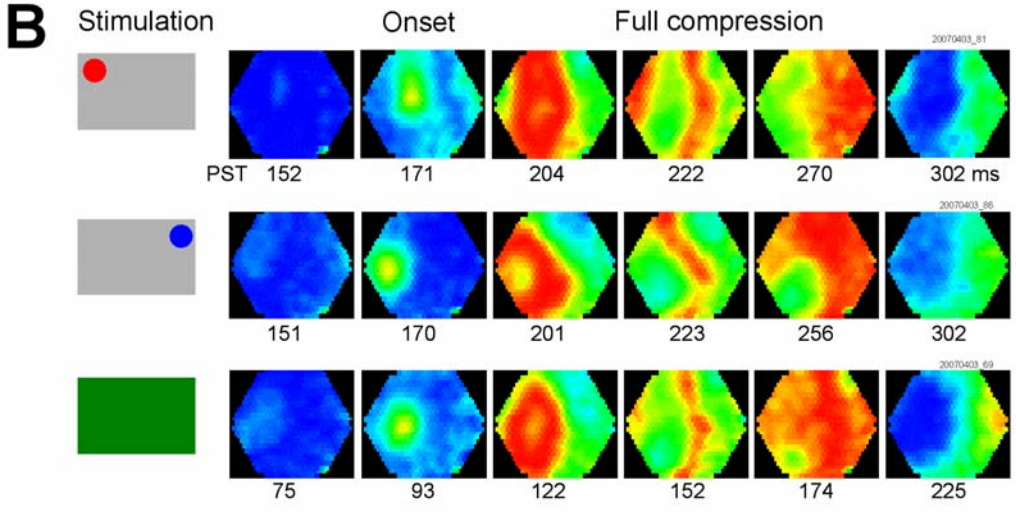



**Supplemental Figure S2. Retinotopic map in V1**

(A) Schematic diagram of visual stimulation. Visual stimulation was projected onto a screen of 10 × 7 inches placed at 20 cm in front of the animal's contralateral eye. The retinotopic map was made by presenting the drifting pattern ($6^o$ in size) at 6 locations on the screen (colored dots).

(B) Initiation sites of the primary waves. Each circle represents the initiation site of one trial. Color of the circles represents the location of the visual stimulation in the field of view. The approximate coordinates of the stimulation sites are (in degree from the center): yellow (-19, 11); red (0, 11); dark green (19, 11); blue (-19, 0); light green (0, 0); and purple (19, 0). All the data are from the same animal. The broken line marks the approximate position of V1/V2 border.


A
a
b
20070403_81
20070403_85
20070403_84
20070403_86
c
d
20070403_69
20070403_70
1 mm


B
Stimulation
Onset
Full compression
PST 152
171
204
222
270
302 ms
151
170
201
223
256
302
75
93
122
152
174
225

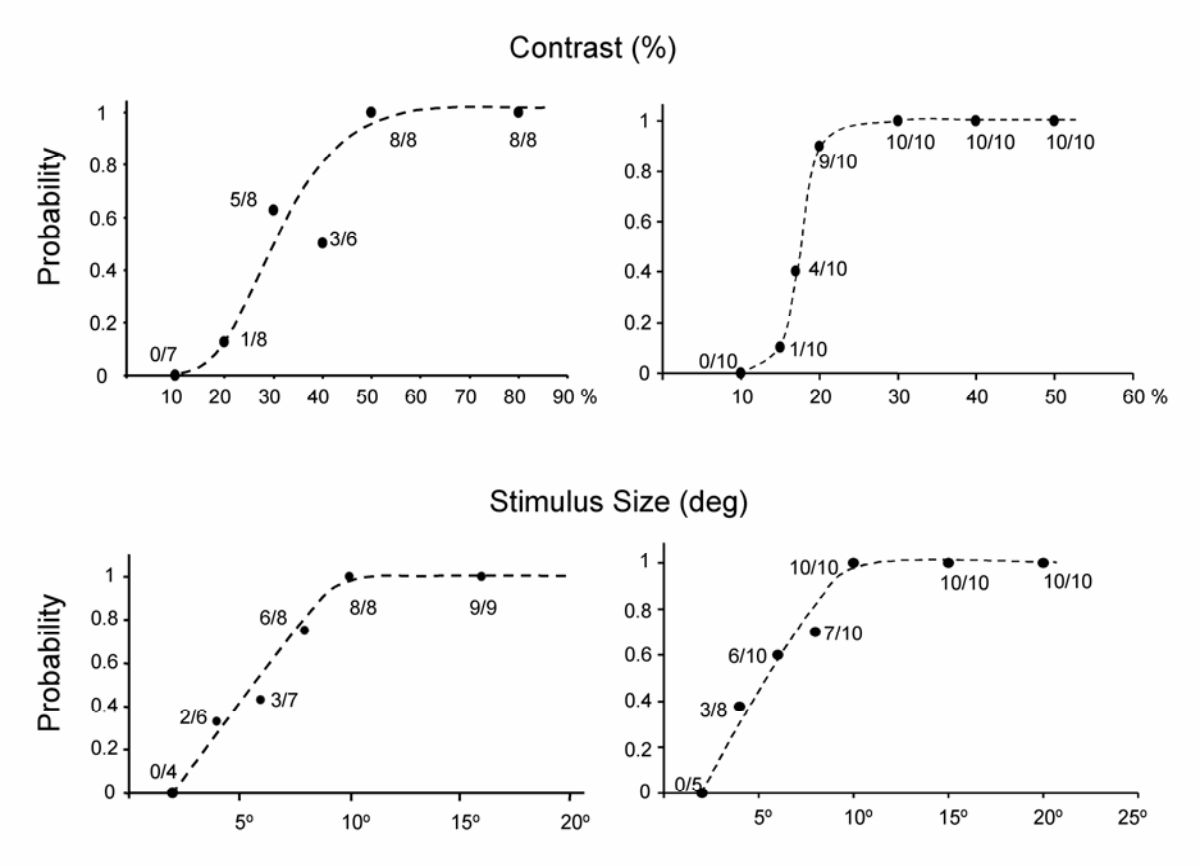
**Supplemental Figure S3. Stimulus position and evoked wave patterns**

(A) Stimulus position and the compression band. The relationship between stimuli, initiation sites and compression band are shown with six trials imaged from the same imaging field. From each trial, two snap shots are selected. In panels a-c the upper and lower row images are from two trials with identical stimuli. The left and right images in each row show the onset and the full compression of the primary wave respectively. The location of the stimulus in the visual field is indicated on the top of each image panel.

(a-b) Waves induced by a $10^{o}$ drifting grating presented on the top left and top right respectively. (c) Waves induced by full screen drifting grating ($50^{o} \times 38^{o}$).

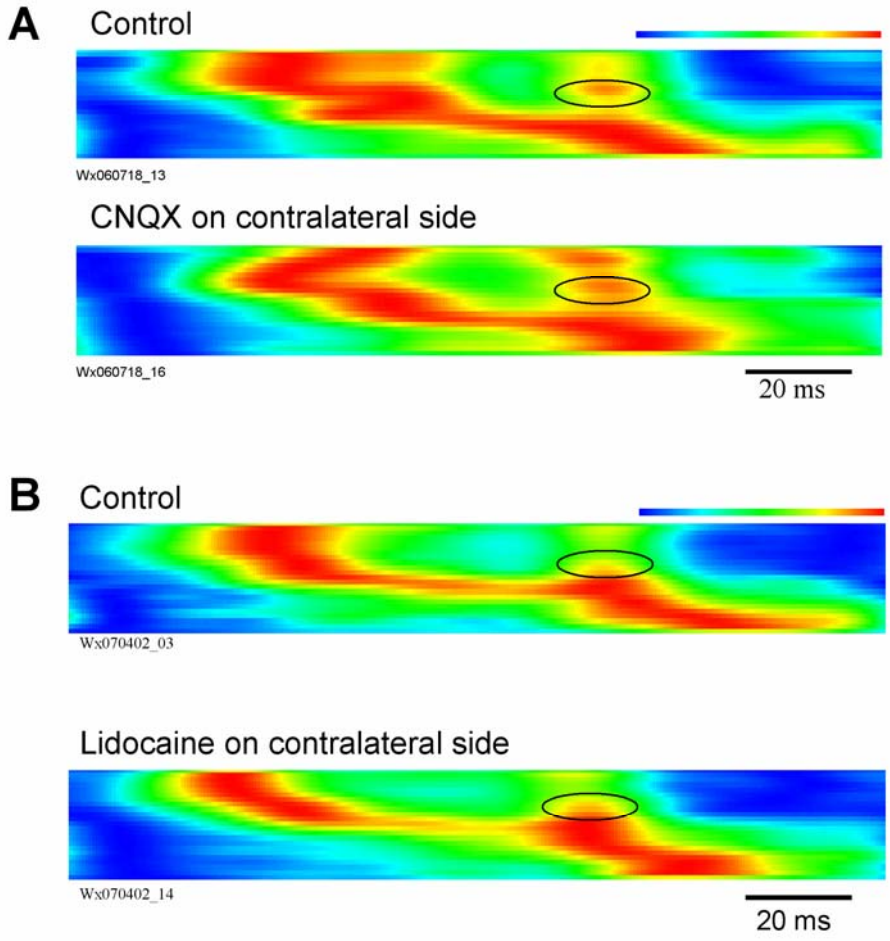
(d) Summarization of initiation sites (circles) and compression band (lines) of all six trials. Circles and lines are colored according to the stimulus condition in panels a - c.

(B) Same wave patterns evoked by different visual stimuli. Three trials are selected from the data set in A, showing that stimulation at different locations in the visual field induce the same compression/reflection pattern. In each row of images, six snap shots are selected at the six stages: before onset, onset of primary wave, onset of compression, full compression, reflection and the end of the primary/reflection wave complex. The number under each image is the post-stimulus time (PST) in milliseconds.



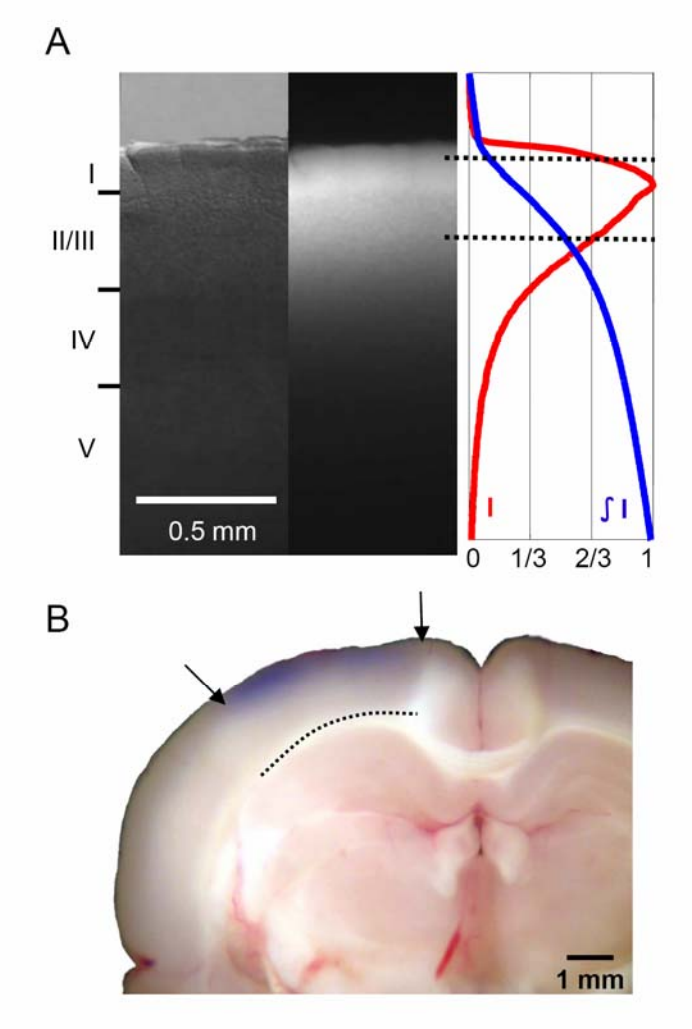

**Supplemental Figure S4. Thresholds of the contrast and size of the visual stimulation**

The probability for evoking the primary wave is plotted against stimulation contrast (top row) and stimulation size (bottom row). Each plot summarizes the results of one animal. The two numbers near each data point are the number of trials with evoked response and the total trials tested under that stimulus condition. The probability is calculated by dividing these two numbers. The broken lines in the plots are drawn arbitrarily.




**Supplemental Figure S5. Effect of blocking the activity on the contralateral cortex**

Local application of CNQX (A) or Lidocaine (B) on the contralateral cortex does not block the wave reflection (marked by circles). The X-T map was made with the same method as that of Figure 5C.




**Supplemental Figure S6. Profile of voltage-sensitive dye staining**

(A) *Left*, Transmitted light image of the cortical section over visual cortex. *Middle*, fluorescence image (excitation 630 nm, emission >690 nm) from the same cortical section showing distribution of RH1691 staining. *Right*, fluorescence intensity (red) and integrated fluorescence intensity (blue). Broken lines mark the tissue depth with fluorescent intensity higher than 2/3 of the maximum intensity.

(B) Photograph of a stained cortical section. Arrows indicate boundaries of the cranial window. Broken line indicates the border between gray and white matter. Staining of RH1691 can be seen by eye as a light blue hue.