



Presentation Abstract

Program#/Poster#: 305.05/XX79

Presentation Title: Opto-fMRI activation to thermal (heat) in awake rodents with and without optically silencing the Anterior Cingulate Cortex.

Location: Hall A-C

Presentation time: Sunday, Nov 13, 2011, 1:00 PM - 2:00 PM

Authors: \***L. BECERRA**<sup>1</sup>, G. BRENNER<sup>1</sup>, J. BISHOP<sup>1</sup>, H.-S. SHIN<sup>1</sup>, G. BARMETTLER<sup>1</sup>, D. WALLIN<sup>1</sup>, D. BORSOOK<sup>1</sup>, E. BOYDEN<sup>2</sup>;  
<sup>1</sup>P.A.I.N. Group, Massachusetts Gen. Hospital, HMS, Boston, MA; <sup>2</sup>Media Lab., MIT, Cambridge, MA

Abstract: The study of pain in animals is mainly restricted to behavioral approaches with no CNS correlates. Functional MRI provides an opportunity to examine brain activity in humans and animals. Optogenetic techniques allow the modulation of brain circuits by switching neurons on and/or off in specific brain structures. We virally targeted anterior cingulate cortex (ACC) pyramidal neurons to express ArchT light-driven proton pumps that inhibit neuronal firing upon illumination. Rodents were allowed to express channels for 3 weeks before imaging. A 9.4 T Bruker Biospec scanner was used. Images were acquired with a GE EPI sequence (TR/TE<sub>eff</sub>=3s/13 ms). Stimuli (5) were delivered to the whisker area of the face in a 21 seconds on-24 seconds off manner. Stimuli were repeated while a green laser (532 nm, 25 mW 200 micron fiber optic) was turned on during the periods of thermal stimulation. Data was processed using fsl ([www.fmrib.ox.ac.uk/fsl](http://www.fmrib.ox.ac.uk/fsl)). Rat brains were registered to a template based on the Paxinos Atlas. Group results indicate activation to heat in pain pathway structures. Activation to heat with illumination (inhibition) of the ACC resulted in reduced activation in several brain structures (sensorimotor, cingulate) as well as increased activation in others (prefrontal, caudate/putamen).

Disclosures: **L. Becerra:** None. **G. Brenner:** None. **J. Bishop:** None. **H. Shin:** None. **G. Barmettler:** None. **D. Wallin:** None. **D. Borsook:** None. **E. Boyden:** None.

Keyword(s): PAIN  
FUNCTIONAL MRI

Support: NIH 1RC2DE020919 (EB)

NIH K24NS064050 (DB)

[Authors]. [Abstract Title]. Program No. XXX.XX. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2011. Online.

2011 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.