Data in Brief 14 (2017) 659–664

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Data on the effect of conductive hearing loss on auditory and visual cortex activity revealed by intrinsic signal imaging

Manuel Teichert, Jürgen Bolz *

University of Jena, Institute of General Zoology and Animal Physiology, Erbertstraße 1, 07743 Jena, Germany

ARTICLE INFO

Article history:
Received 19 July 2017
Received in revised form
4 August 2017
Accepted 24 August 2017
Available online 31 August 2017

Keywords:
Simultaneous intrinsic imaging
Auditory cortex
Visual cortex
Conductive hearing loss

ABSTRACT

This data article provides additional data related to the research article entitled "Simultaneous intrinsic signal imaging of auditory and visual cortex reveals profound effects of acute hearing loss on visual processing" (Teichert and Bolz, 2017) [1]. The primary auditory and visual cortex (A1 and V1) of adult male C57BL/6J mice (P120-P240) were mapped simultaneously using intrinsic signal imaging (Kalatsky and Stryker, 2003) [2]. A1 and V1 activity evoked by combined auditory and visual stimulation were measured before and after conductive hearing loss (CHL) induced by bilateral malleus removal. We provide data showing that A1 responsiveness evoked by sounds of different sound pressure levels (SPL) decreased after CHL whereas visually evoked V1 activity increased after this intervention. In addition, we also provide imaging data on percentage of V1 activity increases after CHL compared to pre-CHL.

DOI of original article: http://dx.doi.org/10.1016/j.neuroimage.2017.07.037
* Corresponding author.
E-mail address: Jurgen.Bolz@uni-jena.de (J. Bolz).

http://dx.doi.org/10.1016/j.dib.2017.08.016

Specifications Table

Subject area	Neuroscience
More specific subject area	Cross-modal interactions
Type of data	Figures
How data was acquired	Optical imaging of intrinsic signals [2]
Data format	Analyzed
Experimental factors	Auditory and visual cortex activity was measured in adult mice before and after conductive hearing loss
Experimental features	Stimulus evoked cortical activity was measured using intrinsic signal imaging
Data source location	07743 Jena, Germany
Data accessibility	Data are provided within this article

Value of the data

- Demonstration that intrinsic imaging enables mapping of distinct sensory cortices simultaneously and investigation of cross-modal interactions.
- Data show that sound driven A1 activity decreases after conductive hearing loss whereas visually driven V1 activity increases after this intervention.
- Presented data may be relevant for understanding how an acute loss of one sensory modality can affect sensory procession in the remaining senses.
- The data provided here might stimulate further investigations on cross-modal integrations in early sensory cortices.

1. Data

To investigate cross-modal interactions between A1 and V1, we developed a technique to simultaneously map A1 and V1 using periodic intrinsic imaging [1]. Using this novel approach we obtained reliable cortical maps of both sensory cortices (Fig. 1). As it has been shown that A1 activity effects V1 responsiveness [3,4], we investigated the effects of an acute CHL on both A1 and V1 responsiveness. Therefore, we measured A1 and V1 responsiveness to combined visual and auditory stimulation before and after CHL in the same mice. First, we provide data of A1 activity in the low and high frequency regions of A1 elicited by auditory stimulation before and after CHL (Fig. 2**A, B**). Next we measured sound evoked A1 and visually driven V1 activity in individual mice under combined auditory (60 dB, 100 dB SPL) and visual stimulation before and after CHL. Fig. 3**A–D** provides a dataset showing changes of A1 and V1 activity after CHL. As a last step, we calculated the percentage increase of V1 responsiveness after CHL. For this, we measured visual driven V1 activity under concurrent auditory stimulation at 60 dB, 70 dB and 100 dB SPL and compared it to the V1 responsiveness under the same bimodal stimulation after CHL (dataset is given in Fig. 4).

2. Experimental design, materials and methods

2.1. Mouse preparation for optical imaging

Animals were initially anesthetized with 4% isoflurane in a 1:1mixture of O_2/N_2O and placed on a heating blanket (37.5 °C) for maintaining constant body temperature. Subsequently, mice received an