

Publication

Alterations in interhemispheric gamma-band connectivity are related to the emergence of auditory verbal hallucinations in healthy subjects during NMDA-receptor blockade

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 4523264

Author(s) Thiebes, Stephanie; Steinmann, Saskia; Curic, Stjepan; Polomac, Nenad; Andreou, Christina; Eichler, Iris-Carola; Eichler, Lars; Zöllner, Christian; Gallinat, Jürgen; Leicht, Gregor; Mulert, Christoph

Author(s) at UniBasel [Andreou, Christina](#) ;

Year 2018

Title Alterations in interhemispheric gamma-band connectivity are related to the emergence of auditory verbal hallucinations in healthy subjects during NMDA-receptor blockade

Journal Neuropsychopharmacology : official publication of the American College of Neuropsychopharmacology

Volume 43

Number 7

Pages / Article-Number 1608-1615

Mesh terms Adolescent; Adult; Auditory Perception, drug effects; Cross-Over Studies; Dichotic Listening Tests; Electroencephalography, drug effects; Gamma Rhythm, drug effects; Hallucinations, chemically induced; Healthy Volunteers; Humans; Ketamine, pharmacology; Male; Receptors, N-Methyl-D-Aspartate, antagonists & inhibitors; Single-Blind Method; Young Adult

Auditory verbal hallucinations (AVH) are a common positive symptom of schizophrenia. Excitatory-to-inhibitory (E/I) imbalance related to disturbed N-methyl-D-aspartate receptor (NMDAR) functioning has been suggested as a possible mechanism underlying altered connectivity and AVH in schizophrenia. The current study examined the effects of ketamine, a NMDAR antagonist, on glutamate-related mechanisms underlying interhemispheric gamma-band connectivity, conscious auditory perception during dichotic listening (DL), and the emergence of auditory verbal distortions and hallucinations (AVD/AVH) in healthy volunteers. In a single-blind, pseudo-randomized, placebo-controlled crossover design, nineteen male, right-handed volunteers were measured using 64 channel electroencephalography (EEG). Psychopathology was assessed with the PANSS interview and the 5D-ASC questionnaire, including a subscale to detect auditory alterations with regard to AVD/AVH (AUA-AVD/AVH). Interhemispheric connectivity analysis was performed using eLORETA source estimation and lagged phase synchronization (LPS) in the gamma-band range (30-100 Hz). Ketamine induced positive symptoms such as hallucinations in a subgroup of healthy subjects. In addition, interhemispheric gamma-band connectivity was found to be altered under ketamine compared to placebo, and subjects with AUA-AVD/AVH under ketamine showed significantly higher interhemispheric gamma-band connectivity than subjects without AUA-AVD/AVH. These findings demonstrate a relationship between NMDAR functioning, interhemispheric connectivity in the gamma-band frequency range between bilateral auditory cortices and the emergence of AVD/AVH in healthy subjects. The result is in accordance with the interhemispheric miscommunication hypothesis of AVH and argues for a possible role of glutamate in AVH in schizophrenia.

Publisher Nature Publishing Group

ISSN/ISBN 0893-133X ; 1740-634X

edoc-URL <https://edoc.unibas.ch/79934/>

Full Text on edoc No;

Digital Object Identifier DOI 10.1038/s41386-018-0014-z

PubMed ID <http://www.ncbi.nlm.nih.gov/pubmed/29453445>

ISI-Number WOS:000432114600017

Document type (ISI) Journal Article, Randomized Controlled Trial