**Resting-State Gamma-Band Power Alterations in Schizophrenia Reveal Functional E/I-Balance Abnormalities Across Illness-Stages**

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**Abstract**

We examined alterations in the balance of Excitation/Inhibition (E/I-Balance) in the pathophysiology of schizophrenia (ScZ) through measurements of resting-state gamma-band activity and GABA and Glutamate/Glutamine (Glx) concentrations using 1H-Magnetic Resonance Spectroscopy in participants meeting clinical high-risk (CHR) criteria (n=88), 21 antipsychotic-naïve, first episode (FEP) patients and 34 chronic schizophrenia (ScZ) patients. Magnetoencephalographic (MEG) resting-state activity was examined in the low- (30-46 Hz) and high- gamma-band (64-90 Hz) range at source level and MEG-data were correlated with neuropsychological scores and clinical symptoms. CHR-participants were characterized by increased 64-90 Hz power. In contrast, FEP- and ScZ-patients were characterized by aberrant spectral power at both low- and high-gamma frequencies. MRS-data showed a shift in E/I-balance toward increased excitation in CHR-participants, which correlated with increased occipital gamma-band power. Finally, neuropsychological deficits and clinical symptoms in the FEP and ScZ-patients were correlated with reduced gamma band-activity, while elevated psychotic symptoms in the CHR group showed the opposite relationship. The current study suggests that resting-state gamma-power and altered Glx/GABA ratio indicate changes in Excitation/Inhibition-balance parameters across illness stages that could underlie the development of psychosis as well as impairments in neurocognition.

**Data submission content**

Included in the data repository is a data matrix in txt formal (readible with a simple text editor program) including individual participant’s High-Gamma (64-90 Hz) power MEG source-activity data extracted from four occipital regions (specified below) and GABA/Glx MR-Spectroscopy data collected from 35 healthy control participants (CON1) and 69 participants at clinical high-risk (CHR) for the development of a psychotic disorder.

The data matrix contains 9 columns:

**Column 1: group identity**

UHR (Ultra-High Risk) or CON1 (healthy control)

**Column 2: UHR-status**

SPI-A only subgroup

CAARMS only subgroup

CAARMS + SPI-A subgroup

**Columns 3-5: MR-Spectroscopy data from right middle-occipital cortex**

GLX (Glutamate/Glutamine concentration)

GABA concentration (corrected for CSF and relaxtion time differences across different tissues)

RATIO (GLX/GABA concentration)

**Column 6-9: MEG high-gamma (64-90 Hz) data**

Data extracted from AAL-atlas based reconstructed MEG data in four different regions of interest

RMOG right middle occipital gyrus

LMOG left middle occipital gyrus

RCAL right calcarine fissure

LCAL right calcarine fissure