neural substrate of schizophrenia, is due to interactions with epigenetic changes that reflect environmental influence. By demonstrating the moderating role of schizotypy on the association between BDNF methylation and changes in the DMN-FPN network FC, this study provides pivotal neurobiological data substantiating the stress-vulnerability model of developing schizophrenia.
Conflict of interest
Disclosure statement:
Acknowledgement: This work was supported by the Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning, Republic of Korea (grant number 2017R1A2B3008214, 2022R1A2B5B03002611). The authors have declared that there are no conflicts of interest in relation to the subject of this study.

doi: https://doi.org/10.1016/j.nsa.2022.100567

P.0507
NEUROSCIENCE APPLIED 1 (2022) 100112 100568
Altered functional connectivity patterns in schizophrenia – a possible link between psychopathology and decreased physical fitness?

L. Hamzehpour [1], T. Bohn [1], L. Jaspers [1], O. Grimm [1]. 1Goethe University Frankfurt- University Hospital, Department of Psychiatry- Psychosomatic Medicine and Psychotherapy, Frankfurt am Main, Germany

Introduction: Obesity, weight gain and decreased physical fitness often co-occur with psychiatric disorders, especially schizophrenia. These comorbidities constitute important predisposing factors for cardiovascular disorders and lower life expectancies of patients. Dopaminergic neurotransmission might play a major role in the context of weight gain in schizophrenia [1], as it currently poses the main target of antipsychotic medication, which is known to cause an increase of appetite. Moreover, it mediates reward processes, regulates energy expenditure and is further linked to weight gain of otherwise healthy obese patients [2].
Objectives: We hypothesize that alterations of the reward system lead to weight gain and lower physical fitness in patients compared to a group of healthy participants, indexed by less muscular strength, more body fat and lower aerobic capacity (VO2max). With this study, we aim to establish a link between psychopathology and physical fitness to contribute to the development of alternative treatment options.
Methods: We will investigate 50 schizophrenic patients and 50 healthy volunteers, matched by gender and age. We have established a neuroimaging battery of two standardized fMRI tasks and a resting state measurement. We use a monetary incentive delay task [3] to probe reward anticipation as well as a delay-discounting-paradigm [4] to test orbitofrontal evaluation strategies. Anthropometric measures further provide us with information about body fat, muscular strength and maximal oxygen capacity in order to characterize the physical fitness status of the participants.
Psychopathology is assessed by the Positive and Negative Syndrome Scale, the Calgary Depression Scale for Schizophrenia as well as by self-rating scales, such as the Chapman Scale of Physical and Social Anhedonia and the WHO Disability Assessment Schedule. Furthermore, we record diet, eating behavior and physical activity by using standardized questionnaires.
Results: Up to now, we have measured 35 patients (age = 40.6 ± 14.42) as well as 30 gender and age- matched healthy volunteers (age = 39.8 ± 15.25). First tendencies reveal no differences as to body fat between the two groups. Physical fitness is, however, significantly lower in the patient- (VO2max = 29.7 ± 16,4) compared to the healthy subject group (VO2max = 41.6 ± 9.7, p-value = 0.012). A principal component analysis (PCA) of the fitness test variables revealed two factors, we interpreted as 'physical fitness' and 'physical condition', that were used for further analyses. The resting state analysis yielded altered seed-to-voxel functional connectivity (FC) between reward areas and the rest of the brain in the patient group compared to healthy individuals. Decreased FC could be linked to psychopathology, while increased FC positively correlated with the physical fitness variable of the PCA.
Conclusion: Our resting state analysis indicates that alterations in reward mediating brain areas might constitute the link between weight gain and decreased physical fitness in schizophrenia. Although there are other factors contributing to weight gain, the reward system regulates behavioural responses and might thus represent a target for behavioural interventions in the future, such as fitness and lifestyle therapies. Our follow-up analysis of the two fMRI reward tasks might give further insights.
References
[1] Grimm, O., Kaiser, S., Plichta, M.M., Tobler, P.N., 2017. Altered reward anticipation: Potential explanation for weight gain in schizophrenia? Neuroscience & Biobehavioral Reviews 75, 91–103. [2] Park B.Y., Byeon K., Lee M.J., Chung C.S., Kim S.H., Morys F., Bernhardt B., Dagher A., Park H., 2020. Whole-brain functional connectivity correlates of obesity phenotypes. Hum Brain Mapp. 41(17), 4912-4924. [3] Knutson, B., Westdorp, A., Kaiser, E., Hommer, D., 2000. FMRI Visualization of Brain Activity during a Monetary Incentive Delay Task. NeuroImage 12, 20–27. [4] McClure, S.M., Laibson D.I., Loewenstein G., Cohen J.D., 2004. Separate neural systems value immediate and delayed monetary rewards. Science (New York, N.Y.), 306(5695), pp.503–507.
No conflict of interest

doi: https://doi.org/10.1016/j.nsa.2022.100568

P.0509
NEUROSCIENCE APPLIED 1 (2022) 100112 100569
Exploring effects of exercise on the functional connectome in patients with schizophrenia

L. Roell [1], I. Maurus [1], D. Keeser [1], T. Karali [1], B. Papazov [2], A. Hasan [3], A. Schmitt [1], I. Papazova [3], M. Lembeck [1], D. Hirjak [4], E. Sykorova [4], T. Christina [4], S. Muenz [1], V. Seitz [1], D. Greska [1], M. Campana [1], E. Wagner [1], L. Loehrs [1], S. Stoecklein [2], B. Ertl-Wagner [2], J. Poemsl [5], A. Roeh [3], B. Malchow [6], K. Keller-Varady [7], A. Meyer-Lindenberg [4], P. Falkai [1]. 1University Hospital- LMU Munich, Department of Psychiatry and Psychotherapy, Munich, Germany; 2University Hospital- LMU Munich, Department of Radiology, Munich, Germany; 3Bezirkskrankenhaus Augsburg-University of Augsburg, Department of Psychiatry and Psychosomatics, Augsburg, Germany; 4Central Institute of Mental Health- Heidelberg University, Medical Faculty, Heidelberg, Germany; 5University Hospital-Technical University Munich, Department of Psychiatry and Psychotherapy, Munich, Germany; 6University Hospital Goettingen, Department of Psychiatry and Psychotherapy, Goettingen, Germany; 7Institute of Sports Medicine, Hannover Medical School, Hannover, Germany

Introduction: Schizophrenia is accompanied by widespread alterations in static functional connectivity associated with symptom severity and cognitive deficits. Improvements in aerobic fitness have been demonstrated to ameliorate symptomatology and cognition in people with schizophrenia, but the intermediary role of macroscale connectivity patterns remains unknown. Particularly, even the general association between aerobic fitness and global functional connectivity patterns in patients with schizophrenia has not been studied to date. Consequently, we do not know to which particular functional connections aerobic fitness is generally linked in schizophrenia and thus cannot derive hypotheses on behaviorally relevant, regional connectivity adaptations induced by aerobic exercise interventions.
Objective: Therefore, we aim to explore the relation between aerobic fitness and the functional connectome in individuals with schizophrenia. Further, we investigate clinical and cognitive relevance of the identified fitness-connectivity links.
Methods: Patients diagnosed with schizophrenia in accordance to the DSM IV were included in this cross-sectional resting-state fMRI analysis. A stepwise lactate threshold test was utilized to measure aerobic fitness. The functional connectome was examined using two global approaches: Focusing on the functional organization of the human brain, we computed functional connectivity within and between core intrinsic connectivity networks. Considering the anatomical perspective, we assessed functional connectivity between different regions of interest. Multilevel Bayesian partial correlations between aerobic fitness and the functional connectome as well as between static functional connectivity patterns and clinical and cognitive outcome were performed. Preliminary causal inferences were enabled based on mediation analyses.
Results: Aerobic fitness was linked to static functional connectivity within and between several prominent intrinsic connectivity networks such as the default-mode, the fronto-parietal or the basal ganglia network. Additionally, aerobic fitness was associated with functional connectivity between multiple anatomical regions of interest across the whole brain, especially within the cerebellum. With regard to clinical relevance of those interrelations, static functional connectivity between the subcortical nuclei and the cerebellum as well as between temporal seeds mediated the attenuating relation between aerobic fitness and total symptom severity. Functional connections between cerebellar seeds affected the positive link between aerobic fitness and global cognition, while the functional interplay between central and limbic seeds drove the beneficial association between aerobic fitness and emotion recognition.