



Linking synaptic dysfunction to disease mechanisms in schizophrenia - a multilevel investigation (SYNSCHIZ)

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Schizophrenia is a severely debilitating mental illness characterized by hallucination, delusions, cognitive disabilities and reduced functioning. It represents one of the major challenges for society, with large unmet patient needs and substantial health care costs to the European community. Over the past decade, it has become clear that schizophrenia is a disorder where different regions in the brain fail to communicate appropriately. In parallel, recent gene discoveries have pointed to dysfunctional communication of brain cells: the neurons. Together, these insights suggest that the connections between neurons in the brain - the synapses - are malfunctioning. However, the precise synaptic mechanisms leading to schizophrenia remain elusive. The SYNSCHIZ project forms a collaboration of experts from Norway, Germany, Switzerland, Finland, Romania and the Netherlands to study synaptic dysfunction at various levels from genes to neuron cells to brain networks using state of the art methodology. This includes gene discoveries in large international samples, creating computer models of synapses, experimental validation of the models in neurons, and imaging of brain networks to test synapse function in humans. By investigating disease patterns related to synapse dysfunction at all levels from genes to brain networks we will elucidate the specific mechanisms in schizophrenia. Further, revealing these mechanisms can also lead to biomarkers – which can be used to predict the illness at an early stage, before the outbreak of severe symptoms. This will allow clinicians to reduce the duration of untreated illness and provide early support. SYNSCHIZ researchers are all experts in different fields. Together we can join the different pieces of the schizophrenia puzzle and target the ambitious aims. Therefore, SYNSCHIZ will increase our understanding of the synaptic mechanisms behind schizophrenia and will stimulate new developments for treatment and potential prevention of mental illness. SYNSCHIZ is perfectly situated to transfer scientific discoveries into clinical applications.