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MEMORY DYSFUNCTION AND DEFECTIVE NOVELTY DETECTION IN SCHIZOPHRENIA

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Objectives: Patients suffering from schizophrenia display an impairment of memory performance among other cognitive deficits. Long term memory impairment can arise from disturbed encoding and/or retrieval processes subserved by mediotemporal, mesencephalic as well as prefrontal brain regions. We assessed functional and structural integrity of these regions in schizophrenia, specifically during cognitive processes of memory encoding and retrieval.

Methods: We assessed in a set of 3 fMRI studies in a total of 50 schizophrenia patients and an equal number of matched controls whether

- 1) hippocampal/parahippocampal activity during encoding into long term memory is impaired,
- 2) this impairment is related to the memory deficit,
- 3) impaired memory retrieval is associated to mediotemporal/prefrontal dysfunction,
- 4) hippocampal dysfunction is related to symptoms in schizophrenia,
- 5) mesolimbic novelty detection is defective.

Functional alterations were related to structural brain changes as detected by voxel-based morphometry.

Results: Patients with schizophrenia displayed a markedly impaired memory performance in our studies. It was related to dysfunction of hippocampal areas during memory encoding as well as novelty detection. During novelty detection, patients had a significantly impaired activity in the mesolimbic loop (hippocampus-ventral tegmental area). Prefrontal and mediotemporal hypofunction was evident during memory retrieval. Positive symptoms were related to a more dysregulated hippocampus activity during memory encoding.

Conclusion: Evident memory dysfunction in schizophrenia is related to severely altered neuronal processes subserving memory encoding and retrieval which importantly include defective mesolimbic novelty detection. Dysregulated hippocampal activity is related to positive symptoms in schizophrenia and importantly provides a neurobiological link to cognitive deficits.