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Symposia

S1. Functional imaging of psychotic symptoms

Chairs: R Murray (UK), M Spitzer (D)

S1-1
PATHOPHYSIOLOGY OF THOUGHT DISORDER IN SCHIZOPHRENIA

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Factor analyses of clinical ratings suggest that thought disorder is heterogenous, with 'positive' and 'negative' components. The former is characterised by speech which appears disorganised, while the latter corresponds to speech which is impoverished in content or quantity. This study examined the patterns of neural activity associated with expression of 'positive' and 'negative' thought disorder. PET was used to measure regional cerebral blood flow (rCBF) while 6 dextral male patients with schizophrenia were describing ambiguous pictures. This procedure elicits thought disordered speech, with the severity varying from picture to picture. Subjects were scanned 12 times, with a different picture presented before each scan. The severity of 'positive' and 'negative' thought disorder during each scan were assessed using the Thought, Language & Communication Index, then correlated with rCBF across the 12 scans within each subject, using statistical parametric mapping. The analysis controlled for the number of words articulated per scan, eliminating effects due to variation in the amount of speech produced. 'Positive' thought disorder was correlated with activity in the parahippocampal region and inversely correlated with activity in the inferior frontal, cingulate and left superior temporal cortex ($p < 0.001$). 'Negative' thought disorder (corresponding mainly to poverty of content) was inversely correlated with activity in dorsolateral prefrontal cortex and the left superior temporal cortex ($p < 0.003$). These observations are consistent with the notion that thought disorder is heterogenous, but also suggest that both its 'positive' and 'negative' components are associated with defective function in areas responsible for the generation and monitoring of language.

S1-2
MEG-BASED EVIDENCE OF ACCELERATED AUDITORY PROCESSING IN SCHIZOPHRENIA

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Prior event-related potential (ERP) studies in schizophrenics have demonstrated diminished inhibition to the second P50 response using two-stimulus paradigm. Besides ERP, cerebral processing can also be studied with magnetoencephalography (MEG). Previous MEG-studies have demonstrated that P50m and N100m auditory responses appear somewhat earlier over the contralateral than over the ipsilateral auditory cortex to the ear stimulated in healthy subjects. We investigated with a 122-channel whole-head magnetoencephalography, which enable one to measure simultaneously brain activity in both hemispheres, whether early parallel auditory processing is impaired in schizophrenia. Sequences of tone pips were monaurally presented to 11 schizophrenic patients and to 21 healthy controls in a passive condition. The event-related magnetic fields (ERFs) were recorded simultaneously over both auditory cortices. The interhemispheric latency difference of the P50m, but not that of the N100m, was significantly shorter in the patient group in the right-ear but not in the left-ear stimulus condition. Furthermore, the ipsilateral P50m was significantly earlier in schizophrenics in the right-ear condition. This suggest that schizophrenics have accelerated ipsilateral auditory processing in the right hemisphere possible due to altered inhibition.

S1-3
IS CORTICAL RESPONSIVITY INCREASED IN SCHIZOPHRENICS PREDISPOSED TO HALLUCINATIONS?

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We explored the hypothesis that schizophrenics with a history of auditory hallucinations (trait positive, T+), would show greater responsivity of temporal cortex to the modulatory effects of auditory selective attention than schizophrenics without a history of AH (trait negative, T–).

Functional magnetic resonance imaging (FMRI) was used to measure blood oxygenation level dependent signal induced by auditory selective attention in right-handed male subjects: i) 8 T+ schizophrenics (none of whom were currently hallucinating); ii) 7 T– schizophrenics, and iii) 8 healthy volunteers. We performed voxel-by-voxel comparisons of the median power of response to selectively attending to auditorily presented numbers versus passive listening, and passive listening versus background noise.

Schizophrenic patients exhibited a greater temporal cortical response than healthy controls when listening passively to numbers.

Responsivity to attentional modulation in temporo-frontal language regions was greater in T+ than T– patients, and showed a different distribution pattern.