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Characterisation of minicoloumnarity and volume tensors of neurons in Brodmann Area 46 in normal, schizophrenic and depressive human autopsy brains

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Schizophrenia and depression are neuropsychiatric diseases that affect a person's feelings and behaviour. Both mental disorders are influenced by environmental and genetic factors, which leads to social problems for the individual patient, family and friends as well as economic costs for the society. fMRI and PET studies have shown abnormal activation of the dorsolateral prefrontal cortex (DLPFC) in Brodmann Area 46 (BA46), which is involved in the development of schizophrenia and depression.

This could be due to an altered 3-dimensional size, orientation, shape and organization of the neurons in BA46. Using autopsy human brains from 11 control subjects, 10 subjects with schizophrenia, 11 suicidal patients with a history of depression, and 8 subjects with major depression without committing suicide, advanced methods from stochastic geometry and 3-dimensional reconstruction will be implemented for the characterization of minicoloumnarity and volume tensors of neurons in BA46.

BA46 will be identified from thick and thin histological sections and the sampling of cells will be carried out by various forms of optical microscopy and serial sectioning bright field microscopy.

Assuming a difference in number, organisation or orientation of neurons in BA 46 of normal subjects, and patients with schizophrenia or depression, it will be a very significant step in a better understanding of the pathophysiology behind schizophrenia and depression.