Age-related loss of neuropil within the lateral amygdaloid nucleus in schizophrenia

Kreczmanski P/**, Heinsen H***, Hof PR****, Rutten BPF*/**, Steinbusch HWM*/**, Schmitz C*/**
*Dept of Psychiatry and Neuropsychology, Div of Cellular Neuroscience, Univ Maastricht, Maastricht, **European Graduate School of Neuroscience (EURON), Maastricht, ***Morphol Brain Res Unit, Univ of Würzburg, Würzburg, Germany, **** Kastor Neurobiology of Aging Lab, Fishberg Research Center for Neurobiology, Dept of Geriatrics and Adult Development, and Advanced Imaging Program, Mount Sinai School of Medicine, New York, NY, USA

The amygdala has long been suspected to contribute to psychotic symptoms in schizophrenia. Furthermore recent meta-analyses and reviews of postmortem or magnetic resonance imaging (MRI) studies have consistently concluded that schizophrenia is associated with brain abnormalities of the medial temporal lobe structures, including the amygdala. However, the neuropathology of the amygdala in schizophrenia has remained to be largely unknown. In the present study the subcortical amygdaloid nuclei were investigated in the brains from 13 schizophrenic patients (DSM-IV criteria) and 13 age-matched controls with several design-based stereologic techniques. Compared to the controls the following significant ($p < 0.05$) alterations were found in the brains from the schizophrenic patients: (1) bilaterally reduced mean volumes of the basal nucleus (BN) and the lateral nucleus (LN), (2) reduced mean neuron number within the right LN, (3) age-related reduction in volume of the LN (both hemispheres) but no age-related alterations in neuron number or in mean perikaryal size within the right LN, and (4) age-related loss of neuropil within the right LN [the parameters (2) to (4) were not investigated for the left LN and the BN]. Three-dimensional reconstruction revealed a less complex shape of the subcortical amygdaloid nuclei within the brains from the schizophrenic patients. Additional analyses showed an inverse ratio of the mean capillary density within the subcortical amygdaloid nuclei in the brains from the schizophrenic patients (right > left vs. left > right in the controls) as well as an age-related reduction in total capillary length within the right subcortical amygdaloid nuclei. These data establish for the first time a complex pattern of neuropathologic alterations within the subcortical amygdaloid nuclei in schizophrenia, combining several aspects of neurodegeneration with neurodevelopmental defects.
Supported by The Stanley Medical Research Institute

Pawel Kreczmanski, Department of Psychiatry and Neuropsychology, Division of Cellular Neuroscience, University of Maastricht, Postbus 616, 6200 MD Maastricht, t 043 38 810338, e-mail pawel.kre@np.unimaas.nl