

P02-338

SEROTONIN-1A BINDING IN THE SUBGENUAL ANTERIOR CINGULATE CORTEX IS ASSOCIATED WITH REGIONAL GREY MATTER VOLUME IN STRIATUM AND TEMPORAL AREAS

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Introduction: The subgenual part of the anterior cingulate cortex (sgACC) has been frequently reported to be structurally and cytoarchitecturally changed in major depressive disorder (MDD) and is also a promising target in deep brain stimulation in treatment-resistant MDD. Furthermore, substantial evidence demonstrates a high density of serotonin-1A (5-HT_{1A}) receptors in the sgACC, a key area involved in emotional processing.

Objectives: Here, we investigated the relationship between the 5-HT_{1A} receptor in the sgACC and changes in regional grey matter volume with voxel-based morphometry.

Methods: PET ([carbonyl-¹¹C]WAY-100635) was used to quantify 5-HT_{1A} receptor binding (BP_{ND}) together with structural magnetic resonance images from 32 healthy subjects (mean 26.68 ±5.1 years; 17 women). Regression analysis was performed in SPM8 (p < .001 uncorr.) using sgACC 5-HT_{1A} BP_{ND} as regressor, controlling for sex, age and total grey matter volume (GMV).

Results: 5-HT_{1A} BP_{ND} in the sgACC was positively associated with regional GMV in the medial temporal gyri (T=4.37) and nucleus accumbens bilaterally (T=4.19). Furthermore, sgACC 5-HT_{1A} binding was negatively correlated with GMV within the inferior temporal gyri (T=5.22) and putamen bilaterally (T=5.12).

Conclusions: Our findings demonstrate structural relationships between sgACC 5-HT_{1A} receptor binding and grey matter volume in the ventral striatum as well as in temporal regions, which both exhibit close neuronal connections with the sgACC. Moreover, the GMV of the ventral striatum has been reported to be decreased in patients with MDD.

Conclusively, our results underpin the role of serotonergic neuronal transmission in cytoarchitectural processes within regions involved in the modulation of mood.