O-28 - SEROTONIN-1A RECEPTOR RELATED MORPHOGENIC SIGNALING IS ASSOCIATED WITH REGIONAL BRAIN VOLUMES AND NETWORK NEUROPLASTICITY

C.Kraus[1], M.Savli[1], A.Hahn[1], P.Baldinger[1], A.Höflich[1], J.Ungersboeck[2], M.Mitterhauser[2], C.Windischberger[3], W.Wadsak[2], S.Kasper[1], R.Lanzenberger[1]

[1]Department of Psychiatry and Psychotherapy, [2]Department of Nuclear Medicine, Medical University of Vienna, [3]Center for Medical Physics and Biomedical Engineering, Medical University of Austria, Vienna, Austria

Introduction: Dysfunctional neuroplasticity contributes to the pathogenesis of Alzheimer's disease, schizophrenia and depression. However, the underlying molecular mechanisms are not fully understood. Previous studies report neuromodulatory properties of the serotonin-1A (5-HT_{1A}) receptor, which is also altered in these disorders. This suggests 5-HT_{1A} mediated neuroplasticity as potential pathogenic factor.
Objectives: The aim of this study was to demonstrate 5-HT_{1A} mediated neuroplasticity *in vivo.*
Methods: We used positron emission tomography to quantify 5-HT_{1A} receptor binding (BP_{ND}) together with structural magnetic resonance imaging in 35 healthy subjects (mean 26.6 ±6.8 years; 17 women). Voxel-wise regression analysis was performed with gray matter volume (GMV) as dependent and 5-HT_{1A} BP_{ND} as independent variable. Additionally, regression analysis was calculated with whole brain GMV as dependent variable and 5-HT_{1A} BP_{ND} of the dorsal raphe nucleus (DRN) as independent variable. Control variables were age, sex and total GMV, respectively.
Results: 5-HT_{1A} receptor density predicted GMV of the hippocampus, medial temporal cortex, inferior temporal cortex, medial occipital cortex and the pericalcarine region in each hemisphere ($p < 0.05$ false discovery rate corrected, R^2: 0.308-0.503). These associations were independent from local numbers of neurons. Furthermore, 5−HT_{1A} receptor levels in the DRN predicted GMV of the anterior cingulate cortex ($p=0.001$, $R^2=0.656$, uncorrected).
Conclusions: These results demonstrate 5-HT_{1A} receptor mediated morphogenetic mechanisms in healthy human subjects' brains, which occur not only locally but also at the macro-network level. Finally, morphogenetic signaling investigated with multimodal neuroimaging could contribute to better understanding and diagnostic identification of gray matter loss in neuropsychiatric disorders.

https://doi.org/10.1016/S0924-9338(12)74128-7 Published online by Cambridge University Press