tissue, to identify biophysical alterations, which are represented by a magnetization transfer ratio (MTR). Whole brain voxel-based analysis was used to compare MTR across groups controlling for age and gender, thresholded at $p < 0.05$ (corrected) for a minimum cluster size of 132 voxels. Moreover, we conducted correlation analyses between the average regional values in affected regions with age, 17-item Hamilton Rating Scale for Depression (HRSD) and illness duration.

Results: The patients exhibited significantly reduced MTR in left superior parietal lobule (SPL) and left middle occipital gyrus (MOG) compared to healthy controls ($p < 0.05$, corrected for multiple comparisons). These abnormalities were not correlated with age, HRSD or illness duration.

Conclusions: The first-episode, drug-naïve MDD patients displayed biophysical alterations in the SPL and MOG which were involved in the attentional[2] and cognitive dysfunction[3]. These findings in first-episode, drug-naïve MDD patients may reflect illness-related macromolecular changes close to illness onset, and thus potentially provide important new insight into the early neurobiology of depression.

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Opposite 1-H MRS Cho changes in amygdala and DLPFC in responders after SSRI as monotherapy in MDD

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Abstract

Objective: To identify pattern of proton magnetic resonance spectroscopy (1-H MRS) choline (Cho) and other metabolite changes in left amygdala and in left dorsolateral prefrontal cortex (DLPFC) after SSRI treatment as a single psychoactive medication in major depressive disorder (MDD).

Methods: In 17 responders and 11 non-responders Cho, N-acetyl aspartate (NAA), creatine (Cr), myo -Inositol (MI), lactate and glutamine and glutamate (Glx) peaks and their ratios were analysed by 1-H MRS on 3T scanner in left amygdala and in left DLPFC prior and after 2 months of SSRI treatment as monotherapy.

Summary of results: In responders, Cho/Cr in DLPFC significantly increased post-treatment (by 16.0%), whereas in amygdala it significantly decreased (by 6.1%). In non-responders there was no change in Cho/Cr in DLPFC, while Cho/Cr in amygdala moderately rose (by 2.5%). No significant changes in MI were observed in any group. Post-treatment improvement rate positively correlates with Cho/Cr increase in DLPFC (r=0.62) and inversely with Cho/Cr decrease in amygdala (r=-0.45). Cho/Cr changes between two analysed regions are highly correlated themselves (r=0.82). Metabolite changes were not dose dependent.

Conclusion: Our findings corroborate the evidence that Cho changes in 1H-MRS reflect metabolic effects of treatment. Results indicate the increased membranes turnover rate in responders in DLPFC (presumably due to phosphorylcholine-to-glycerophosphorylcholine mediated synthesis-to-breakdown overbalance) and decreased in amygdala, a finding congruent to amygdala-to-DLPFC functional connectivity shift observed in neuroimaging studies. High correlation in Cho/Cr changes between the two regions may likely be attributed to their involvement in the same functional circuitry. More profound and eventually class-specific 1-H MRS detectable effects appear to emerge as study medication was used as monotherapy, thus avoiding modulating effects of other psychoactive medications.

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Light exposure and seasonal variation of the serotonin degrading enzyme monoamine oxidase A in the healthy human brain revealed by PET

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Abstract

Objectives: Monoamine oxidase (MAO) A is the key enzyme responsible for the oxidative degradation of several biogenic amines including serotonin in the human brain [1]. A previous positron emission tomography (PET) study revealed elevated MAO-A levels in patients with depressive symptoms, potentially leading to lower serotonergic neurotransmission in these subjects [2]. Seasonal changes in mood, like blues during the dark time of the year, are common within healthy controls living in areas of high latitude [3, 4]. We aimed to demonstrate a light dependent seasonal difference in MAO-A distribution volume (V_T) in a healthy study population.

Methods: 16 healthy subjects (mean age: 37; 14 female) underwent 2 PET scans, one in summer and one in winter, using the radioligand [^{11}C]harmine. PET images were co-registered to structural magnetic resonance imaging scans and normalized using SPM12. Quantification of MAO-A V_T was carried out in PMOD 3.509 using Logan plots for 13 regions of interest [5]. Statistical analysis was performed in SPM12 using Pearson´s correlation between regional MAO-A V_T and the cumulated amount of individual exposure to global radiation (total light intensity) during the days (1–30) before the PET scans.

Results: We found significant negative correlations between cumulated global radiation and MAO-A V_T in the amygdala, anterior cingulate cortex and caudate nucleus (r=-0.561, r=-0.550 and r=-0.569; $p<0.05$, highest correlation coefficient for the period of 5 to 14 days) in winter PET scans only.

Conclusions: These findings suggest an increase in MAO-A during winter associated with light deprivation in regions implicated in previous imaging studies on depression. Although the subjects in our study population showed no signs of depressive symptoms these results shed light on the often experienced "seasonality" in healthy people. The lack of a relation between MAO-A and light exposure during the summer months might be explained by a ceiling effect.