

Aberrant stress hormone receptor balance in the human prefrontal cortex and hypothalamic paraventricular nucleus of depressed patients

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Research question and background

The prefrontal cortex (PFC) plays an important role in the regulation of the hypothalamo-pituitary-adrenal (HPA)-axis regarding stress response and possibly also depression.

Methods and tissues used

We used quantitative real-time PCR to determine the mRNA levels of 17 stress-related genes in the human postmortem anterior cingulate cortex (ACC) and dorsolateral PFC (DLPFC) of patients with mood disorder and of well-matched controls from the Netherlands Brain Bank. The correlation between the expression of these DLPFC genes and their earlier measured expression in the paraventricular nucleus (PVN) of the same subjects was also determined.

Results and conclusion

Transcript level of mineralocorticoid receptor (MR) was significantly decreased, while the ratio of glucocorticoid receptor (GR) α to MR mRNA level was increased in the ACC/DLPFC, both in the bipolar and major depressive disorder subgroups and also in the pooled depression group. Significantly inverse correlations were found for MR mRNA level and for GR α /MR ratio in the DLPFC and PVN. A selective disturbance of MR and of the GR α /MR ratio thus seems to exist in the ACC/DLPFC in depression, which was inversely correlated with the corresponding levels in the PVN. These changes may contribute to HPA-axis hyperactivity and hence to depression etiology.