

Research report

## Tryptophan breakdown pathway in bipolar mania

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### Abstract

The upregulation of the initiating step of the kynurenine pathway was demonstrated in postmortem anterior cingulate cortex from individuals with schizophrenia and bipolar disorder. However, the tryptophan and kynurenine metabolism in bipolar mania patients especially in drug naïve state has not been clearly explored. This study explored the plasma tryptophan and its competing amino acids, kynurenine, kynurenic acid and 3-hydroxyanthranilic acid and their association with psychopathological scores in 39 drug naïve and drug-free bipolar manic patients in comparison with 80 healthy controls. When age and gender were controlled in multivariate analysis, bipolar manic patients have significantly lower tryptophan index than normal controls ( $f=9.779$ ,  $p=0.004$ ). The mean plasma tryptophan concentration and mean tryptophan index were reduced and mean tryptophan breakdown index was increased significantly after a 6-week treatment. The reduction in plasma tryptophan and reduction in tryptophan index showed significant negative correlation with reduction in YMRS score ( $r=-0.577$ ,  $p=0.019$  and  $r=-0.520$ ,  $p=0.039$  respectively). The reduction in YMRS also showed positive correlation with both plasma tryptophan concentration and tryptophan index both at the time of admission ( $r=0.464$ ,  $p=0.019$  and  $r=0.4$ ,  $p=0.047$  respectively) and discharged ( $r=0.529$ ,  $p=0.035$  and  $r=0.607$ ,  $p=0.013$  respectively). The reduction in BPRS score also showed positive correlation with tryptophan index at the time of discharge ( $r=0.406$ ,  $p=0.044$ ). These findings indicated the involvement of bi-directional tryptophan metabolism and kynurenine pathway in pathophysiology and response to medication in bipolar mania.

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