Research report

Tryptophan breakdown pathway in bipolar mania

Aye Mu Myint a, b, Yong-Ku Kim c, *, Robert Verkerk b, Sun Hwa Park d, Simon Scharpè b, Harry W.M. Steinbusch a, Brian E. Leonard a

a Department of Psychiatry and Neurology, University of Maastricht, The Netherlands
b Department of Medical Biochemistry, Institute of Pharmaceutical Sciences, University of Antwerp, Belgium
c Department of Psychiatry, Division of Brain Korea 21 Biomedical Science, College of Medicine, Korea University, Korea
d Department of Anatomy, Division of Brain Korea 21 Biomedical Science, College of Medicine, Korea University, Korea

Received 28 September 2006; received in revised form 6 December 2006; accepted 8 December 2006
Available online 30 January 2007

Abstract

The upregulation of the initiating step of the kynurenine pathway was demonstrated in postmortem anterior cingulated 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 multivariated analysis, bipolar manic patients have significantly lower tryptophan index than normal controls (r=−0.779, 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.

© 2006 Elsevier B.V. All rights reserved.

Keywords: Bipolar mania; Tryptophan; Kynurenine