The Diagnostic Potential of Brain Derived Neurotrophic Factor in Mild to Moderate Depression

Maharaj, Arjuna

The human brain has the ability to regenerate, remodel, and form new neural connections. This process, known as neuroplasticity, is regulated by the neurotrophin Brain-Derived Neurotrophic Factor (BDNF). Patients with Major Depressive Disorder (MDD) are reported to have altered neuroplasticity due to changes in BDNF levels. BDNF may therefore be involved in the pathophysiology of MDD and could potentially be a diagnostic biomarker. This experiment was designed to measure BDNF levels in female patients (44-60 years) with MDD and its possible correlation with clinical diagnosis. Serum BDNF levels were measured using the ELISA method in MDD patients (n=11) and healthy subjects (n=21) before and after 8 weeks of treatment with the SNRIs (serotonin-norepinephrine reuptake inhibitor) Duloxetine or Desvenlafaxine. Pre and post treatment severity of depression was scored using the Montgomery-Asberg-Depression Rating Scale (MADRS) and Hamilton Rating Scale for Depression (HAM-D). Baseline BDNF levels in MDD patients (46.1±2.7 ng/mL) were significantly greater than in healthy subjects (37.1±3.7 ng/mL, p=0.02) and post treatment was normalized (41.0±3.8 ng/mL, p=0.20). There was a significant correlation between baseline BDNF levels and HAM-D scores (r=0.72, p=0.04) prior to antidepressant treatment. This correlation also approached significance with baseline MADRS scores (r=0.56, p=0.07). The current investigation is the first to show that serum BDNF levels are elevated in mild to moderate depression and are normalized after successful SNRI treatment. These results suggest that BDNF may be a reactive protein that is upregulated to protect from neuronal injury. Further, BDNF may be an indicator of depression severity prior to antidepressant treatment.