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Research Article

# Brain-Derived Nerve Factor, A Novel Marker For Aggression Correlating Cognitive Ergonomics: A Retrospective Analysis Supporting Anthropometry Amongst The Pre-Pubertal Children Of West Bengal

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**ABSTRACT**

Brain derived nerve factor (BDNF) is considered to be one of the major neurotropic factors responsible for numerous psychological up regulations and down regulations. There are many potential researches evidenced about the role of BDNF in depression, anxiety and trauma. Serum BDNF, salivary BDNF even the samples of CSF (cerebro-spinal fluid) amongst the human from every parts of the globe indicated many biochemical chains of various signaling molecules like phosphatidylinositol 3 kinase, Phospholipase C and some of the families of mitogen activated protein kinase (MAP-Kinase) families which activate the genuine functions of BDNF. Aggression is a mixture of emotions like anger, antipathy and hyperkinetic behavior. Many biomolecules namely serum testosterone, cortisol appear to be the base line molecules responsible of aggression along with emotions like stress, anxiety and hostility for both adult & children of pre and post puberty. Many anthropometric indices like fWHR (facial width to height ratio), 2D/4D ratio and Cranio-facial indices have showed direct relationship with testosterone and cortisol in promoting mood swings, hyperkinetic attitude and provocative actions amongst the children. Whereas the logic wheel for the BDNF in this regard is under research. It was also observed that the Leptin gene up-regulation changes the various craniofacial anthropometric dimensions lead to identification of novel cognitive markers for BDNF correlating aggression in the pre pubertal children of Bengal.

**Keywords:** *BDNF, Aggression, Leptin, Cognitive ergonomics, Anthropometry, neurotropic factor.*

## Introduction:

Brain derived nerve factor is a neuro-trophic factor that controls and coordinates many physiological and psychological aspects of the human body. The emotional aspect of BDNF is still under research. Variety of studies have revealed the trend of BDNF in controlling human behavior is still an invaded area of research, so researchers from every domain of physiology, cognitive sciences, psychology, behavioural sciences and many more have tried to recognized many recent trends relating BDNF. There is plenty of logic wheels persist in correlating attributes of BDNF with the types of animal behavior. Many ways are present by which BDNF can be assessed in the body namely serum, saliva etc.. There are many factors, both exogenous and endogenous present which are responsible to identify BDNF in the human at every age. For example like: some of the

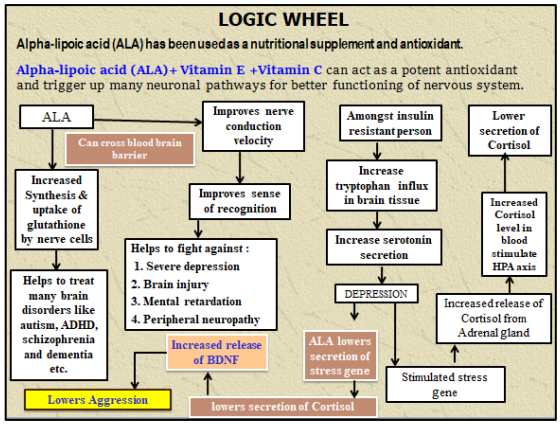

Figure 1

facial anthropometric markers namely; en-ex, ch-t, earinclination and mentocervical angle are said as the most discussed one (Majumder, 2020). Beside this biochemical assessments are much common to assay the presence of BDNF. In terms of many dietary alterations are also pointed out to establish various relationships with BDNF, Figure 1; can be one of the major observations. In the following figure it can be find that the alpha lipoic acid and Vitamin E & C, showed direct relationship with BDNF and other steroidal factors (Froud, 2019 & Afsharfar, 2021). Even magnesium shows also a very potential role in regulating BDNF.

## Discussion

### Effect of BDNF in behavioral control

Noble and et.al showed that BDNF released from specific brain locations leads to enhance energy, working ability, emotional flexibility (Noble, 2011). In another study the effects of BDNF prevails upon the mood disorders as the pro and m configuration of it mediate brain stress and reward(Martinowich, 2007). Most of the effects of BDNF is observed in the study of mice models whereas, the study upon serum BDNF is almost found in very few of the population. Once again the study of neuroplasticity proved that the neuro-trophic factor surely possess a great effect upon lowering depression as the stimulation upon the reward centers enhances many signaling pathways which lowers the level of stress by lowering the activity of stress hormones, extensive studies are required to reach out the conclusion further (Yang, 2020). The cross-sectional study of BDNF and NF- kappa beta helps in regulating depression in many ways, a positive feedback loop was observed in between them to regulate anxiety and depression (Caviedes, 2017). The synaptic plasticity dependent factors are also regulated by BDNF. It also shows a higher order loop lowers the complexity relating plasticity (Duman, 2021). Patients with ALS can be survived from initial respiratory impairment and bowel syndrome by treating them with BDNF (Ghafouri-Fard, 2021). The expression of BDNF protein expression which has been presumably derived from human neural stem cells and are effective in treating many animals suffering from stroke (Chang, 2013). Exercise induced BDNF expression leads to positive impact upon the human brain and also gives a positive impact upon other behavioural issues (Pilc, 2010). BDNF has cultured human fetal tissue this has been found very much beneficial in influencing various neuronal actions of the fetus (Spencer, 1995). Not only emotional factors many physiological factors are also altered by regulating BDNF.

### Regulation BDNF by various factors

Many psychiatric disorders can be treated with the help of BDNF and it has been proved that all the positive effects upon lowering any psychotropic disorders have been induced by BDNF signaling pathway (Boulle, 2013). BDNF is one of the potent modulator of stress, on the other hand it also deregulates the action of cortisol the hormone known for as stress hormone. So reactions of the BDNF are about to treat stress linked mental disorders, in terms of psychological treatments (Miao, 2020). Eating disorders related with the biochemical changes in the body leads to increase body weight in the early growth spurt. DNA methylation, histone acetylation, environmental factors are responsible for the early development of the children and sometimes genes for obesity may be also triggered (Rosas-Vargas, 2011). BDNF induced physiological changes occurred due to alteration in many genetic expressions which leads grow subcutaneous fat within the primary mammals. Comparative analysis with the higher order animals need to show inhibition of the transgene expression lead to show progressive plateau in the weight standardization (Cao, 2009). Food addiction especially substances like; alcohol and other substances alike alcohol forces changes in the diet imposes changes in the glucose level so as the genes responsible for normal food uptake lowers and the required expressions of the proteins are very poor in nature as a result negative control upon the stress hormones induce depression. Clinical evidences are much more required in this regard (Nicolau, 2011). Even it has been also observed that fear induced aggression can be controlled by triggering the reward centre of

hypothalamus even the mood disorders can be also triggered by altering the values of BDNF. The pathway of stress infection also suggests the activation of BDNF sometimes mediated by Trk-B pathway (Figure 2) (*Yoshida, 2015).

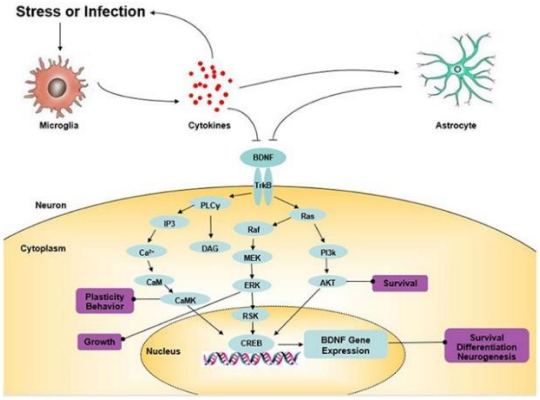


Figure 2

The research upon the brain derived nerve factor is now in the loop of innovative research practices as it is an eye opener for many cognitive researches and showed extremely significant results. Many evidences have come upon with multiple unintended wings and hypothesis which show remarkable outcomes for biochemical, physiological, behavioral, clinical and cognitive research.

## Conclusion

Bio chemical markers are always said to be as the actual markers to analyse any of the abnormal physiological and cognitive scenario. Correlation of them with the exogenous markers like anthropometry or survey based data can show an astounding results for identifying non-invasive painless markers. Future trends of researches are always believed in giving comfort to the subjects, henceforth getting better result. Amongst all these BDNF can be very potential to find many dimensions of biological science bridging between anatomy, physiology, anthropometry and psychology.

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