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BRAIN-DERIVED NEUROTROPHIC FACTOR AND EXERCISE, CAN IT BE A NEW BIOMARKER FOR ATHLETIC PERFORMANCE?

BEYİN TÜREVLİ NÖROTROFİK FAKTÖR VE EGZERSİZ, ACABA ATLETİK PERFORMANS İÇİN YENİ BİR BİYOMARKER OLABİLİR Mİ?

Korkut Ulucan*[1,2]

To editor,

Brain-derived neurotrophic factor, BDNF, is a member of the neurotrophin family, in humans, and has important roles on the survival of the neurons; also in growth and differentiation of newly produced neurons (Huang& Reichardt, 2001). In brain, BDNF is commonly active in hippocampus and cortex, where learning and memory areas are located (Yamada& Nabeshima, 2003), and also active in retina, saliva and prostate (Mandel et al. 2009 2009). BDNF is the gene responsible for coding BDNF protein, has 12 exons and located at 11p13. Alternative splicing gives rise to multiple transcripts, one of which encodes a preproprotein that is proteolytically processed to generate the functioning protein. Recent studies showed the reduced expression of this gene in Alzheimer's, Parkinson's, and Huntington's patients, and BDNF protein is believed to play a role in the biology of mood disorders, either alone or in contact with monoamins.

To improve brain health and function, including cognitive function and alleviating depression, one of the important behavioral habit is regular exercise. Exercise also increases adult neurogenesis in the dentate gyrus (DG), dendritic complexity of DG granule neurons, and synaptic plasticity (the cellular basis of learning) in the pathway connecting the entorhinal cortex to the DG (Xu, 2013). BDNF is known to show increased expression as a response to acute and chronic physical exercise, and this increased expression of the protein as a result of exercise may be the main benefit of exercise to brain health. Berchtold et al. (2005) showed also that exercise primes a molecular memory for BDNF induction after the exercise was ceased in rats. In addition, serum BDNF is known to increase under exercise conditions in humans, and the source of this BDNF is thought to be brain, under concrete conditions, BDNF can penetrate blood–brain barrier (BBB), although not all the studies says so (Maaike et al. 2011).

Although the effect of BDNF on brain health is a known fact, studies including sportsman, BDNF levels and polymorphism effecting BDNF expression are limited. Oztasyonar (2016) examined the BDNF levels of taekwondo fighters, boxers, and athletes before and after training, and compared the results to sedentary subjects. It was shown that all the trainers BDNF levels were higher than sedentary subjects, and also BDNF levels were higher after the exercise sessions. There are also some studies in humans, all implying the importance of BDNF levels and healthy mood conditions.

The effect of BDNF on sports performance is still unclear. The rise in BDNF levels after exercise may not show the athletic performance status. But new studies associating the average levels of serum BDNF and athletic performance will fulfill the importance of BDNF in athletic performance. Also the probability of administration of BDNF to athletes should be considered as a doping action although the molecular effect of BDNF on athletic performance is not clear. Besides, to date, it is thought that

*[1]Corresponding Author Marmara University, Faculty of Dentistry, Department of Medical Biology and Genetics, Istanbul, Turkey E-mail: korkutulucan@hotmail.com , korkut.ulucan@uskudar.edu.tr Phone: 0216 400 22 22- 2409
[2]Uskudar University, Faculty of Engineering and Natural Sciences, Department of Molecular Biology and Genetics, Istanbul, Turkey

serum BDNF is originated mainly from brain, in the case of penetrating from BBB. But the effect of administrated BDNF on athletic performance will be a topic of new research in sports science.

When we consider the healthy mood status of sportsman, one can speculate on the effect of healthy mood in athletic performance. In this case, BDNF will be one of the target molecules for success in sports. Studies on this topic will be needed to outline the link between psychological factors and athletic performance.

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