**INTRODUCTION**

- Physical activity (PA) in adolescents is associated with numerous health benefits, including improved functions of the CV, metabolic, muscular, respiratory, immune, and neurohormonal systems (Dubbins, 12; Strong 86).
- The American College of Sports Sciences recommend 3-5 times/week of moderated/vigorous exercise to improve health and fitness (ACSM, 11).
- Brain derived neurotrophic factor (BDNF) is essential for neural growth and functions, especially the ones related to cognitive function adolescents (Verburgh, 14; Jeon, 15).
- Exercise seems to enhance cognitive function (Verburgh, 14), and serum BDNF levels (Jeon, 15) in adolescents.

**METHODOLOGY**

**Design and Participants**
- Adolescents from 7th-12th grades were recruited to participate in the study.
- Informed consents and assents were obtained from all adolescents after detailed orientation.
- A self-reporting questionnaire was used to assess weekly frequency of participating in running PA.

**BDNF and Physical Activity Measurements**
- Blood samples were drawn using venipuncture from antecubital veins into plain glass tubes while participants were sitting.
- After collection, samples were spun for 8-10 minutes at 1500 xg to obtain serum for BDNF measures.
- Serum samples were then divided into several aliquots and immediately stored at ~80°C for future use.
- Serum BDNF was determined by ELISA.
- Weekly frequency of running was self-reporting using the “SALSA” questionnaire to determine moderate/vigorous exercise.

**RESULTS**

The ANOVA revealed differences in BDNF levels according to frequency of participation in vigorous PA.
Subsequent post-hoc comparison showed that BDNF levels increased in a stepwise manner and peaked at 5 day participation in running.

**CONCLUSIONS**

- The study confirms the importance of PA for BDNF.
- Regular participation in exercise seems to increase BDNF mRNA transcription, formation, and release in several brain compartments (Vaynman, 04).
- This increase is associated with promoting growth and survival of neurons, synaptic plasticity, efficacy and modulation (Sedlert, 10). Consequently, cognitive function, particularly learning and memory, are improved (Joundi, 17).
- In the current study, serum BDNF level increased in a stepwise manner as frequency of exercise increased.
- This is consistent with the "dose-response" principle of exercise training that indicates improvements are greater with more stimulus (i.e. exercise).
- The results suggest that some exercise (3-4 d/wk) is beneficial for BDNF, however more can be even better.
- Adolescents should regularly participate in exercise according to the international exercise recommendations (ACSM, 09).

**RECOMMENDATIONS**

- Interventional and longitudinal studies are needed to examine the long-term effects of various frequencies of exercise on serum BDNF.
- Additionally, studies are needed to investigate the dose-effect of exercise-induced increase in BDNF with cognitive function among adolescents.