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hippocampus after training. There was no difference in plasma [BDNF] at rest between pre- and post-training; plasma [BDNF] increased ($p < 0.05$) at exhaustion and was higher following training (pre, 15.4 ± 3.7 ; post, 17.5 ± 4.4 ng/ml; $p < 0.05$).

CONCLUSION: A moderate intensity training program resulted in small, but significant increases in exercise tolerance, brain structural and functional activation, particularly in the hippocampal region. However, there was little evidence for a relationship between changes in plasma [BDNF], brain structure and memory function.

3023 Board #88 June 3, 2:00 PM - 3:30 PM

Neural Reserve Induced By Practice Of Physical Activity In Adolescence: A Study Of The Intracellular Signaling Pathways Linked To Cellular Growth And Proliferation

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PURPOSE: The present study was designed to investigate the hypothesis of neural reserve induced by early physical activity. To do this, we evaluated the intracellular signaling pathways linked to cellular growth and proliferation (Akt, mTOR, p70S6K, CREB and p38) during the aging course of rats submitted to physical exercise during adolescent period.

METHODS: Male Wistar rats aged 21 postnatal days old (P21) were divided into two groups: exercise ($n=24$) and control ($n=24$). Animals in the exercise group were submitted to daily exercise on the treadmill between P21 and P60. After the aerobic exercise program (P60), the cortical and hippocampal expressions of Akt, mTOR, p70S6K, CREB and p38 (total and phosphorylated) from the exercise and control groups were investigated at different life stages: P60, P90, P120 and P150 ($n=6$ in each group and age). Statistical analysis was made using ANOVA with Bonferroni correction.

RESULTS: After the last physical training session (at P60), a significant increase in cortical expression of total ($p = 0.005$) and phosphorylated ($p = 0.020$) mTOR protein was detected in exercise group in relation to control group. At P90, no significant difference in the cortical and hippocampal expression of signaling proteins (total or phosphorylated) was noted between exercise and control groups. At P120, it was observed a decrease in the expression of phosphorylated mTOR ($p = 0.039$) and p70S6K ($p = 0.042$) and an increase in expression of total CREB ($p = 0.024$) in the hippocampal formation of the exercise group compared to control group. At P150, the phosphorylation of p70S6K protein ($p < 0.001$) and CREB ($p = 0.043$) significantly increased in cortex of exercise group compared to control group. In the hippocampal formation, the total mTOR ($p = 0.004$) and phosphorylated Akt ($p < 0.001$) significantly increased in the exercise group compared to the control group at P150. No significant difference in cortical and hippocampal expression of total p38 protein (protein related apoptosis and autophagy) between the exercise and control groups was found.

CONCLUSION: Our results indicate that changes in the cortical and hippocampal expression and activation of intracellular proteins linked to cellular growth and proliferation may occur throughout of life of rats exercised in youth.

3024 Board #89 June 3, 2:00 PM - 3:30 PM

Associations Between Sleep Time, Body Composition And Levels Physical Activity In Obese Adolescents Of Monterrey, Mexico.

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Currently sleep disorders the unhealthy eating habits, consumption of foods high in calories and low in nutritional value, combined with sedentary activities have resulted in a considerable increase in weight and body fat in adolescents, leading to a more likely to have more and noncommunicable chronic diseases earlier ages .

PURPOSE: Analyze associations between sleep time, body composition and intensity levels of physical activity in obese adolescents of Monterrey, Nuevo Leon. México

METHODS: A total of 66 obese adolescents from 12 to 14 years participated in a cross sectional study. The body composition assessments were performed using a BOD POD. Sleep time and levels physical activity (PA) were monitored by triaxial accelerometer (ActiGraph wGT3X -BT) for at least 7 consecutive days. The outcome variables for (PA) were percentages of time spent in sedentary, light PA and moderate-to-vigorous PA (MVPA) and for sleep (Total sleep time).

RESULTS: Sleep time was positively correlated with and fat mass (kg) ($r = -0.44$ $p < 0.01$) There was also a positive correlation between the time spent on sedentary PA and fat mass ($r = 0.58$, $p < 0.01$) Higher time of MVPA. were positively correlated with longer sleep duration ($r = 0.48$, $p < 0.01$)

CONCLUSIONS: Sleep time might be an important modifiable factor associated with obesity also it requires to be included in the prevention and treatment and intervention in obesity in adolescents. Implications are provided for educators and health professionals .

3025 Board #90 June 3, 2:00 PM - 3:30 PM

A Strong Correlation Between Dorsolateral Prefrontal Cortex And Vastus Lateralis Activity During Running To Fatigue

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Fatigue is a phenomenon of pronounced importance in sports. Recently, there is strong evidence of interplay between the prefrontal cortex and motor output during fatiguing contractions. The dorsolateral prefrontal cortex (DLPC) due to its large involvement in cognitive and motor activities is believed to be involved but this requires physiological clarification. AIM: We investigated the relationship between DLPC activity - responses in oxyhemoglobin (HbO2) and total hemoglobin (HbT) measured by near-infrared spectroscopy (NIRS), and the vastus lateralis muscle (VL) activity - quantified as root-mean-square (RMS) of the EMG signal, during a fatigue protocol.

METHODS: Four male runners (32 ± 12 yrs) with probes for NIRS over the DLPC and EMG over the VL performed a track running test at a constant speed to fatigue (exhaustion). The running speed was individually determined as the average speed of a 1200-m time trial performed ~3 days prior to testing. For NIRS changes in $\mu\text{mole/L}$ of HbO2 and HbT were computed. The VL EMG-RMS of the contraction of each step was normalized as a percent of a submaximal reference contraction (%RMS), thus removing the non-activity between steps. Data of 10s epochs at 20, 40, 60, 80 and 100% of time for each lap were averaged for analyses. Regression analyses performed with HbO2 and with HbT as dependent variables and %RMS as the independent variable.

RESULTS: Over time there was an increase in HbO2 and HbT in the DLPC, and in VL-%RMS. Both HbO2 and HbT correlated strongly with EMG-RMS during running to fatigue (see figures below); $p < 0.001$ for both.

CONCLUSION: The strong relationship between DLPC and VL activities during running to fatigue suggests the involvement of the DLPC in the central processing of fatigue.