Effect of physical exercise combined with grape juice consumption on memory, BDNF levels and epigenetic modulation in healthy elderly women

Viviane Rostirola Elsner, PhD, Centro Universitário Metodista IPA, Porto Alegre-RS, Brazil.

Abstract (300 word limit)

Statement of the Problem: Emerging evidences have been pointed out that exercise in combination with dietary factors is able to affect molecular events related to synaptic plasticity and cognitive improvement. Therefore, this study aimed to investigate the impact of grape juice consumption and/or exercise on memory performance and neurotrophic factor (BDNF) and global histone H4 acetylation in peripheral blood of healthy elderly women.

Methodology & Theoretical Orientation: Nineteen volunteers were distributed in two groups: Grape Juice Group (GJG, n=9) and Grape Juice + Exercise Group (GJEG, n=10). The GJG was instructed to drunk daily the grape juice (400 ml) during 30 days, while the GJEG was also submitted to a concurrent exercise intervention (twice a week, 60 min/session). Memory function was assessed via the MoCA (Montreal Cognitive Assessment) and blood sampling (15 mL) was taken for BDNF and epigenetic analysis pre/post intervention in both groups. These analysis were done using ELISA kits in accordance to the fabricant instructions. Findings: The histone H4 acetylation levels remained unchanged while it was observed a significant increase on BDNF levels in GJG (p=0.000) and GJEG (p=0.041) after intervention. The memory improvement was verified only in GJEG (p=0.024). No differences between groups were found in the variables. Conclusion & Significance: The grape juice consumption per se is capable to modulates/increases BDNF levels, response that was not potentiated by exercise practice. On the other hand, the memory performance was improved only when grape juice consumption is combined to exercise intervention in healthy elderly women. These responses did not engage histone acetylation status, suggesting the involvement of other epigenetic markers.

Image

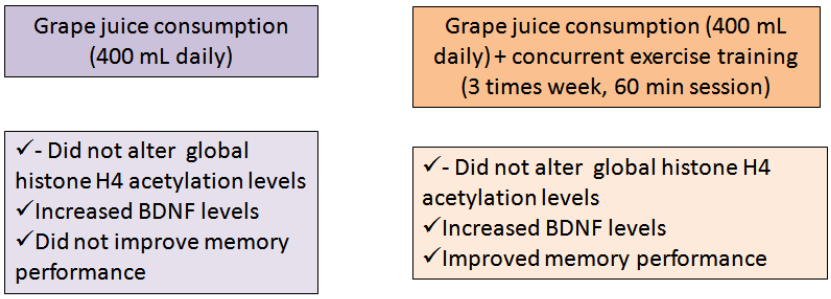


Figure 1. Effect of physical exercise combined with grape juice consumption on memory, BDNF levels and epigenetic modulation in healthy elderly women

Recent Publications (minimum 5)

1. SPINDLER, CHRISTIANO SEGABINAZI, E. ; MEIRELLES, A. L. F. ; PIAZZA, F. V. ; MEGA, F. ; SALVALAGGIO, G. S. ; ACHAVAL, M. ; **ELSNER, V. R**. ; MARCUZZO, S. (2019) Paternal physical exercise modulates global DNA methylation status in the hippocampus of male rat offspring. Neural Regeneration Research JCR, v. 14, p. 491-500.
2. FUHR, L. F. ; LAVRATTI, CAROLINE ; SILVA, I. R. V. ; REINALDO, G. ; ONO, N. ; OLIVEIRA, J. L. ; WAGNER, L. ; RIBEIRO, J. ; **ELSNER, V. R**. (2018) Exercise-induced time-dependent changes in plasma BDNF levels in people with schizophrenia. Journal of Novel Physiotherapy and Physical Rehabilitation, v. 5, p. 1-6.
3. POCHMANN, D. ; PECCIN, P. K. ; SILVA, I. R. V. ; DORNELES, G. ; PERES, A. ; NIQUE, S. ; STRIEBEL, V. ; **ELSNER, V. R.** (2018) Cytokine modulation in response to acute and chronic aquatic therapy intervention in Parkinson disease individuals: a pilot study. NEUROSCIENCE LETTERS JCR, v. 674, p. 30-35.
4. KORB, ARTHIESE ; Bertoldi, Karine ; AGUSTINI LOVATEL, GISELE ; SUDATTI DELLEVATTI, RODRIGO ; **ROSTIROLA ELSNER, VIVIANE** ; CAROLINA FERREIRA MEIRELES, LOUISIANA ; FERNANDO MARTINS KRUEL, LUIZ ; RODRIGUES SIQUEIRA, IONARA (2018) Acute exercise and periodized training in different environments affect histone deacetylase activity and interleukin-10 levels in peripheral blood of patients

with type 2 diabetes. DIABETES RESEARCH AND CLINICAL PRACTICE JCR.

5. **ELSNER, V. R.**; BERTOLDI, KARINE ; CECHINEL, L. ; MEIRELES, L. ; SIQUEIRA, Ionara Rodrigues (2018) Epigenetic marks are modulated by gender and time of the day in hippocampus of adolescent rats. Neural Regeneration Research JCR, v. 13, p. 2160-2163.
6. MENEZES, M. F. ; NICOLA, F. ; SILVA, I. R. V. ; VIZUETE, ADRIANA ; **ELSNER, V. R.** ; XAVIER, L. L. ; GONCALVES, C. A. ; NETTO, C. A. ; MESTRINER, R (2018) Glial fibrillary acidic protein levels are associated with global histone H4 acetylation after spinal cord injury in rats. Neural Regeneration Research JCR, v. 13, p. 1945-1952.
7. DE ARAUJO, CINTIA LAURA PEREIRA ; SILVA, IVY REICHERT VITAL DA ; REINALDO, GUSTAVO PEREIRA ; PECCIN, PÂMELA KRAUSE ; POCHMANN, DANIELA ; TEIXEIRA, PAULO JOSÉ ZIMERMANN ; **ELSNER, VIVIANE ROSTIROLA** ; LAGO, PEDRO DAL (2018). Pulmonary rehabilitation and BDNF levels in patients with chronic obstructive pulmonary disease: a pilot study. RESPIRATORY PHYSIOLOGY & NEUROBIOLOGY JCR.
8. HENKE, EUGÊNIA ; OLIVEIRA, VICTORIA SANTOS ; DA SILVA, IGOR MARTINS ; SCHIPPER, LUCAS ; DORNELES, GILSON ; **ELSNER, VIVIANE R** ; DE OLIVEIRA, MARCOS ROBERTO ; ROMÃO, PEDRO R T ; PERES, ALESSANDRA (2018). Acute and chronic effects of High Intensity Interval Training on inflammatory and oxidative stress markers of post-menopausal obese women. Translational Sports Medicine, v. 1, p. 257-264.
9. LAVRATTI, CAROLINE ; DORNELES, GILSON ; POCHMANN, DANIELA ; PERES, ALESSANDRA ; BARD, ANDRÉIA ; DE LIMA SCHIPPER, LUCAS ; DAL LAGO, PEDRO ; WAGNER, LUCIANE CARNIEL ; **ELSNER, VIVIANE ROSTIROLA** (2017) Exercise-induced modulation of histone H4 acetylation status and cytokines levels in patients with schizophrenia. Physiology & Behavior JCR, v. 168, p. 84-90.
10. **ELSNER, V.R.** ; BASSO, C. ; BERTOLDI, K. ; MEIRELES, L. ; CECHINEL, L. R. ; SIQUEIRA, Ionara Rodrigues (2017) Differential effect of treadmill exercise on histone deacetylase activity in rat striatum at different stages of development. The Journal of Physiological Sciences JCR, v. 67, p. 387-394.



Biography (150 word limit)

Dr. Viviane Elsner coordinates the “Interdisciplinary Group of Study on Epigenetics Applied to Health and Disease” and is teacher of Physical Therapy Graduation Course in Centro Universotário Metodista-IPA, Porto Alegre, Rio Grande do Sul, Brazil. Their academic production primarily involves the line of research related to the effects of physical exercise on the modulation of epigenetic mechanisms in healthy subjects or patients with chronic diseases.

Email: elsner.viviane@gmail.com

Notes/Comments: