ANTIOXIDANT SUPPLEMENTATION ANNULS THE NEUROMETABOLIC PROGRAMMING INDUCED BY MATERNAL EXERCISE

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Introduction: Health maintenance has been related to an active life allied to a balanced diet. In this context, moderate aerobic exercise is often associated with antioxidant supplements intake. Considering that aerobic exercise induces biochemical adaptations via reactive species production, we hypothesized that the metabolic programming elicited by maternal exercise could be abrogated by dietary supplements with antioxidant activity ingested during pregnancy.

Objectives: Our main objective was to define if maternal swimming allied to naringenin intake during pregnancy might alters the energetic metabolism adaptations verified in the offspring’s brain.

Materials and methods: Female Wistar rats were divided into four groups: (1) sedentary (2) naringenin (3) swimming exercise (4) swimming exercise + naringenin (Ethics commission approval N°26542). Exercised rats were submitted to 30 min/day moderate swimming, 5 days/week, 4 weeks (starting 1 week before mating). Sedentary groups were immersed in water, without swimming. Naringenin (50 mg/Kg) was administered by gavage 10 minutes before swimming. Offspring was euthanized at 7th day of life, when cerebellum, parietal cortex, and hippocampus were dissected, and immediately stored at -80ºC until biochemical assays. We evaluated the activities of succinate dehydrogenase (SDH), complex II, complex II-III, and complex IV.

Results: Our results showed that maternal exercise increased complex IV activity in cerebellum, and complex II activity in parietal cortex of offspring. Maternal naringenin administration increased SDH, complex II and IV activities in cerebellum, complex II activity in parietal cortex, as well as SDH and complex II in hippocampus. Complex II-III was not affected. In general, offspring’s respiratory chain was augmented by maternal exercise and naringenin administration to the dams. In accord with our expectations, the groups who received naringenin and performed swimming delivered pups totally unaffected.

Conclusion: We conclude that brain benefits induced by maternal exercise are annulled by antioxidant supplementation, suggesting that the conduct to maintain a healthy life must be reviewed.

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Key Words: mitochondrial respiratory chain, naringenin, maternal swimming