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Association of environmental enrichment and locomotor stimulation in a rodent model of cerebral palsy: Insights of biological mechanisms

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Several physiotherapy approaches are used with different aims in the treatment of cerebral palsy (CP), such as early stimulation and the treadmill walking. In animal models, these strategies can be compared, with due translational restrictions, to the environmental enrichment (EE) that is a combination of social interaction, physical activity and learning in a different large house cage and locomotor stimulation (LS) that can be performed using the treadmill adapted for rats. The study was designed to describe how some biological mechanisms may act in different and usually rehabilitative strategies underlying functional improvement. Male rat pups were initially divided into two groups: control (healthy) and submitted to a CP model. Then, pups were divided into 8 groups: CP, CPEE, CPLS, CPEELS and its respective control groups. Functional outcomes were assessed on the postnatal day (P) 31 and P52. The tibialis anterior and soleus muscles, and the expression of synaptophysin in the primary motor cortex (M1) and ventral horn of the spinal cord were evaluated. EE was able to prevent the CP motor deficits. LS reversed the CP musculoskeletal alterations and the association of interventions presented an increase in the synaptophysin immunoreactivity in M1 and ventral horn when compared to the CP group. Isolated therapies presented different complementary improvements in the model of CP utilized, but the association of therapies proved to be a fundamental and effective strategy for functional recovery, besides altering positively in all biological tissues evaluated in this study.

Biography

Simone Marcuzzo has completed her PhD from Universidade Federal do Rio Grande do Sul, Brazil. Currently she is Professor/Researcher in a Post Graduate Neuroscience Program and Department of Morphological Sciences, Basic Sciences Institute of Health, Federal University of Rio Grande do Sul, Brazil. She guides 2 Master students and 3 PhD students. She coordinates the "Plasticity of Neurodevelopment Group" and their academic production primarily involves the line of research related to the effects of therapies on the cerebral palsy model in rats. She has published 22 papers in reputed journals in the last years.

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