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Study of Melatonin as an Anti-Inflammatory Agent in a Rat Model of Perinatal Asphyxia

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Perinatal asphyxia (PA) is a clinical condition characterized by a transient disruption of oxygen availability followed by metabolism deficits during birth. It was demonstrated that melatonin has neuroprotective effects throughout different mechanisms such as the reduction of oxidative stress, inflammation, and neurodegeneration. To evaluate the anti-inflammatory effect of melatonin in a PA model [1], in P7 rats the right common carotid artery (CCA) was isolated and permanently ligated in PA group (n = 13). After a 4 h recover period, animals were subjected to anoxia in a 100% nitrogen environment at 37°C for 3 minutes. In sham-operated group (n = 11) right CCA was exposed but not ligated, and no nitrogen was applied. One hour after anoxia, animals were injected intraperitoneally with vehicle solution (n = 10) or with 10 mg/kg of melatonin (n = 12). At P8, animals were sacrificed and brains were analyzed either by immunohistochemistry or western blot (WB). Iba-1 immunoreactive cells were counted in the CA1 area of the hippocampus. Two slides per brain were analyzed and at least 8 counting frames were assessed per animal. PA rats injected with vehicle solution (7.72 Iba-1+ cells) presented a 1.42 fold increase in the number of Iba-1 positive cells, in comparison to sham rats treated with vehicle solution (5.42 Iba-1+ cells) ($p < 0.01$), the protein level of Iba-1 also showed this increase by WB. PA animals treated with melatonin (8.05 Iba-1+ cells) showed no significative differences in the number of Iba-1 positive cells when compared to the PA group treated with vehicle. Protein level by WB showed a slight but non-significative decrease in the PA+melatonin group with respect to the PA group treated with vehicle. Further studies considering earlier stages of development are still necessary to evaluate the anti-inflammatory effect of melatonin for neuroprotective treatment following PA [2].

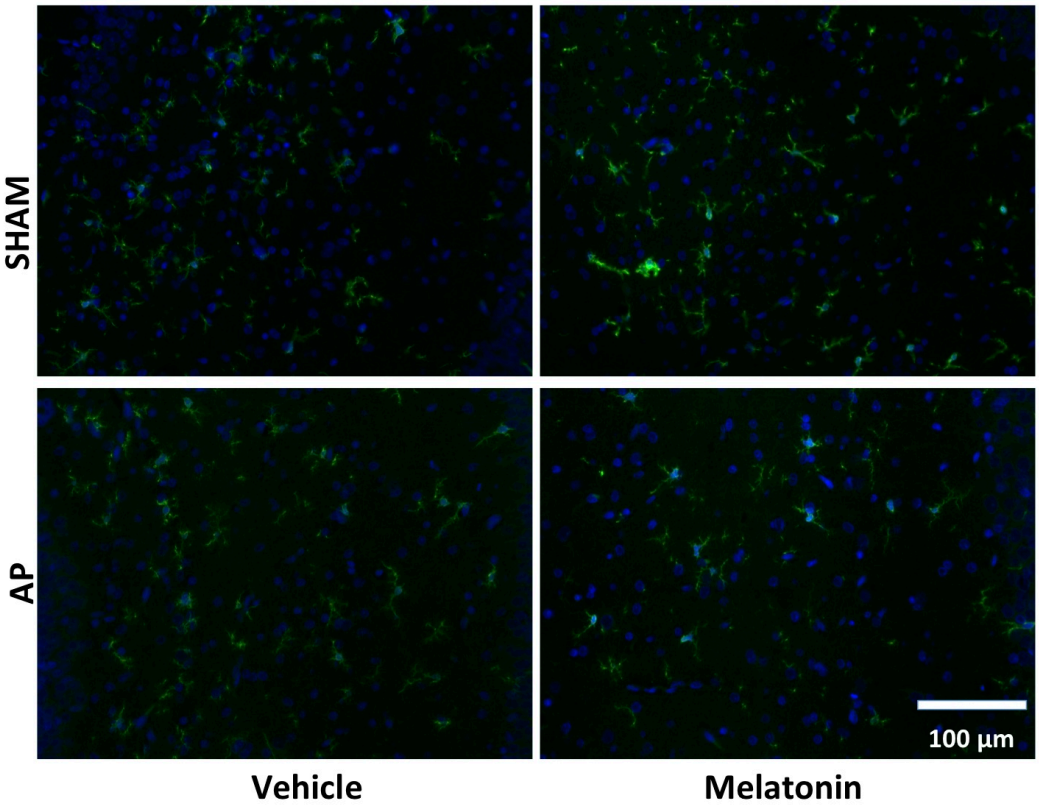

Figure 1. Representative photomicrographs of Iba-1 immunoreactive cells in the CA-1 region of the hippocampus in the different experimental groups. Inmunohistochemistry for Iba-1 (green) was counterstained with DAPI (blue).

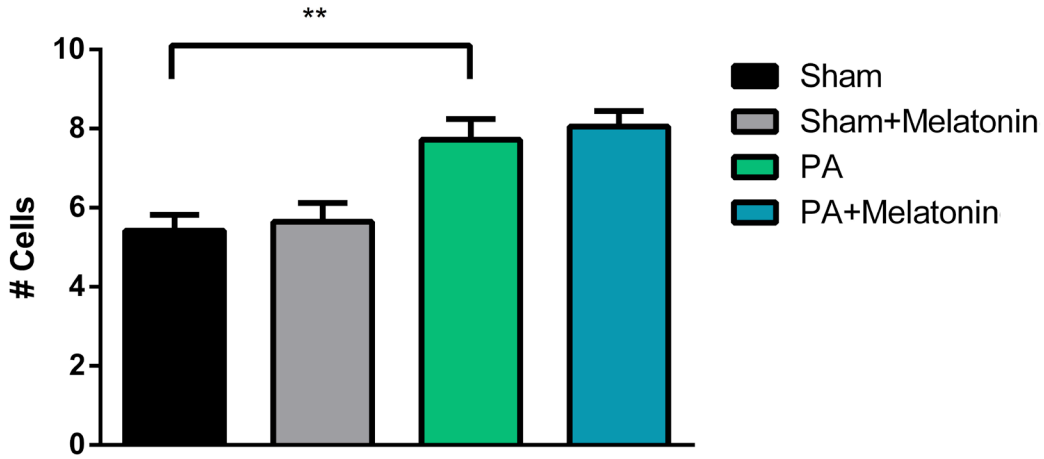

Figure 2. The histogram represents the number of the Iba-1 positive cells measured from each experimental group. Bars represent the mean + SEM. Student's t test was employed to analyze the data (**$p < 0.01$).

References
[1] J.I. Romero, et al., Biochim. Biophys. Acta **1850** (2015), p. 1274.
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