EFFECT OF A SPECIALIZED NUTRITION FORMULATION IN AN ANIMAL MODEL OF ALZHEIMER'S DISEASE

Topic: Nutrition and chronic disease
SUN-PO157

E. Moura[1], T. Bassani[1], H. Santos*[2], M. A. B. F. Vital[1]
1 Pharmacology, Federal University of Parana,
2 Scientific Department, Prodiet Clinical Nutrition, Curitiba, Brazil.

Introduction and objectives

Nutritional factors influence the risk of developing Alzheimer's disease (AD) and its rate of clinical progression. In rodents, models mimicking AD, can be used to study whether nutrition can improve cognitive alterations. One of these models, the applying of intracerebroventricular (ICV) streptozotocin (STZ), culminate in a neuroinflammatory picture with cognitive alteration.

Methods

Rats were randomly divided into two groups: sham and STZ. STZ group received a single bilateral ICV injection of STZ (1 mg/kg total dose) dissolved in sterile 0.9% saline. Sham group received a single bilateral ICV injection of 0.9% saline. Treatment with an antioxidant and anti-inflammatory nutritional formulation (AZ) (1g/kg, per os) or its vehicle (0.9% saline) was performed over 30 days, once a day (n=6-10 per group). The animals were assessed in the open field test (OFT) to evaluate locomotor activity (day 27).Cognitive performance was evaluated (day 28), in the object recognition test (ORT) and in the spatial version of the Y maze. On day 30, they were deeply anesthetized and intracardially perfused for the immunohistochemical of doublecortin (DCX; marker of newborn and migrating neurons) and Iba-1 (microglial activation marker). Group differences were analyzed using one way analysis of variance (ANOVA) with Bonferroni's post-hoc test, with $p < 0.05$ (significant).

Results

Locomotor activity in the OFT did not reveal any changes in the locomotion parameters in all of the groups. STZ-lesioned rats showed a reduction in memory process in both ORT and Y maze. Besides, an increase in IBA-1 in the CA1 and CA3 region of hippocampus. Most importantly, the treatment with AZ formulation was able to reverse the memory impairment observed in the ORT (FIGURE 1) and Y maze and also reduced IBA-1 in the CA-1 and DG (FIGURE 2) region of hippocampus.

Object Recognition Test

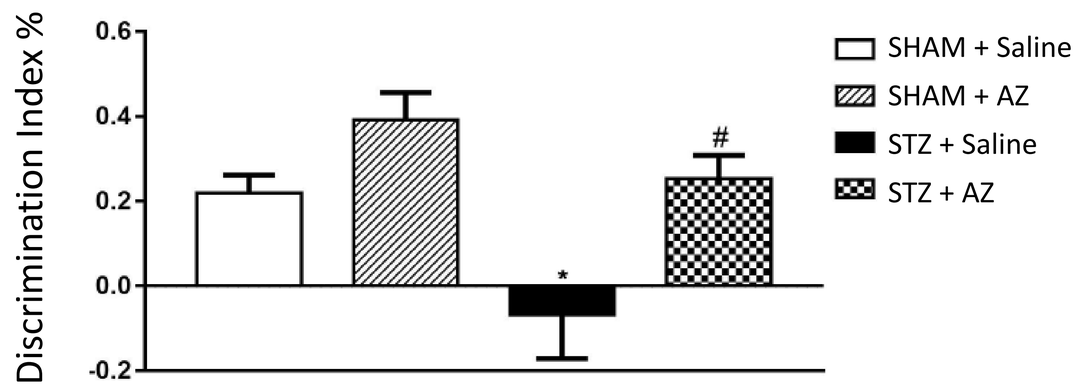

FIGURE 1. COGNITIVE PERFORMANCE EVALUATION OF AZ FORMULATION EFFECTS IN STZ-INJECTED ANIMALS COMPARED WITH SHAM ANIMALS. The data are expressed as mean (± SEM. N = 6-10 per group. *p<0,05, **p<0,01 vs. sham group; #<0,05, vs. STZ group (one-way ANOVA with Post Hoc de Bonferroni).

IBA-1 Immunorreacitivity/ GD

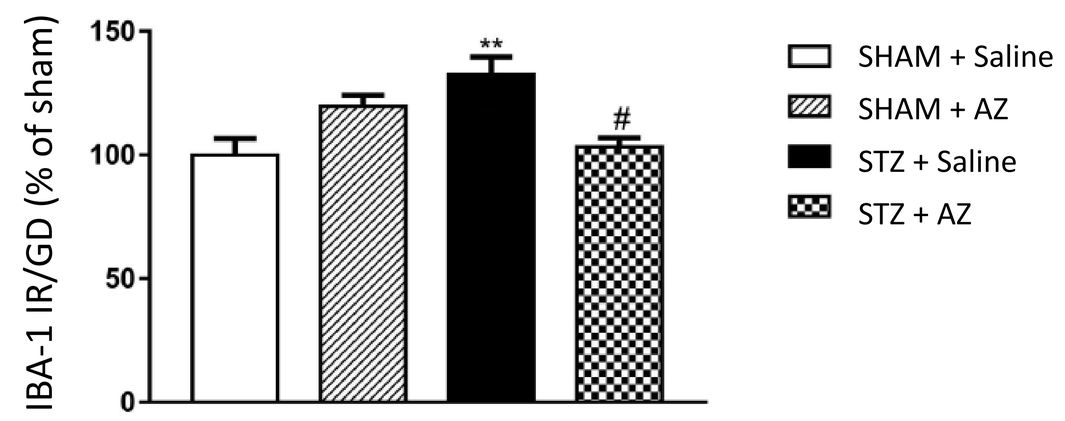

FIGURE 2. AZ FORMULATION EFFECTS ON MICROGLIAL CELLS (IBA-1 – IMMUNORREACTIVITY) IN STZ-ICV ANIMALS. The Iba-1-IR significantly increased in the GD area of hippocampus in STZ-ICV rats, 30 days after surgery. The formulation AZ decrease Iba-1-IR significantly in the GD area of hippocampus. The data are expressed as mean ± SEM. n = 4-6 per group. **p<0,01 vs. sham group; #<0,05, vs. STZ + saline group (one-way ANOVA with Post Hoc de Bonferroni).

Conclusion

STZ-lesioned rats present a memory impairment besides the increase in microglial activation. The prolonged treatment with AZ formulation was able to counteract these changes.

Research Support from: Prodiet Clinical Nutrition