IMMUNO NATAL 2013
XXXVIII Congress of the Brazilian Society of Immunology
VI ESCI – Extra Section of Clinical Immunology

11th WORLD CONGRESS ON INFLAMMATION
International Association of Inflammation Societies

Carbolec
Laboratório de Carboidratos e Lectinas
Carbolec.webnode.com.br

Sulfated Agaran From Seaweed *Gracilaria cornea* Protects Rats Against Behavioral And Neurochemical Alterations Induced by 6-OHDA

Souza, R.B.[1];

ricardobastosouza@gmail.com
Carbolec.webnode.com

1.BIOCHEMISTRY AND MOLECULAR BIOLOGY DEPARTMENT OF THE FEDERAL UNIVERSITY OF CEARÁ, FORTALEZA - CE - BRAZIL

INTRODUCTION

Parkinson disease model in rats: Neuroinflammation and Behavior

Neuroinflammation is implicated in the Parkinson's disease (PD) progression (Collins et al. 2012). Studies have confirmed that elevated proinflammatory response occurs early in this disease and these processes contribute to the nigrostriatal degeneration (Mosley et al. 2006; Maia et al. 2012). In the animal model of PD induced by the neurotoxin 6-hydroxydopamine (6-OHDA), occurs neurodegeneration through oxidative and inflammatory process (Dexter & Jenner, 2013). In this model we observed motor problems, behavioral alterations and increase of nitrite levels in cerebral areas (Bové & Perier, 2012; Zhang et al. 2006).

Anti-inflammatory effect of the Sulfated agaran from red seaweed *Gracilaria cornea*

Sulfated agaran (SA) is a polysaccharide with sulfate groups found in the red seaweed *Gracilaria cornea* (J. Agardh, 1852) (Melo et al. 2002). Recently, a study with SA showed anti-inflammatory effects and absence of toxic effects *in vivo* (Coura et al. 2012).

Purpose of this work

Thus, the aim of this work is to evaluate the effects of SA in the modulation of locomotor and neurochemical alterations induced by 6-OHDA in rats.

METHODS

Male Rats *
Rattus albinus novergicus
Wistar
(250-300 g)

* This study was approved by Ethics Committee of Animal Research of the Federal University of Ceará - CEPA (nº 45/13)

Lesion Induction by 6-OHDA in striatum following to treatment

0 day

Experimental Groups #

- Sham (Saline 0.9%) **
- 6-OHDA (20 µg) **
- 6-OHDA + SA (15, 30 or 60 µg ##) **

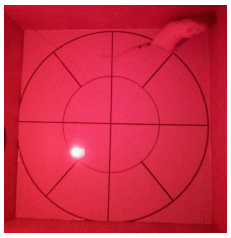
** All treatments were realized through stereotaxic injection into right striatum (Paxinos & Watson, 1986) and solutions were prepared in saline (0.9%; with 0.01% ascorbic acid).

All animals were randomically divided in five groups (n=10 animals per group). Animals were maintained under *ad libitum* feeding conditions.

The seaweed was collected from Flecheiras beach, Brazil. SA was obtained as previously described by Coura et al (2012).

Behavioral tests

Open-field test (Acher, 1973)



Author's photography

Rotational test induced by apomorphine (3 mg/Kg, i.p.) (Kim et al. 1998)

Contralateral rotation
Ipsilateral rotation

14th day

Euthanasia and Neurochemical Analysis

Analysis of nitrite levels in hippocampus, prefrontal cortex and striatum (Green et al. 1981)

RESULTS

Locomotor activity

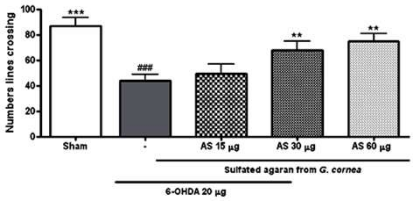


Fig 1: Open-field test of rats submitted to 6-OHDA-induced lesion and/or treated with sulfated agaran (SA) (15, 30 or 60 µg, intrastriatum). Data are expressed in ±S.E.M. ### indicates statistical differences (p < 0,001), in relation to Sham. ** and *** indicate statistical differences (p<0,01 and p<0,001, respectively), in comparison to 6-OHDA group. ANOVA, Bonferroni test.

Rotational test induced by apomorphine

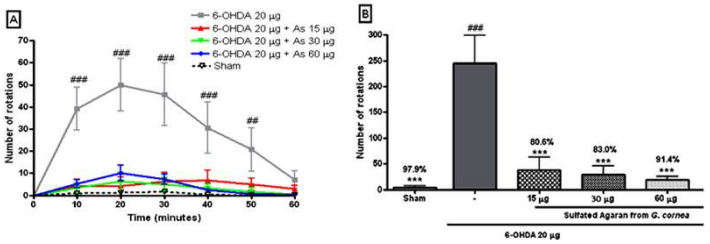


Fig. 2 A and B: Rotational test induced by apomorphine (3 mg/Kg, i.p.) of rats submitted to 6-OHDA-induced lesion and/or treated with sulfated agaran (SA) (15, 30 or 60 µg, intrastriatum). Data are expressed in ±S.E.M. ### or *** indicate statistical differences (p<0,001), in relation to Sham and 6-OHDA group, respectively. ANOVA, Bonferroni test.

Determination of the Nitrite levels

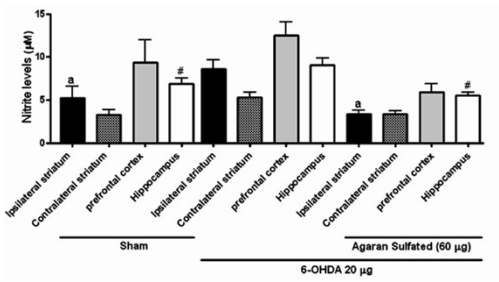


Fig. 3: Nitrite concentration in prefrontal cortex, hippocampus and (ipsilateral and contralateral) striatum of rats submitted to 6-OHDA-induced lesion and/or treated with Sulfated agaran (SA) (60 µg, intrastriatum). Data are expressed in ±S.E.M.. (a, b and c) indicates statistical similarities (p<0,05). ANOVA, Bonferroni test.

CONCLUSION

Sulfated agaran from seaweed *G. cornea* presented neuroprotective effects against motor alterations induced by 6-OHDA injection into striatum and recovered the nitrite levels in the rat cerebral tissues.

Bibliography

ARCHER, J. **Anim. Behav.**, v.21, n.2, p.205-235, 1973.
BOVÉ, J.; PERIER, C. **Neuroscience**, v.21, p.51–76, 2012.
COLLINS, L. M et al. **Neuropharmacology.** v. 62, p. 2154-2168, 2012.
COURA, C. O. et al. **Basic. Clin. Pharmacol. Toxicol.**, v. 110, p. 335-341, 2012.
DEXTER, D. T.; JENNER, P. **Free Radical and Medicine**. p.1-13, 2013.
GREEN, L. C.; TANNEMBAUN, S. R.; GOLDMAN, P. **Science**, v. 212, p. 56-8, 1981.
KIM, Y. S. et al. **Neuroreport,** v. 9, p. 2387-2390, 1998.
MAIA, S.et al. **Synapse**, v. 66, p. 573-583, 2012.
MELO, M. R. S. et al. **Carbohydrate Polymers**, v. 49, n. 4, p. 491-498, 2002.
MOSLEY, R. L. et al. **Res.,** v. 6, p. 291-311, 2006.
PAXINOS, G.; WATSON, C. **New York: Academic Press,** 2dn Edn, 1986.
ZHANG, L.; DAWSON, V. L.; DAWSON, T. M. **Pharmacol Therapeutics**, v. 109, p. 33-41, 2006.

Acknowledgments

INCT-IBISAB
Instituto de Biomedicina do Semi-Árido Brasileiro
CNPq
Conselho Nacional de Desenvolvimento Científico e Tecnológico
CAPES
LAFS
LABORATÓRIO DE FARMACOLOGIA DE SOBRAL