

POSTER PRESENTATION

Open Access

# Quercetin and Omega 3 ameliorate oxidative stress-induced neurodegeneration by Aluminium Chloride

Haytham Abdallah<sup>2</sup>, Mohamed Afifi<sup>1,2\*</sup>, Aaser Mohamed Abdelazim<sup>1</sup>

From 2nd International Genomic Medical Conference (IGMC 2013)  
Jeddah, Kingdom of Saudi Arabia. 24-27 November 2013

## Background

Background Exposure to high levels of Aluminium (Al) leads to a neurodegenerative disorders, which may be mediated through over generation of free radicals. So in the present study we investigated the ability of both Quercetin and Omega 3 to ameliorate Al adverse effect on brain antioxidant through monitoring the main brain antioxidant enzymes on molecular and cellular levels.

## Materials and methods

Forty male albino rats were used, they were divided into 4 groups; Control, Aluminum Chloride (AlCl<sub>3</sub>) supplemented group that orally supplemented with 100mg of AlCl<sub>3</sub> (Sigma, St. Louis, MO) per Kg b.w. for two months. Quercetin group treated as AlCl<sub>3</sub> group and orally supplemented with 100 mg/kg b.w. Quercetin for two months according to Hui et al. [1] and Omega 3 group that treated as AlCl<sub>3</sub> and orally supplemented with 20 mg/kg b.w. Omega 3 for two months. At the end of the experiments,

brain samples were taken and used for biochemical and molecular analysis.

## Results

Our results indicate a significant increase in superoxide dismutase (SOD) activity and MDA level and a significant decrease in the activities of catalase (CAT), glutathione reductase (GR) and glutathione peroxidase (GPX) and levels of reduced glutathione (GSH) in brain tissues in AlCl<sub>3</sub> supplemented group when compared with control or Quercetin and Omega 3 supplemented groups (Table 1). At the molecular level SOD mRNA showed the highest expression level in the AlCl<sub>3</sub> supplemented group while the highest expression levels of mRNAs of CAT, GPx and GR was observed in the Quercetin and Omega 3 supplemented groups (Figure 1).

## Conclusions

Both Quercetin and Omega 3 has the ability to overcome the Al induced oxidative stress in brain, manifested by the

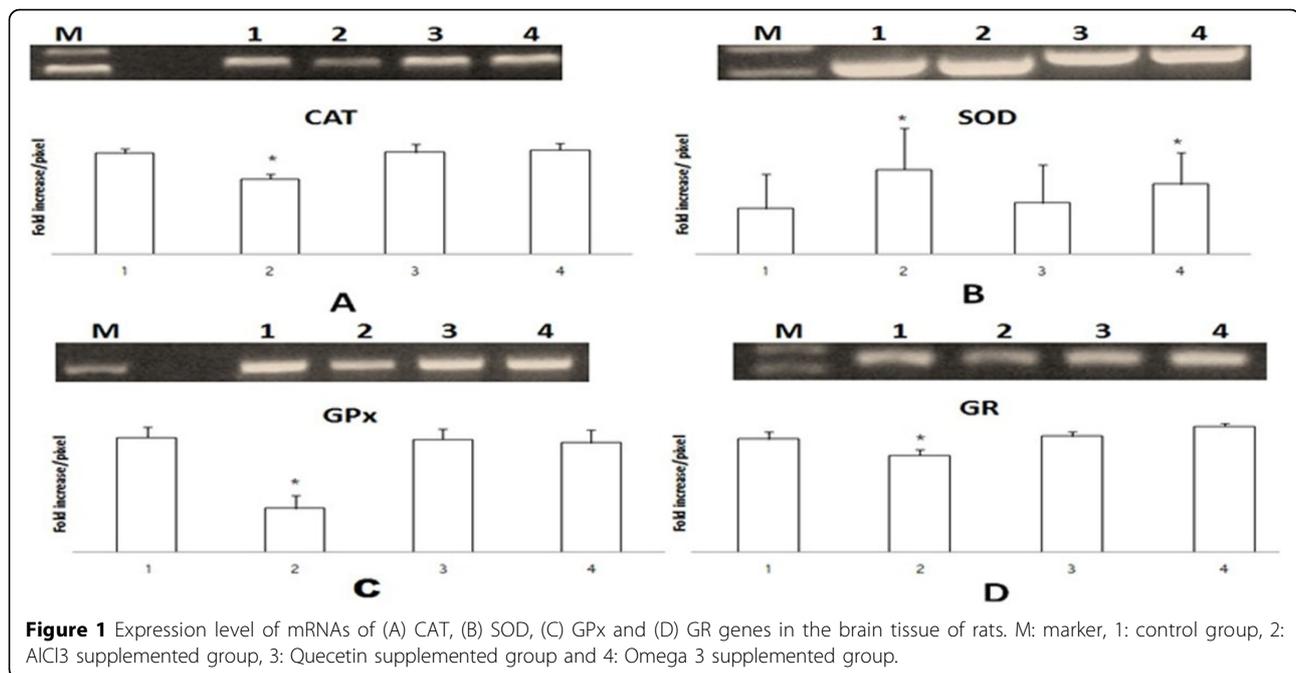
**Table 1 Effects of ALCl<sub>3</sub>, Quercetin and Omega 3 on antioxidants and MDA in brain tissues of rat.**

Groups	GSH (umol/g tissue)	SOD (ug/g tissue)	CAT(μM H <sub>2</sub> O <sub>2</sub> decomposed/g tissue)	GPx (μM /min/g tissue)	GR (unit/g tissue)	MDA (nmol /g tissue)
Control	86 ± 3 <sup>a</sup>	0.45 ± 0.02 <sup>d</sup>	1.66 ± 0.01 <sup>a</sup>	51.4 ± 1.3 <sup>a</sup>	19.3 ± 0.7 <sup>a</sup>	5.4 ± 1 <sup>d</sup>
AlCl <sub>3</sub> group	53.7 ± 2.2 <sup>d</sup>	0.93 ± 0.009 <sup>a</sup>	1.5 ± 0.014 <sup>d</sup>	26.7 ± 2.3 <sup>d</sup>	9.9 ± 0.3 <sup>d</sup>	29.9 ± 2.5 <sup>a</sup>
Quercetin group	75.4 ± 2.9 <sup>b</sup>	0.51 ± 0.007 <sup>c</sup>	1.6 ± 0.02 <sup>b</sup>	45.3 ± 0.6 <sup>b</sup>	16.3 ± 0.7 <sup>b</sup>	9.5 ± 1 <sup>c</sup>
Omega 3 group	68.6 ± 3.2 <sup>c</sup>	0.70 ± 0.016 <sup>b</sup>	1.58 ± 0.01 <sup>c</sup>	41.5 ± 0.9 <sup>c</sup>	13.9 ± 0.4 <sup>c</sup>	14.4 ± 2.5 <sup>b</sup>

Means in the column carry different subscripts are significant at P<0.05

\* Correspondence: mafifi@kau.edu.sa

<sup>1</sup>Department of Biological Sciences, Faculty of Science, King Abdulaziz University, North Campus, PO Box 11508, Jeddah, 21463, Saudi Arabia  
Full list of author information is available at the end of the article



significant reduction in free radicals concentration and induction of the activity and gene expression of the brain antioxidant enzymes.

#### Authors' details

<sup>1</sup>Department of Biological Sciences, Faculty of Science, King Abdulaziz University, North Campus, PO Box 11508, Jeddah, 21463, Saudi Arabia.

<sup>2</sup>Department of Biochemistry, Faculty of Veterinary Medicine, Zagazig University, Zagazig, Egypt.

Published: 2 April 2014

#### Reference

1. Hui L, Lei Z, Shaoping L: Evaluation of antioxidant and immunity activities of quercetin in isoproterenol-treated rats. *Molecules* 2012, **17**:4281-4291.

doi:10.1186/1471-2164-15-S2-P45

Cite this article as: Abdallah et al.: Quercetin and Omega 3 ameliorate oxidative stress-induced neurodegeneration by Aluminium Chloride. *BMC Genomics* 2014 **15**(Suppl 2):P45.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at  
www.biomedcentral.com/submit

 BioMed Central