Caffeine Increases TBARS Levels in Liver, Kidney and Cerebral Cortex of Hyperglycemic Rats

Rech, V.C. 1,2, Vaucher, R.A., De Franceschi, I.D. 2, Do Carmo, G.M. 1, Mezzomo, N.J. 1, Baldissera, M.D. 1, Cremonese, C.R. 1, Zanon, J.P. 1, Friedrich, J.D. 1, Zago, A.M. 1.

1 Área de Ciências da Saúde, Centro Universitário Franciscano-UNIFRA, Santa Maria/RS; 2 Departamento de Bioquímica, UFRGS, Porto Alegre/RS, Brazil.

Introduction: Some studies have reported protective effects of caffeine in preventing diabetes while others report the worsening disease. Thus, the aim of this work was to evaluate whether caffeine reverses lipid peroxidation in tissues such as liver, kidney and cerebral cortex of hyperglycemic rats.

Material and Methods: 32 male Wistar rats (200g) were randomly assigned to four groups and treated daily for 2 months. Control (C) and diabetic (D) group received physiological saline; Caffeine (Caf) and Dibetic+Caf (D+Caf) group received 30 mg caffeine/kg. After two months, the animals were fasted for twelve hours and killed by decapitation. The tissues were rapidly excised and homogenized. The homogenates were centrifuged at 800x g for 10 min at 4 °C and the supernatants were used to measure thiobarbituric acid-reactive substances (TBARS). Plasmatic glucose was analyzed. Data were expressed as mean ± standard deviation. Comparison between means was performed by two-way ANOVA followed by the Tukey test to p <0.05.

Results and Discussion: In the liver, caffeine increased TBARS levels to D group: Control= 504±50; Caf= 460±40; D= 590±70 and D+Caf= 607±103(p<0.05). In the kidney, caffeine increased TBARS levels to D group and D+Caf: Control= 221±10; Caf= 230±16; D= 330±26(p<0.001) and D+Caf= 311±23(p<0.001). In the cerebral cortex, caffeine decreased TBARS levels to Caf and D group, but increased to D+Caf group: Control= 1683±138; Caf= 1349±94(p<0.001); D=1400±190(p<0.001) and D+Caf= 2044±62(p<0.001). The plasmatic glucose increased to the D and D+Caf groups: Control= 102±8,2; Caf= 111±5,8; D= 494±41,5(p<0.001) and D+Caf= 545±44,7(p<0.001).

Conclusions: Our results show that caffeine per se did not affect the tissues, instead, it made a neuroprotective role. However, if the alteration of lipid peroxidation also occurs in liver and cerebral cortex of hyperglycemic people, our results suggest caution with its use these patients.

Word Keys: caffeinated, diabetic, lipid peroxidation, neuroprotection, oxidative stress
Sources of research support: PROBIC/UNIFRA e FAPERGS.