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Nuclear factor E2-related factor 2's activation in transgenic mice fed with dosage of saturated or unsaturated fatty acids using in vivo bioluminescent imaging

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Abstract

Cells developed several mechanisms, including the transcription factor Nuclear Factor E2-related factor 2 (Nrf2) to counteract oxidative stress (Lee and Johnson, 2004). The aim of the study was to evaluate the activation of Nrf2 in transgenic mice fed saturated or polyunsaturated fatty acids and the anti-inflammatory effect of oestrogens on organism. Forty-eight ARE CRE OMO reporter mice were divided into 3 groups, consisting of 16 animals, based on presence/absence of oestrogens (ovariectomized or sham female, OVX - SH; male, MA). Each group was further split in 4 subgroups of 4 animals each and fed different diets (7.5% lard, 7.5% tuna oil, 20.0 % lard and 20.0% tuna oil). Two times a week animals were anaesthetized and injected intraperitoneally with 100µL luciferin 15 min before the imaging session. Using the Living Image Software, photon emission was mapped for selected body areas. On day 70, animals were sacrificed after a challenge with Sodium Arsenite. Specific organs were dissected and immediately subjected to *ex vivo* imaging session. MIXED and GLM procedures of SAS software were used for statistical analysis. Dietary treatments did not affect body weight and feed intake as well as Nrf2 expression in both pre- and post-challenge phases, with the exception of the abdominal region (P=0.031 pre-challenge); in this area, during the pre-challenge phase, OVX showed lower Nrf2 activation (P<0.001). *Ex vivo* results outlined a significant effect of the challenge on all the considered organs (P<0.001), while OVX subjects had higher Nrf2 expression on urinary bladder and kidney (P<0.05) and high fat diet increased Nrf2 in urinary bladder (P<0.05). The present trial shows how supplementation of saturated or polyunsaturated fatty acids in the diet do not exert significant effects on oxidative stress in mice, but confirms the protective role of oestrogens under physiological condition.

References

Lee, J.M., and Johnson, J.A., 2004. An important role of Nrf2-ARE pathway in the cellular defence mechanism. Journal of Biochemistry and Molecular Biology. 37, 139-143.

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