

Dental & Dental Hygiene 2018: The impact of vitamin E against acrylamide induced toxicity on skeletal muscles of adult male albino rat tongue: light and electron microscopic study - Rasha H Al Serwi - Mansoura University

Rasha H Al Serwi and Fatma M Ghoneim

Mansoura University, Egypt

Acrylamide, one of the major environmental public health problems, results from its increased accumulation in the process of cooking food materials. This study aimed to demonstrate the light and electron microscopic structural effects of acrylamide on the skeletal muscle fibres of adult male albino rat tongue and to investigate the possible protective effect of vitamin E co-administration.

Thirty adult male albino Sprague–Dawley rats were divided into 3 groups, each group included 10 rats. Group I (control), group II which was subdivided into two equal subgroups: subgroup IIa: included 5 rats that received acryl-amide orally once daily for 20 days. Subgroup IIb: included 5 rats that received acrylamide orally once daily for 40 days. Group III was also subdivided into two equal subgroups: sub-group IIIa: included 5 rats that received acrylamide and vitamin E orally once daily for 20 days. Subgroup IIIb: included 5 rats that received acrylamide and vitamin E orally once daily for 40 days.

At the end of the experiment the tongue was dissected out for histological and electron microscopic studies, another muscle sample was homogenized and processed for biochemical estimation of malondialdehyde (MDA) and total antioxidant capacity (TAC). Light microscopic study of tongue skeletal muscles in acrylamide exposed animal's revealed abnormal

wavy course and splitting of the muscle fibres with fatty infiltration in between. Moreover, pyknosis and remnants of nuclei were detected.

EM (electron microscopy) revealed marked aggregation of mitochondria of different size and shape with giant cells formation, and partial loss of myofilaments. There was statistically significant increase in MDA and decrease in TAC indicating oxidative stress in acrylamide administered groups (group II) than the control group which increased by prolonged duration (subgroup IIb versus subgroup IIa, $p < 0.0001$). This oxidative stress could explain the histological changes in tongue muscles of acrylamide exposed rats.

Co-administration of vitamin E with acrylamide ameliorated most of the above mentioned histological changes in the animals used and signs of improvement that became better with prolonged administration of it (subgroup IIIb versus subgroup IIIa, $p < 0.0001$) were detected. It could be concluded that, chronic exposure to acrylamide might lead to skeletal muscle damage in rat tongue which becomes worse with prolonged duration of exposure. Acrylamide induced oxidative stress is the implicated mechanism of such histological changes. This toxic effect of acrylamide could be minimized when vitamin E is given concomitantly with it by its antioxidant effect.