

International Conference on

Restorative Dentistry and Prosthodontics

October 20-21, 2016 Houston, USA

Glutathione-dependent enzymes as biomarkers in dental fluorosis

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Introduction: Fluorosis, caused by long-term intake of high levels of fluoride is characterized by clinical manifestations in teeth. Although fluorosis is irreversible, it could be prevented by appropriate and timely intervention through understanding the process at biochemical and molecular levels. Increased production of reactive oxygen species (ROS) and lipid peroxidation has been considered to play an important role in the pathogenesis of chronic fluoride toxicity. Saliva as a biological liquid of the human organism may be a reflection of the metabolic state, and salivary parameters have the clinical-diagnostic means.

Aim: Comparative examination of the activities of glutathione dependent enzymes, glutathione reductase (GR) and glutathione-S-transferase (GST), and contents of glutathione, calcium and protein in the saliva of adult patients with dental fluorosis, before and after complex antioxidant therapy was done.

Material & Methods: 26 patients (19-30 years) with mild and moderate dental fluorosis (Dean's classification: 3 and 4) and 20 healthy subjects (20-30 years) were examined. Patients were treated with complex therapy, which included "Opalescent Whitening gel" (Ultradent products, USA), calcium gluconate and vitamins-antioxidants A, E, D and C. The activities of glutathione-dependent enzymes and contents of glutathione, calcium and protein were determined in the saliva of the patients using spectrophotometric methods (DiaSys Diagnostics).

Results: Chronic fluoride intoxication led to the imbalance of antioxidative glutathione-dependent defense system in the patients with dental fluorosis. The results reflected dose-dependent fluoride intoxication and metabolic imbalance and suggested that complex antioxidant therapy was effective and partially restored imbalance of the anti-oxidative defense of saliva in the patients with fluorosis.

Conclusion: Glutathione-dependent enzymes, GR and GST, may be used in dental practice as biomarkers for estimation of the degree of metabolic disturbances in patients with dental fluorosis.

Biography

Ludmila Gavriluc is Professor of Biochemistry and Clinical Biochemistry in the Department of Nicolae Testemitanu State University of Medicine and Pharmacy, Chisinau, Moldova. She graduated from the State Medical University, Medico-Biological Department with specialty in Biochemistry and completed PhD (1978) and MD (1997) at the State Medical University, Moscow, Russia. She had scholarships in Russia, Italy, USA (01-08.2013, Fulbright Program US, Feist-Weiller Cancer Center, LSU HSC, LA). She is author of 104 scientific and methodic peer-reviewed manuscripts and 6 books. Areas of her scientific interests are clinical-diagnostics, oncology, hematology, stomatology and antioxidant therapy.

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