PO18- SALIVAGES – EU JPI Project

Expression of n-epsilon carboxymethyl lysine in rat oral cavity tissues and organs: a biomarker of aging

Bosca Adina Bianca1, Tăulescu Marian3, Miclăuş Viorel3, Negru Mihai2, Băbţan Aniţa Maria2, Petrescu Nausica Bianca4, Buhătel Dan4, Mesaros Anca5, Gasparik Cristina5, Irimie Alexandra5, Pârvu Alina Elena1, Crişan Maria2, Collino Massimo2, Ilea Aranka4.

1Department of Histology, Faculty of Medicine, “Iuliu Haţieganu” University of Medicine and Pharmacy Cluj-Napoca, Romania
2Department of Pathology, Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania
3Department of Histology and Embryology, Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania
4Department of Oral Rehabilitation, Oral Health and Dental Office Management, Faculty of Dentistry, “Iuliu Haţieganu” University of Medicine and Pharmacy Cluj-Napoca, Romania
5Department of Propaedeutics and Facial Esthetics, Faculty of Dentistry, “Iuliu Haţieganu” University of Medicine and Pharmacy Cluj-Napoca, Romania
6Department of Physiopathology, Faculty of Medicine, “Iuliu Haţieganu” University of Medicine and Pharmacy Cluj-Napoca, Romania
7Department of Drug Science and Technology, University of Turin, Turin, Italy

Introduction:
Accumulation of deleterious substances, such as AGEs, in cells and tissues accelerates the multisystem functional decline that occurs with aging. Exogenous and endogenous AGEs are irreversibly deposited in various tissues and organs and thus, they influence many biological functions. The aim of this study was to assess the correlation between the expression of CML in rat oral cavity tissues and various organs, associated with aging.

Methods:
Tissue samples were harvested from 10 eight-month and 10 two-year old Wistar rats, five females and five males. The samples, including tissues from the oral cavity, skin, encephalus, cerebellum, liver, kidney, pancreas, parotid gland, testes and ovaries were processed by standard histological technique and stained with hematoxylin and eosin and by immunohistochemistry.

Results:
The Ne-CML expression had different intensities for the various tissues and organs and was more intense in the adult rats, compared with the young animals. There were no differences of Ne-CML expression between males and females. In the oral mucosa and skin, CML expression was higher in the epithelium compared with the connective tissue. In the central nervous system, Ne-CML expression was more pronounced in neurons of the cerebral hemispheres and cerebellum than in the neuropil. In the kidneys, the epithelial cells in the proximal renal tubule showed a higher intensity of the Ne-CML than the distal tubules, glomeruli and interstitium. In the salivary glands, a diffuse distribution of Ne-CML was
observed in the glandular acini compared to the ductal and interstitial structures. Myocardial cells exhibited a multifocal distribution of CML. A diffuse expression of CML has been identified in the gonads.

Conclusion:
Ne-CML had similar distribution in the oral cavity and in various organs, and was correlated with the animals’ age. However, the clinical significance of our results is that the tissues harvested during various therapeutic procedures (e.g. hard dental tissues harvested during tooth extraction or the gingiva) could be used in order to assess the aging process and the risk for developing associated general diseases.

Funding:
This study was supported by the COFUND-ERA-HDHL ERANET Project, European and International Cooperation - Subprogram 3.2 - Horizon 2020, PNCDI III Program - Biomarkers for Nutrition and Health – "Innovative technological approaches for validation of salivary AGEs as novel biomarkers in evaluation of risk factors in diet-related diseases", no 25/1.09.2017.