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# BOOK OF ABSTRACTS



Effective current approaches  
in anti-aging medicine  
and gerontology

depleted, which means that the life expectancy of a person is shortened (4). Peptide bioregulators at the epigenetic level mobilize the reparative capabilities of the body, thereby contributing to the restoration of the function and structure of tissues and organs, which leads to an improvement in the quality of life and increase in its duration.

The use of peptides in autoimmune diseases of the thyroid gland has helped to improve its structure and function without any side effects. Overall, peptides were well tolerated by patients. An important point is that peptides open up new horizons in the treatment of endocrine disorders, thus, this is considered as significant topic for research. Taking into account the annual growth of the average life expectancy, the improvement of life quality and active longevity should be one of the key objectives of public health.

*Reference list:*

1. Khavinson V.Kh., Kuznik BI, Ryzhak G.A. Peptide geroprotectors as the epigenetic regulators of physiological functions of the body: Monograph. - Spb.: Publishing House of the Russian Teachers' University named after A.I. Herzen, 2014. – 271 pp.
2. Khavinson V.Kh. Peptide regulation of aging. - Spb.: Nauka, 2009. 50 pp.
3. Mark P. J. Vanderpump. The epidemiology of thyroid disease. British Medical Bulletin, Volume 99, Issue 1, 1 September 2011, Pages 39–51
4. Vanderpump MPJ. The epidemiology of thyroid diseases. In: Braverman LE, Utiger RD, eds. Werner and Ingbar's The Thyroid: A Fundamental and Clinical Text. 2005, 9th edn, pp 398-406. JB Lippincott-Raven, Philadelphia.

## **SHORT PEPTIDES INCREASED NESTIN EXPRESSION IN HUMAN PERIODONTAL LIGAMENT STEM CELLS**

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*Relevance:* Short peptides (di, tri and tetrapeptides) are signaling molecules capable of interacting with DNA and histone proteins, acting as regulatory factors of proliferation, apoptosis and cell differentiation. Human

periodontal ligament stem cells (hPDLSCs) are multipotent postnatal stem cells grown in culture, the advantage of using hPDLSCs as a model for studying biological activity of any substances.

*Methods:* hPDLSCs were collected after informed consent of ten patients. Biopsies were obtained from the alveolar crest and horizontal fibres of the PDL by scraping the roots of non-carious third molar teeth with a Gracey's curettes. hPDLSCs were cultured in xeno-free medium without animal derived molecules. Cells at passage 2 were used in the experiment. hPDLSCs were divided in six different cultures: 1 - control group (without peptides), 2 - AEDG peptide, 3 - KE peptide, 4 - AED peptide, 5 - KED peptide and 6 - mix of all abovementioned peptides together. All the peptides were diluted in PBS at a concentration 0.01 $\mu$ g/ml and were added to cell medium and replaced every 3 days. The cells were placed at 37°C in a humidified 5% CO<sub>2</sub> incubator. After 10 days of induction, differentiated and undifferentiated cells treated or not with peptides were collected for subsequent analysis. Thirty micrograms of proteins were obtained from undifferentiated and neurogenic differentiated hPDLSCs of all groups. Membranes were incubated with primary antibodies rabbit anti-Nestin (1:750, rabbit; Sigma-Aldrich, Milan, Italy). After five washes in PBS containing 0.1% Tween-20, samples were incubated for 1 hour at room temperature with peroxidase-conjugated secondary antibody anti-rabbit and anti-mouse diluted 1:2.000 in 1x PBS, 3% milk, 0.1% Tween. Protein expression was detected using the enhanced chemiluminescence detection system (ECL) (Amersham Pharmacia Biotech, PA, USA) with photo documenter Alliance 2.7 (Uvitec, Cambridge, UK). Signals were captured by ECL enhancing and analyzed using a UVband-1D gel analysis (Uvitec). GraphPad Prism version 6.0 (GraphPad Software, La Jolla, CA) was used for statistical data analysis. Data were expressed as means and standard deviation of the recorded dependent variables. The differences among the levels of the factor under investigation were evaluated performing distinct two-way-ANOVA tests. Tukey tests were applied for pairwise comparisons. A value of p<0.05 was considered statistically significant in all tests.

*Results:* Western blot analysis showed that a mixture of AEDG, KE, AED, KED peptides increases the expression of GAP43 in undifferentiated hPDLSCs, but the effect was more visible in differentiated hPDLSCs compared to the undifferentiated cells and to untreated differentiated hPDLSCs. It was indicated that in addition to a mixture of all peptides under study and the peptide KED also affect GAP43 expression, increasing the expression of this growth factor compared with the control.

*Conclusion:* Thus, in hPDLSCs cultures with the addition of a differentiation medium under the action of the KED peptide and a mixture of peptides AEDG, KE, AED, KED, the expression of Nestin significantly increased as compared to the control. Nestin is expressed during neurons

differentiation. So, short peptides can be inductors of neuronal differentiation of stem cells.

*Reference list:*

1. Anisimov V.N., Khavinson V.Kh. Peptide bioregulation of aging: results and prospects // Biogerontology. 2010. N 11. P. 139-149.
2. Khavinson V.Kh. Peptides and ageing Neuroendocrinology Letters. Special Issue, 2002. 144 p.
3. Trubiani O., Guarnieri S., Diomede F. et al. Nuclear translocation of PKCalpha isoenzyme is involved in neurogenic commitment of human neural crest-derived periodontal ligament stem cells// Cellular signalling. 2016. Vol. 28. P. 1631-1641.
4. Trubiani O., Toniato E., Di Iorio D. et al. Morphological Analysis and Interleukin Release in Human Gingival Fibroblasts Seeded on Different Denture Base Acrylic Resins// International journal of immunopathology and pharmacology. 2012. Vol. 25. P. 637-643.

## THE SCIENCE OF CHOOSING WISELY: IS IT APPLICABLE TO HEALTHY AND ACTIVE LONGEVITY?

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We do experience a longevity revolution. The number of persons aged 80 or over is projected to more than triple by 2050 and to increase more than seven-fold by 2100. Globally the number of persons aged 80 or over is supposed to increase from 125 million in 2015 to 434 million in 2050 and 944 million in 2100. In 2015, 28% of all persons aged 80 or over lived in Europe, but that share is expected to decline to 16% by 2050 and 9% by 2100 as the population of other major areas continue to increase in size and to grow older (1). These impressive demographic data underlie social, economic and financial consequences of population aging.

Global aging of human population being one of the main challenges and opportunities of the twenty first century, policy makers across OECD (2) are keen to improve and maintain health of people bearing in mind a declining