INTERNATIONAL SYMPOSIUM OF EXPERTS 2020

Under the patronage of
**Her Highness Sheikha Madiyah Dalmook Bin Juma Al Maktoum**

# BOOK OF ABSTRACTS

# REGENERATIVE MEDICINE and AGEING

**February 01- 02 / 2020**
**Dubai, UAE**

involved in the life cycle metabolism. It should be assumed that the presented mechanism of the peptide-DNA interaction is universal for living nature.

*Reference list:*

1. Kolchina N., Khavinson V., Linkova N., Yakimov A., Baitin D., Afanasyeva A., Petukhov M. Systematic search for structural motifs of peptide binding to double-stranded DNA. // Nucleic Acids Research. – 2019. – Vol. 47, N 20. – P. 10553-10563. DOI: 10.1093/narlgkz850
2. Caputi S., Trubiani O., Sinjari B., Trofimova S., Diomede F., Linkova N., Diatlova A., Khavinson V. Effect of short peptides on neuronal differentiation of stem cells. // International Journal of Immunopathology and Pharmacology. – 2019. – Vol. 33. – P. 1-12.
3. Sinjari B., Diomede F., Khavinson V., Mironova E., Linkova N., Trofimova S., Trubiani O., Caputi S. Short Peptides Protect Oral Stem Cells from Ageing. // Stem Cell Reviews and Reports. – 2019. – 8 p. DOI: 10.1007/s12015-019-09921-3
4. Khavinson V., Popovich I. Short Peptides Regulate Gene Expression, Protein Synthesis and Enhance Life Span. // In RSC Drug Discovery Series No. 57 “Anti-aging Drugs: From Basic Research to Clinical Practice” Ed. A.M. Vaiserman. – 2017. – P. 496-513.
5. Vanyushin B.F., Khavinson V.Kh. Short Biologically Active Peptides as Epigenetic Modulators of Gene Activity. // Epigenetics – A Different Way of Looking at Genetics. – W. Doerfler, P. Böhm (eds.). – Springer International Publishing Switzerland. – 2016. – P. 69-90.

## EDR PEPTIDE: PERSPECTIVES OF APPLYING IN NEUROPROTECTION

Khavinson Vladimir[1,2,3], Linkova Natalia[1,4], Kozhevnikova Ekaterina[1], Kraskovskaya Nina[5], Ilina Anastasiia[1,5]

*[1] Saint Petersburg Institute of Bioregulation and Gerontology, Saint Petersburg, Russia*
*[2] Pavlov Institute of Physiology of RAS, Saint Petersburg, Russia*
*[3] Mechnikov North-Western State Medical University, Saint Petersburg, Russia*
*[4] Academy of postgraduate education under FSBU FSCC of FMBA of Russia, Moscow, Russia*
*[5] Peter the Great Saint-Petersburg Polytechnic University, Saint Petersburg, Russia*

*Relevance:* Drugs used for treatment of brain pathology specifically in the older patients belong to different pharmacological groups. These groups include antioxidants, nitrogen oxide blocking agents, inhibitors of lipid peroxidation processes, etc. Short peptides revealing high physiological activity and the absence of side effects are currently considered to be

promising neuroprotective agents. Neuroprotective peptide EDR (Glu–Asp–Arg) was created in the Saint Petersburg Institute of Bioregulation and Gerontology.

*Results:* It is noted that EDR peptide regulates the expression of signal molecules, serotonin and pro-apoptotic protein p53 in dissociated cultures of rat cerebral cortical neurons, which are the markers of the cells' functional activity. In addition, it is shown that in Alzheimer's and Huntington's diseases models, EDR peptide restores the number of neuronal dendritic spines, which is characteristic of its ability to normalize interneural interactions [1, 4]. Neuroprotective role of the EDR peptide is manifested in experimental prenatal hypoxia and hyperhomocysteinemia. EDR peptide reduces the accumulation of reactive oxygen species in neurons, thus increasing their resistance to oxidative stress and preventing the interaction of homocysteine and its derivatives with glutamate receptors [2, 3].

*Conclusion:* We suggest that the revealed neuroprotective properties of EDR peptide are associated with its ability to penetrate into cell's nucleus and nucleolus, bind with the DNA or histone proteins, thus regulating gene expression and synthesis of proteins implementing neuronal functions of the brain. Oral application of EDR peptide contributed to the regulation of heat shock protein gene expression, increased physical activity and performance capabilities in athletes, and normalized memory, psycho-emotional state in the senior patients.

The authors express their gratitude to Irina Viner-Usmanova for the financial support of the research.

*References list:*

1. Khavinson V., Linkova N., Kukanova E., Bolshakova A., Gainullina A., Tendler S., Morozova E., Tarnovskaya S., Vinski D.S.P., Bakulev V., Kasyanenko N. Neuroprotective Effect of EDR Peptide in Mouse Model of Huntington's Disease // J. of Neurology and Neuroscience. 2017. Vol.8 No.1:166. P. 1-11.
2. Khavinson V., Ribakova Y., Kulebiakin K., Vladychenskaya E., Kozina L., Arutjunyan A., Boldyrev A. Pinealon increases cell viability by suppression of free radical levels and activating proliferative processes // Rejuvenation Research. 2011. Vol. 14, No 5. P. 535-541.
3. Kozina L.S., Arutjunyan A.V., Stvolinski S.L., Stvolinskii S.L., Stepanova M.S., Makletsova M.G., Khavinson V.Kh. Regulatory peptides protect brain neurons from hypoxia in vivo// Doklady Biol Sci. 2008. Vol .418. P. 7-10.
4. Kraskovskaya N.A., Kukanova E.O., Linkova N.S., Popugaeva E.A., Khavinson V.Kh. Tripeptides Restore the Number of Neuronal Spines Under Conditions of In Vitro Modeled Alzheimer's Disease// Bulletin of Experimental Biology and Medicine. 2017. Vol. 163, N 4. P. 550-553.