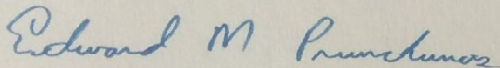




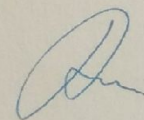
Cedars-Sinai Medical Center
&
RECOOP HST Association

**Recognize and Award the Certificate of Appreciation
for the Outstanding Scientific Contribution to
RECOOP KFSD 2nd International Student Conference
April 11, 2019, Bratislava, Slovakia**

VALERIA MESZLENYI



Edward M. Prunchunas
Executive Vice President for Finance
and Chief Financial Officer
Cedars-Sinai Medical Center and
Chairman of the Supervisory Board of the RECOOP HST
Association



Sandor G. Vari, MD
Director, International Research
and Innovation in Medicine Program,
Cedars-Sinai Medical Center
& President of the RECOOP HST
Association



RECOOP HST ASSOCIATION™

**RECOOP 14TH BRIDGES IN LIFE SCIENCES AND
2ND RECOOP - KFSD INTERNATIONAL STUDENT CONFERENCE 2019
BRATISLAVA, SLOVAK REPUBLIC APRIL 10-14, 2019**



11
04
19



**RECOOP
BRATISLAVA**

BRATISLAVA

Editorial Board

Edward Prunchunas
Cedars-Sinai Medical Center, Los Angeles, California, USA
<https://www.cedars-sinai.org/>

Sandor G. Vari
Cedars-Sinai Medical Center & RECOOP HST Association, Los Angeles,
California, USA
<https://www.cedars-sinai.edu/Research/Research-Administration/Recoop/>

Veronika Puska
RECOOP HST Association, Budapest, Hungary
<https://www.cedars-sinai.edu/Research/Research-Administration/Recoop/>

Simona Lauerova
RECOOP HST Association, Prague, Czech Republic
<https://www.cedars-sinai.edu/Research/Research-Administration/Recoop/>

Dora Antal
Frigyes Koranyi Science Dormitory, Semmelweis University, Budapest,
Hungary
<http://semmelweis.hu/szakkollegium/en/>

Csaba Vladoar
Art & Craft '95 Kft., Nagykovacsi, Hungary
<http://artcraft.hu/magyar.html>

ISBN 978-615-6006-00-4

Changes in motor neuronal calcium level after long-term treatment with serum from patients diagnosed with sporadic amyotrophic lateral sclerosis

Valéria Meszlényi^{1,2}, Roland Patai¹, Bernát Nógrádi^{1,2}, Tamás F. Polgár¹, Izabella Obál^{3,4}, József I. Engelhardt⁴ and László Siklós¹

¹Institute of Biophysics, Biological Research Centre, Hungarian Academy of Sciences, Szeged, Hungary

²Foundation for the Future of Biomedical Sciences in Szeged, Szeged Scientist Academy, Szeged, Hungary

³Department of Neurology, Aalborg University Hospital, Aalborg, Denmark

⁴Department of Neurology, University of Szeged, Szeged, Hungary

Corresponding author: Valéria Meszlényi, (mesvall13@gmail.com), 4th year student at Faculty of Medicine

Keywords: ALS; motor neuron; calcium homeostasis; stereology; electron microscopy

Introduction: Different pathological processes lead to motor neuronal degeneration in sporadic amyotrophic lateral sclerosis (sALS). Our aim was to understand the effect of chronic treatment with sera that contains anti-motoneuronal antibodies of sALS patients on calcium homeostasis, neuronal survival and motor function.

Methods: Balb/c mice were injected intraperitoneally for 75 days with blood serum from healthy individuals (n=3) and patients diagnosed with sALS (n=6). During the passive transfer, isometric muscle strength of their limbs was measured. The number of motor neurons in the spinal cord was measured with the disector method. Intracellular calcium level was quantified with geometrical statistics in the spinal cord and in the axon terminals of their *musculus interosseus* samples.

Results: Isometric muscle strength significantly decreased after long-term inoculation of sera from sALS patients. The numbers of motor neurons were also significantly decreased in the cervical ($p<0.001$) and lumbar ($p<0.001$) spinal cord. Significant increase of intracellular calcium could be documented in the cervical ($p<0.001$) and lumbar ($p<0.001$) spinal cord and in the axon terminals of their forelimb ($p<0.001$) and hindlimb ($p<0.01$). Ultrastructural alterations of perikarya and neuromuscular synapses were observed.

Discussion and conclusion: Functional regression, motor neuronal loss and elevated intracellular calcium level confirm the motor neuronal degeneration in this model. Such long-term treatment provides a feasible representation of sALS, as no genetic mutations were observed in the patients. However, it is reconcilable with the transgenic animal models widely used in pharmacotherapeutic tests. Therefore this model could be give us further understanding of motor neuronal degeneration in ALS.

Ethical Committee or Institutional Animal Care and Use Committee Approval: Ethical approvals to the study involving animals were given by the Committee for Animal Experiments of the University of Szeged, Szeged, Hungary I. 74-II/2015 and the Biological Research Center of the HAS (approval No. 72-45/b/2001 and No. 03876/0014/2006) and carried out in accordance with the national law (XXVIII. chapter IV. paragraph 31) which conforms to the international law and policies (EEC Council Directive 86/609, OJL 358 1 DEC. 12, 1987; revised 1996). Ethical approvals for obtaining and storing blood samples were approved by The Human Investigation Review Board, University of Szeged, Hungary. (#2557/2009).

Grants and financial support: This work was financially supported by the GINOP-2.3.2.-15-2016-00001, the GINOP-2.3.2.-15-2016-00034 and GINOP-2.3.3-15-2016-00001 programs and the "Foundation for the Future of Biomedical Sciences in Szeged" program with the financial aid of the Ministry of Human Capacities (34232-3/2016/INTFIN). Our work was also supported by the UNKP-18-2 New National Excellence Program of the Ministry of Human Capacities.

Acknowledgements: We thank Erika Rácz Bánfiné for her assistance in histochemical and electron microscopic work.