

## Pervasive blood-brain/spinal cord barrier impairment in ALS patients

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Vascular pathology, including blood-brain/spinal cord barrier (BBB/BSCB) alterations, has recently been recognized as a key factor possibly aggravating motor neuron damage, identifying amyotrophic lateral sclerosis (ALS) as a neurovascular disease. The majority of findings on microvascular pathology in ALS have been established in mutant SOD1 rodent models, identifying barrier damage during disease development which might similarly occur in FALS patients carrying the SOD1 mutation. However, BBB/BSCB competence in sporadic ALS (SALS) is still undetermined. In this study, BBB/BSCB structural and functional integrity in postmortem gray and white matter of medulla and spinal cord tissue from 25 SALS patients and 18 controls obtained from human tissue banks (Human Brain and Spinal Fluid Resource Center, Los Angeles, CA; NICHD Brain and Tissue Bank for Developmental Disorders at the University of Maryland, Baltimore, MD) was investigated. Major findings: (1) endothelial cell damage and pericyte degeneration, (2) severe intra- and extracellular edema, (3) reduced CD31 and CD105 expressions in endothelium, (4) significant accumulation of perivascular collagen IV, (5) significantly increased microvascular density in lumbar spinal cord, (6) IgG microvascular leakage, (7) reduced tight junction and adhesion protein expressions. Microvascular structural and functional barrier abnormalities determined in gray and white matter of the medulla, cervical, and lumbar spinal cord of SALS patients are novel findings. Pervasive barrier damage discovered in ALS may have implications for disease pathogenesis.

### Biography

Dr. Garbuzova-Davis received her Ph.D. from the University of Kharkov, Ukraine. Later, she received a D.Sc., Europe's highest scientific degree, from the Institute of Physiology, National Academy of Science, Ukraine. Since 2000, she has worked as an assistant professor in the Center of Excellence for Aging and Brain Repair, Department of Neurosurgery, University of South Florida Morsani College of Medicine, USA. Dr. Garbuzova-Davis is an expert in ALS research and stem cell transplantation. She conducted the initial animal studies investigating a potential stem cell treatment for ALS. She originally described blood-brain/spinal cord barrier impairment in a mouse model of ALS. Presently, Dr. Garbuzova-Davis is studying barrier status in post-mortem tissues from ALS patients with attention to endothelial cell functionality. She is also investigating possibilities of cell therapy for repairing BBB/BSCB in ALS and stroke. She has published more than 60 peer-reviewed papers and serves on the editorial boards of 5 scientific journals.

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