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Alternative strategies for drug delivery to the brain: Recent challenges

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According to statistical reports by well-known authentic centers such as Centre for Disease Control and Prevention as well as the National Centre for Health, Alzheimer's Disease (AD) has surpassed cardiovascular, diabetes and cancer as a leading cause of death. AD, the most common form of dementia, is an exasperating health disorder characterized by a progressive decline in cognitive function. One of the biggest problems and challenges for the development of new drugs and treatment strategies against different types of cancer and AD is the crossing of target drugs to the blood brain barrier. The use of nanoparticles in drug delivery therapy holds much promise in targeting remote tissues, and as a result many studies have attempted to study the ultrastructural localization of nanoparticles in various tissues. However, there are currently no *in vivo* studies demonstrating the ultrastructural distribution of nanoparticles in the brain. The aim of this study was to address how intraperitoneal injection of silver nanoparticles in the brain leads to leaking on the inter-endothelial contact and luminal plasma membrane, thus elucidating the possibility of penetrating into the most affected areas in the cancer and Alzheimer brain (vascular endothelium, perivascular, neuronal and glial cells). Our results show that the silver nanoparticles reached the brain and were found in hippocampal areas, indicating that they can be conjugated and used to deliver the drugs into the cell cytoplasm of the damaged brain cells. The present study can be useful for the development of novel drug delivering therapy and useful in understanding the delivery, distribution and effects of silver nanoparticles in cancer and AD brain tissue at cellular and subcellular level.

Biography

Gjumrakch Aliev, MD, PhD is President of "GALLY" International Biomedical Research Institute Inc., San Antonio, Texas, USA. He also holds appointment with the University of Atlanta, Atlanta, Georgia, USA as a Professor of Cardiovascular, Neuropathology, Gerontology, Health Science and Healthcare Administration, and Leading Researcher in the Institute of Physiologically Active Compounds, Russian Academy of Sciences, Chernogolovka, Moscow Region, Russia. He received his MD in 1982, from the Baku Medical University (former USSR) with cum laude. Then, he accomplished his PhD in Cardiovascular Diseases from the prestigious Russian Academy of the Medical Sciences, Moscow, Russia in 1988 with cum laude. He received Post-doctoral Training with Professor G. Burnstock in the University College of the London. He authored and coauthored more than 500 publications in the fields of neurodegenerative diseases research (Alzheimer's disease), as well as cardio- and cerebrovascular disease, cancer and electron microscopy. He is an outstanding Teacher, Scholar and a Renowned Scientist in the area of cellular molecular physiology, and cardiovascular and neurodegeneration-mediated pathologies and drug development including Alzheimer's disease. He is nationally and internationally reputed in his area.

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