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Editorial

Need to Explore Nanodelivery of Stem Cells with Multimodal Drug like Cerebrolysin for Effective Strategies for Enhanced Neuroprotection and Neurorecovery in Neurodegenerative Disorders

combating neurodegeneration in such diseases. Thus, exploration of novel therapeutic strategies, drug delivery or even combination of several therapeutic agents are needed to find new clinical approach.

With recent advancement in nanotechnology, nanodelivery of drugs could be one of the new approaches to treat such neurodegenerative diseases in future [5-8]. In our laboratory we have shown that cerebrolysin, a multimodal drug comprising a balanced composition of several neurotrophic factors and active peptide fragments when given using TiO₂ nanowired technology is able to induce marked neuroprotection in CNS injuries as compared to the parent drug alone [5-10]. This suggests that nanodelivery of drugs may have far more superior neuroprotective effects in CNS injuries.

Apart from drug delivery to the CNS, recent studies show that stem cells could also be one of the most potent agents in inducing neuroprotection in a variety of CNS diseases including traumatic injuries [2-5]. Thus, there are evidences that stem cells transplantation enhances sensory motor and cognitive functions in stroke, CNS trauma and some neurodegenerative diseases e.g., Parkinson's disease, Huntington's disease, Alzheimer's disease, amyotrophic lateral sclerosis and spinal muscular atrophy [2-4]. Accordingly, stem cell delivery or transplant was used since last decades to induce neuroregeneration in the CNS following various types of insults [2]. However, stem cell transplantation is not always a success for improving the quality of the lives of the victims. There are many problems of stem cell transplantations that may include repeated administration, changes in immune function and survival of stem cells when administered in vivo for long time to maintain [2,6]. Thus, there is an urgent need to enhance the procedures of stem cell therapy to make them more effective for the benefit of the patients.

Some possibilities could easily be adapted to improve stem cell therapy for the neurological patients in future. These could be either use stem cell therapy employing nanotechnology or supplement stem cell delivery with known neuroprotective drugs to enhance the therapeutic benefits to patients.

Recent research from our laboratory as well as from other workers showed the potential benefit of stem cell therapy are enhanced when they are delivered using nanotechnology. In our laboratory we used

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Central nervous system (CNS) is vulnerable to various kinds of physical, chemical, metabolic or age-related insults leading to neurodegeneration. Neurodegenerative diseases either caused by aging or following trauma to the CNS results in misery for large number of people across the Globe involving high social costs for them to maintain a good life [1]. Thus, there is an urgent need to find novel solutions to reduce the burden of neurodegenerative disease induced problems in our aging populations. In this context, Alzheimer's disease (AD) is causing huge social burden for the victims as no such therapy available for them to improve their lifetime disabilities [2,3]. This is especially critical to Military personnel who are the victims of brain or spinal cord injuries during combat operations [4]. There are reasons to believe that primary CNS injury could accelerate development of AD or Parkinson's Diseases (PD) over time apart from post-traumatic stress disorders (PTSD) [5]. More often our young victims could also be critical following traumatic injuries to their CNS either following motor vehicle accidents or during combat operations in the battlefield [4]. All these young and old populations require a healthy life.

So far no suitable therapeutic strategies are successful in

TiO₂ nanowired delivery of stem cell to enhance the viability of the neurons following CNS trauma or heat stroke [5]. Also we employed TiO₂ nanowired Cerebrolysin with stem cell therapy to enhance the neuroprotective efficacy of this combination in several animal models of CNS trauma, PD and AD [5-10]. These preliminary observations clearly support the idea that in future therapy we may look new avenues to combine stem cells with nanotechnology in addition with key neuroprotective drugs e.g., cerebrolysin for the benefits of patients.

This is certainly a matter of future policy issues where healthcare representatives or lawmakers may formulate new laws to have better therapeutic advances in neurological disorders for the benefit of patients when using stem cell therapies.

We are happy that the new International Journal of Nanomaterials, Nanotechnology and Nanomedicine is devoted on all aspects of nanotechnology at the cutting edge of science to provide a novel synthesis of various aspects on nanoparticles research in this developing field. We are sure that the journal will soon become an important reference point for the researchers, students, healthcare professional, healthcare providers and policy makers for the benefit of mankind in near future.

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