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Editorial

Neurodegenerative Diseases: A Possible Therapeutic Approach!

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Accumulating evidences clearly suggest the involvement of structurally or functionally impaired neurons in the neurodegenerative diseases such as, Alzheimer's Disease (AD), Parkinson's Disease (PD), Huntington's disease, Niemann–Pick disease, fronto temporal dementia, and amyotrophic lateral sclerosis [1,2]. Dementia, uncontrollable movements of the body, depression, permeability of blood brain barrier, destruction of myelin sheath, damage of the axon, formation of glial scar, presence of inflammatory cells and lymphocytic infiltration can be observed in different neurodegenerative diseases [3-5]. Neurodegenerative diseases have been found to be implicated through various mechanisms that involve, protein misfolding, impaired protein degradation pathways (ubiquitin-proteasome, authophagy-lysosome pathways), damage in the cellular membranes, impaired cellular death processes, and dysfunctional mitochondria [6,7]. Of most importance, genetic factors (copy number variants and alternative splicing) and epigenetic factors (DNA methylation, histone modification and small nuclear RNAs) have also been found to be implicated in the pathogenesis of neurodegenerative diseases [8]. In association to the conventional techniques, the involvement of genetic and epigenetic factors in mediating AD and PD have been extensively studied using genome wide association studies and next generation sequencing [9]. These processes not only helped examining several mechanistic events in the pathobiology of the neurodegenerative diseases, but also provided a clear path to the future therapeutics. In those consequences, there have been several therapeutic approaches tested which showed improvements in the neuronal survival by amplifying neuronal functioning. However, the stem cell based therapies, cell replacement therapies, therapeutic gene transfers, medicinal chemistry-based strategies and nanotechnology related therapies also showed profound effects against neurodegeneration [10]. One of the interest, the use of exosomes, nano-vesicles ranges 40-100 nm, were found to be extensively useful in treating these disorders [2]. Due to the low immunogenicity, considerable drug loading potential, remarkable delivering properties and the ability to cross the blood brain barrier, these nano-vesicles are becoming primary choice as therapeutics for the researchers. The ability to transfer of nucleotide to the targeted area and possessing rejuvenating potentials, if derived from stem cells, also attracted scientific workers in the past few years [11].

Surprisingly, after decades of research in the field of neurodegenerative diseases, effective therapeutic candidates are still lacking. Hence, working with the new tools and techniques along with potential therapeutic molecules can assist us more on understanding the progression of these disorders, certainly to a major extent. Now, it's important to educate ourselves to the new model/ molecular systems and if combined with the traditional system, we can assuredly come up with the powerful remedy against various neurodegenerative diseases.

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