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Focusing the pivotal role of nanotechnology in Huntington's disease: an insight into the recent advancements

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Abstract

Neurodegeneration is the loss of neuronal capacity and structure over time which causes neurodegenerative disorders like Alzheimer, amyotrophic lateral sclerosis, Parkinson, and Huntington's disease (HD). This review is primarily concerned with HD, which was fully described by George Huntington in 1872. In developed countries, HD has become another common single-gene neurological disorder. Because of its autosomal dominant inheritance, the sickness affects both individuals and their families. Huntington disease has been recognized as a disorder that affects the complete body and brain in which the mutant huntingtin polyglutamine (polyQ) sequence is extensively increased and gets correlated to CAG trinucleotide which codes

for glutamine (Q). These proteins have characteristics that produce apoptosis and dysfunction. HD is a lethal condition which needs an immediate diagnosis and treatment, and therefore, nanoparticle has come into sight out as opportunistic strategies for treatment of HD. Nanostructures have great potential to cross the blood brain barrier and also prevent breakdown of active molecule and reduces the drug toxicity. This review explains the distinguishing symptoms, genetics, and stages during the development of Huntington's disease, and also provides an overview of HD with an emphasis on its epidemiology, pathogenesis, and management. This review focuses on the latest studies on nanotechnology-related technologies, i.e., magnetic nanoparticle, solid lipid nanoparticle, and polymeric nanoparticle for Huntington's disease treatment. The pioneering patents and in-progress clinical trials related to Huntington's disease has also been summarized in this review.

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