Nanocarriers for Alzheimer’s disease treatment: from bench to bedside

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Abstract

Alzheimer’s disease (AD) is a slowly developing neurodegenerative disease that is prevalent among the elderly. AD progression might start 20 years before symptoms are apparent. Several hypotheses were proposed to explain AD pathogenesis. Understanding the key players in AD neuropathogenesis helps identifying the possible therapeutic targets. AD could be managed via symptomatic or disease-modifying treatments. Symptomatic treatments improve memory and cognition; while disease-modifying treatments stop or slow down the disease progression. Recent advances in nanotechnology have provided superior opportunities in the management of AD. Loading a drug in a suitably formulated nanocarrier can increase drug accumulation in the brain via surface functionalization; increasing its blood-brain barrier crossing ability. In spite of the research ongoing for decades, the clinical trials on nanocarriers for AD drug delivery are very limited; hindering their transfer from bench to bedside. It appears that the nanotoxicity and large scale processibility challenge their success. In this presentation, different types of nanocarriers for AD management will be overviewed. Toxicity and scaling up aspects of these nanocarriers will be highlighted.