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Trending options in the treatment of Alzheimer's disease: Targets for drug development

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Alzheimer's Disease (AD) is a fatal, complex, neurodegenerative disease affecting over 5 million Americans as of 2014, with one new AD case being reported every 67 seconds in the United States. The annual cost for AD treatment is estimated to be approximately 172 billion dollars in USA and anticipated to soar to 1.1 trillion dollars by 2050. Currently, there are five FDA-approved Alzheimer's drugs that treat the symptoms of Alzheimer's — temporarily helping memory and thinking problems in about half of the people who take them. But these medications do not treat the underlying causes of Alzheimer's. To date, no truly efficacious drugs for Alzheimer's Disease (AD) have been developed; moreover, all new anti-AD drugs developed since 2003 have failed. To succeed where previous ones have failed in drug development, new approaches for AD therapy are needed. Here we discuss the potential application of network medicine as a new approach to AD treatment. Unlike traditional approaches that focused on a single target/pathway, network medicine targets and restores disease-disrupted networks through simultaneous modulation of numerous proteins (targets)/pathways involved in AD pathogenesis. We consider several drug candidates under development for AD therapy, including Keap1–Nrf2 regulators, endogenous neurogenic agents, and hypoxia-inducible factor 1 (HIF-1) activators. These drug candidates are multi-target ligands with the potential to further develop as network medicines, since they act as master regulators to initiate a broad range of cellular defense mechanisms/cytoprotective genes that exert their efficacy in a holistic way. We also explore their diverse mechanisms of action and potential disease-modifying effects, which may have profound implications for drug discovery.

Biography

Mohd Abdul Nafay Shoeb is an Undergraduate student of Deccan School of Pharmacy pursuing Doctor of Pharmacy (PharmD D V/VI), affiliated to Jawaharlal Nehru Technological University.

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