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New approaches and new targets in the pharmacotherapy of Alzheimer's disease

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Alzheimer's disease (AD) is a progressive and age related neurodegenerative disorder with cognitive, functional, and behavioral alterations. Disease-modifying therapies (DMTs) preventing or delaying the onset or slowing the progression of AD are urgently needed since the disease has shown an alarming rise in the global population. Current pharmacotherapy of AD is limited to acetylcholinesterase inhibitors (AchEIs-donepezil, rivastigmine, galantamine, tacrine) and the NMDA antagonist memantine, and these drugs do not provide satisfactory results, beyond delaying the progression of the disease. AChEIs were found to be efficacious for the treatment of mild to moderate AD whereas memantine was used for moderate to severe AD treatment. Other medications including beta-and gamma-secretase inhibitor, anti-inflammatory agents (aspirin, indometacin, and sulindac), cholesterol-lowering medications, and antioxidants also have limited efficacy and some are not safe in long-term use. Treatment with AChEIs or memantine provide symptomatic short-term benefits without counteracting the progression of the disease, whereas drugs under development are intended to modify the pathologic steps leading to AD. DMTs aim to interfere with the amyloid beta peptide, including vaccination, passive immunization, and tau deposition. Among various therapeutic approaches, stem cell-based therapy (ie, neural stem cells, mesenchymal stem cells, and embryonic stem cells) and gene-based therapies (such as NGF, BACE1, NEP, BDNF, and IL-10) has emerged interesting tools in AD therapy. Stem cells can improve neural disorders through different mechanisms such as immunomodulation, neuroprotection, damaged cells replacement, and trophic and angiogenic effects.It has been demonstrated that different genes including NGF, presenilin, and APOE are involved in pathology of AD, and interfering with their expression presents therapeutic effects. Gene transfer strategies to the brain is an interesting strategy for treating neurological disorders and targeting of various genes could provide an effective therapeutic platform in the treatment of AD.

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Biography

Kydret Esen Gumuslu has graduated from Medical School of Marmara University and completed her PhD in the field of Medical Genetics and Molecular Biology. She has experience in clinical genetics, array CGH analysis and next generation sequencing. She has research experience in genetics of CNS disorders.

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