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Getting into the brain: Potential of nanotechnology to manage neuro-AIDS and drug addictions

Madhavan Nair*Florida International University, USA*

2014 report suggests that, more than 36.9 million people are living with HIV/AIDS in the world today that includes more than 1.2 million people from US. Current studies also show that more than 247 million people are affected with substance abuse in the world that includes more than 24 million Americans. Reports also show that more than 3-4 million people are co-affected with HIV and illicit drug use. Although Highly Active Anti-Retroviral Therapy (HAART) has resulted in remarkable decline in the morbidity and mortality in AIDS patients, inadequate delivery of HIV drugs across the Blood-Brain Barrier (BBB) to the brain results in HIV persistence. Drugs of abuse such as opiates act synergistically with HIV-1 to potentiate the HIV-related neurotoxicity that leads to development of neuro-AIDS. In recent years, use of nanotechnology has shown exciting prospect for development of novel drug delivery systems. We herein report the development of a Magneto-Electric Nanocarrier (MEN) to deliver and release on demand of HIV drugs and opiate antagonist, which are otherwise impenetrable to brain and inhibit HIV and reverse opiate mediated adverse neurological effects. The proposed nanocarrier is anticipated to simultaneously reduce Neuro-AIDS and opiate addiction in HIV-1 infected opiate addicts. Further, this invented/patented new technology will have universal applicability for targeting and controlled release of drugs against a variety of other CNS diseases such as Parkinson's, Alzheimer's, brain tumors, etc.

nairm@fiu.edu