Keegan Braz Gomes et al., J Clin Cell Immunol 2017, 8:5 (Suppl)
DOI: 10.4172/2155-9899-C1-039

Immunotherapeutic approaches for the treatment of drug addiction

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In recent years, there has been an increase in the abuse and addiction of designer recreational drugs, such as MDPV (Methylenedioxypyrovalerone) and alpha-PPP (α-pyrrolidino propiophenone). These psychostimulant drugs, more commonly referred to as "bath salts", are synthetic cathinones seen as a cheap alternative to other stimulants such as methamphetiamine and cocaine. Bath salts can result in many adverse effects including increased heart rate, depression and death. In order to combat the abuse of bath salts, we developed a therapeutic microparticulate vaccine to reduce the effects of various psychostimulant drugs/their analogs on the brain. We characterized the drug taking effect as an increase in locomotory activity. Mice were injected with varying doses of the drug to establish a dose-effect curve for locomotory activity. Next, we formulated the anti-drug vaccine using two approaches: drug encapsulation within BSA (bovine serum albumin) matrix and creating microparticles and drug conjugation to BSA and creating microparticles. After vaccination, using the dose-effect curve as a guide, we injected the mice with the pure drug and correlated the changes in locomotory activity to vaccine efficacy for both approaches. Effective immunization across doses would result in a decrease in locomotory activity indicating a production of antibodies that bind specifically to the drug thereby, neutralizing the effects of the drug on the body. We will validate antibody response (innate and adaptive) and production using a series of *in vitro* studies including nitric oxide assays and anti-drug binding ELISAs.

Biography

Keegan Braz Gomes has completed his Bachelor's degree in Biology from University of Massachusetts, Amherst and is currently a PhD Candidate in Pharmaceutical Sciences at Mercer University.

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