

12th Asia Pacific Global Summit and Expo on

Vaccines & Vaccination

November 24-25, 2016 Melbourne, Australia

Utilizing novel nanoparticles for DNA vaccine delivery

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Most DNA vaccines are effective in eliciting immune responses without any side effects. The main criterion for a successful DNA vaccine is to have an efficient delivery system which can deliver it safely to the target cells. There are several successful delivery systems for DNA vaccines till date; however no standard system is in place. For effective DNA vaccination, targeting antigen presenting cells would be important. In this proof of concept study two novel delivery systems: Yeast transposon virus like particles (Ty-VLPs) and Solid lipid nanoparticles (SLNs) were chosen to study their potential to carry DNA vaccines *in vitro* to dendritic cells using eGFP plasmid as the reporter plasmid. Ty-VLPs are transposition vehicles in *S. cerevisiae* and were also observed to perform the same function *in vitro*. Ty-VLPs were purified and plasmid DNA conjugated with them. These complexes were transfected into DC 2.4 cells and analyzed by flow cytometry for GFP expression. The transfection efficiency of these complexes was shown to increase compared to plasmid alone. The effect of incubation time for complex formation on transfection efficiency was also studied. Positively charged Solid lipid nanoparticles were synthesized and conjugated with DNA to form complexes. It was shown that there is a 10 fold increase in the transfection rate using these complexes in DC 2.4 cells over plasmid alone and is comparable to that mediated by lipofectamine.

Biography

Alekhya Penumarthi is currently a PhD student in Prof. Peter Smookers' Biotechnology lab in RMIT University, Australia. She has completed her Master's degree in Virology from Sri Venkateswara University, Tirupati, India. She also works as a Teaching Assistant for masters and undergraduate students in RMIT University.

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