**Polymeric lipid nanoparticles encapsulating a synthetic peptide as an efficient cancer nanovaccine system**

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**Introduction**

Cancer immunotherapy, including cancer vaccines, are being projected as the perfect anti-cancer therapy solution (Takagi 2017), (Matsui 2014), (Kawano 2014) . The basis of cancer immunotherapy lies in the fact that specific T cells recognize MHC molecules which present tumor-associated antigens (TAAs). Though a large percentile of cancer patients carry such TAAs-specific T cells, they fail to control tumor growth. Enhanced tumor‑specific T cell response with improved overall antitumor immunity, can be achieved by vaccination with TAAs. Synthetic tumor-antigen peptides have greatly enhanced the possibility of developing effective cancer vaccines. However, cancer vaccines tested so far have shown suboptimal results, one reason being the poor immunogenicity of antigen-peptides. Nanomedicine, owing to their superior physico-chemical properties (Mohamed 2019) offers scope to improve the efficacy of these vaccines.

**Methods**

In the present study, we used antigens (An HLA-A\*0201-restricted CTL epitope) encapsulating polymeric lipid nanoparticles (PLNs) (Mohamed 2014) for serving the purpose of cancer vaccine in transgenic HHD mice.

**Results**

The nanoconjugates successfully induced antigen-specific CD8(+) T-cells and CTLs in HLA-A\*0201-transgenic HHD mice. The induced CD8 T cells also recognized endogenously antigen expressing RMA-HHD tumor cells and inhibited their growth in HHD mice. The results demonstrated that the peptide encapsulating PLNs were effective in peptide-specific CTL induction, as well for clearance of a significantly higher percentage (~80%) of antigen expressing tumor cells, suggesting that this system might offer an effective CTL-based vaccine against cancer.

**References**

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