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Development and characterization of a microparticulate vaccine formulation for metastatic breast cancer

Rokon Uz Zaman, Rikhav P Gala, Nihal S Mulla and **Martin J D'Souza**
Mercer University, USA

Breast cancer is the most fatal form of cancer in females. Even with early diagnosis, 20% of women still develop metastases. Immunotherapy is being explored to provide a better treatment option, as current therapies against breast cancer are mostly invasive and pose numerous adverse effects. With this in mind, our purpose has been to formulate and evaluate a micro particulate therapeutic vaccine to provide a new line of therapy for metastatic breast cancer. Murine breast cancer cell line 4T1 was used as source of antigens. Vaccine microparticles were prepared by encapsulating 4T1 tumor associated antigens in cellulose polymer using spray dryer technology. Total protein concentration of the whole cell lysate was determined by Bio-Rad total protein assay. *In vitro* characterization of microparticles was conducted. *In vitro* innate immune response was determined by performing nitric oxide assay. Expression of surface co-stimulatory molecules on dendritic cells treated with vaccine microparticles and other controls were determined by flow cytometer using different markers (CD40, CD80, MHCI and MHC II). The yield of the microparticulate vaccine, following spray drying was 80±5% w/w. Total protein content of whole cell lysate was 3.48±1.25 mg/mL. The particle size was 1-4 μm. Zeta potential was -7±2 mV. There were significantly higher amount of nitric oxide released in the supernatant of cells exposed to vaccine microparticles compared to blank microparticles. CD40, MHC II and CD80, MHC I expression were significantly higher in the vaccine microparticles group compared to blank microparticles and vaccine suspension group.

Biography

Rokon Uz Zaman is working as a PhD Student in the Department of Pharmaceutical Sciences, Mercer University, Atlanta. He has completed his MS in Microbiology from University of Dhaka, Bangladesh. As a Graduate Student in the Vaccine Nanotechnology Laboratory at Mercer University, his research is focused on targeted drug delivery using nanoparticulate vehicles..

rokonuz.zaman@live.mercer.edu

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