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Martin J D'Souza

Mercer University, USA

Immuno-strategies for cancer treatment including novel particulate cancer vaccines

This talk will focus on the trials and tribulations of immune-strategies for cancer treatment, with special emphasis on the design and delivery of novel particulate cancer vaccines. Some of the innovative particulate vaccines under study for cancer are vaccines for a) breast, b) melanoma, c) ovarian, d) prostate cancer vaccines. The vaccine particulate formulations resulted in reduced tumor growth when compared to non particulate vaccines. We also report on the effect of adjuvants such as Alum, MF-59 and MPL on enhancing the potency of these vaccine proto-types. Microparticulate vaccine was prepared by entrapping whole cell lysate of tumor-associated antigens (TAAs), in a polymer matrix of albumin and biodegradable polymers using a Buchi mini spray dryer. Animals were exposed to tumor cell and once the tumor was palpable, these animals received the vaccine microparticles as prime and boosters via transdermal route through microneedles. The tumor growth was routinely monitored with the use of a Vernier Caliper or through imaging on a whole body infra-red bio-imager. Mechanistic studies such as natural killer cell activity, CD8+ and CD4+ T-Lymphocyte activity after vaccination were also carried out in order to study the mechanism by which the vaccine works to modulate immune response. For these mechanistic studies, studies, different organs such as draining lymph nodes, bone marrow, and spleen of mice were extracted and single cell suspensions were prepared. Flow cytometric analyses for CD8 and CD4 T-cell assays, NK-cell activity were carried out to assess vaccine efficacy. Based upon the vaccine response data, the tumor retardation was found to be significant after transdermal administration. Vaccination using individualized tumor cells may prove to be an efficient treatment for patients in the future. Novel delivery of microparticulate vaccines such as transdermal delivery using microneedles and laser ablation, nasal delivery, buccal delivery, and oral delivery of vaccines, amongst others, will also be discussed.

Biography

Martin D'Souza obtained his Ph.D. degree from the University of Pittsburgh, PA, USA. He is a Professor & Director of Graduate Programs in the College of Pharmacy at Mercer University in Atlanta, Georgia. He also serves as the Director of the Clinical Laboratory and Co-Director of the Center for Drug Delivery Research. He is the co-founder of Drug Delivery Therapeutics (DDT), LLC. Dr. D'Souza has graduated over 50 Ph.D. students and has published over 100 manuscripts. He has been the recipient of several research grants from the National Institutes of Health (NIH), the American Diabetes Association, the Georgia Cancer Coalition, Georgia Research Alliance. He serves on several Editorial Boards and is a Journal Reviewer for over 10 Scientific Journals and has several patents issued in the area of Nanotechnology.

DSOUZA_MJ@mercer.edu

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