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Antibody-functionalized nanoparticles for targeted delivery to lung cancer

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Abstract

Non-small cell lung cancer (NSCLC) is the leading cause of cancer deaths in the United States and the world with a 5 year survival rate of only 15% for all stages combined. The cure rate remains <15% despite some recent advances in chemotherapeutic agents. The size and distribution of NSCLC makes cytoreductive surgery ineffective. Consequently, chemotherapy and/or radiation have been the treatments of choice. Nevertheless, toxicity still remains a major issue with the use of chemotherapy. This toxicity is most often the result of unexpected uptake of these chemotherapeutic agents by normal tissues. The need for increased potency and selectivity in chemotherapy is therefore of high importance in order to more fully harness the benefit of this modality of cancer treatment.

My laboratory has spent the last few years investigating the use of antibody functionalized nanoparticles as a means of optimizing drug delivery to cancer cells while avoiding normal cells. Nanoparticles of different sizes were functionalized with anti-HER-2 monoclonal antibody (Herceptin) by covalent reaction. These nanoparticles were characterized using PCS, SEM, mass spectroscopy and immunofluorescence. Release kinetics of loaded drugs was elucidated. The ability to selectively deliver payload to cancer cells while avoiding normal was assessed in vitro using different lung cancer cells (A549, H460 and calu-3) in comparison to normal cells MRC-5. In vivo distribution of this nanoparticle formulation was assessed using lung cancer mouse models. The results of our findings from this exciting research will be presented at the conference.

Biography

Sunday Shoyele completed his Ph.D from Bradford University in the UK and postdoctoral studies from Royal College of Surgeons in Ireland. He is an Assistant Professor of Pharmaceutics at Thomas Jefferson University, Philadelphia. He gathered industrial experience as a Formulation Scientist at 3M HealthCare in the UK before opting for academia. He has published more than 15 papers in reputed journals and has consistently delivered invited talk at reputed conferences. He acts as a manuscript reviewer for many drug delivery journals.