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Optimization of particles size for lung specific drug delivery by way of microspheres

Sree Harsha, Anroop Nair, Bandar E Aldhubiab, Mahesh Attimard, Ibrahim Alhaider and Venugopala Narayanaswamy
King Faisal University, Saudi Arabia

Cancer is a major cause of death in developed countries. Conventional drug delivery including oral, inhalation/parenteral chemotherapeutic agents are highly toxic, and destroy not merely normal tumor cells but also affect rapidly dividing healthy cells in the progression. This leads to a range of side effects due to interaction with other healthy tissues, such as fatigue, infections, nausea, vomiting, multidrug resistance and prevalence of drug interactions with OTC-drugs. The cure rate with newer anticancer agents in long term therapy is low (14%) and not satisfactory. Strictly speaking, it is not yet possible to 'cure' cancer till date. We have proposed to improved drug delivery strategies using existing drugs formulating into biodegradable microspheres by optimizing the size of the particles which can be used for lung targeting. Carbopol microspheres of Methotrexate (MxtCM), a drug used in the treatment of lung cancer, were prepared using Buchi B-90 nano spray-drier. The surface morphology was found to be shriveled to nearly spherical, with an average size of 8.6 μm . The drug loading and percentage yield was found to $77 \pm 0.3\%$ and $89 \pm 0.4\%$ respectively. *In vitro* release indicated Baker and Lonsdale model, the release pattern was swelling and diffusion, the total methotrexate release after 12 h was 98.2% from MxtCM, while for the pure drug was 94.2% in 0.5 hr. Liquification was witnessed during stability studies at 37°C and RH 75%. This study concludes optimizing the size of microspheres for lung targeting.

Biography

Sree Harsha received his Master of Pharmacy Degree and subsequently earned a Doctorate in Pharmaceutics from Rajiv Gandhi University of Health Sciences, Bangalore, India in 2006. He came to King Faisal University in 1997 as an Assistant Professor in the Department of Pharmaceutical Sciences, bringing with him several years' worth of teaching experience in fundamentals of pharmaceutics and drug delivery systems. His primary area of focus is on pharmaceutical technology and novel/targeted drug delivery systems. He has contributed so far to 23 peer-reviewed full papers on a variety of topics in lung targeting, topical drug delivery, and mucoadhesive drug delivery systems, also has contributed in writing a book chapter titled "Targeted Drug Delivery System" and "Microspheres" in Textbook of *Industrial Pharmacy*, Publisher-Orient Longman Private Ltd. In addition he is an Ad-hoc reviewer for scientific journals.

harsha1975@gmail.com