OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Pharmaceutics & Novel Drug Delivery Systems
April 08-10, 2013 Hilton Chicago/Northbrook, USA

Development of oral extended-release drug formulations for cancer epigenetic therapy

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Oral anticancer drug formulations are considerably favorable not only for patient adherence, but also for ease of administration. The main objective of the present research was to develop extended-release capsule formulations containing histone deacetylase inhibitor (HDACI) sulforaphane-encapsulated albumin microspheres. Albumin-based polymeric microspheres were evaluated as a potential platform technology for providing extended-release of oral dosage formulations. Epigenetic agents, such as HDACIs, have emerged as a promising treatment modality since this approach does not alter the principal DNA sequence. Rather, HDACI reverses the aberrant epigenetic modifications in tumor cells. Bovine serum albumin microspheres were prepared by spray drying and characterized for their physicochemical properties. Scanning electron microscopy (SEM) was used to analyze the size, surface morphology, and size distribution of the drug-loaded microspheres. Zeta potential measurements were carried out to assess the surface properties and stability of the microsphere formulations. Dissolution studies were conducted to analyze the release profiles of the microspheres and capsule-containing microsphere drug formulations. SEM analysis indicated that microspheres were less than 2-μm in size, which is considered to be optimal for uptake by the enterocytes. The average Zeta potential measurements were approximately -30 mV. Additionally, the data showed that microspheres, which contained 1% BSA and 0.1% glutaraldehyde, provided a drug release profile that is desirable for cancer epigenetic therapy. Both microsphere and capsule-encapsulating microsphere formulations were shown to provide extended-release of the drug over 36 hours. Thus, capsules containing biodegradable microspheres show potential for effective delivery of oral drug formulations.

Biography

Duc P Do is an Assistant Professor of Pharmaceutical Sciences at Chicago State University College of Pharmacy (CSU-COP). Prior to joining CSU-COP, Dr. Do was Assistant Professor of Pharmaceutical Sciences at LECOM, School of Pharmacy. He received his B.S. from the University of Georgia and his Ph.D. in Pharmaceutical Sciences from Mercer University. His research interests are in the areas of drug delivery systems and microencapsulation technology. Dr. Do has published in these areas and has presented at national conferences. He is member of several scientific editorial boards and has served as a reviewer for several scientific journals.

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