Supriya Verma, J Clin Trials 2018, Volume 8
DOI: 10.4172/2167-0870-C3-029

7th International Conference on **Clinical Trials**
&
12TH World CADD & Drug Delivery Summit
September 24-26, 2018 | Chicago, USA

Copolymer based carrier system of Risedronate for the target-specific (bone) delivery with enhanced efficacy, safety, and compliance

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Aim: The study was intended to develop a copolymer based carrier system of drug Risedronate (RIS) for its effective bone delivery at the target site for the treatment of osteoporosis (porous bone disease).

Summary of The Problem: Risedronate is an FDA-approved third-generation bisphosphonate drug which acts as an antiresorptive agent in the treatment of osteoporosis. It is a versatile drug molecule, which has been used for the treatment of postmenopausal osteoporosis, glucocorticoid-induced osteoporosis, male osteoporosis and Paget's disease. It is available in the market as oral tablet dosage forms but has some challenges like patience in compliance, low drug permeability and is prone to metal chelation, which leads to GIT irritation.

Methodology & Theoretical Orientation: The chosen drug (RIS) was entrapped in a copolymer based carrier system, which consists of chitosan, Tripolyphosphate (TPP) and eudragit. Chitosan and eudragit copolymer based nanoparticles were prepared by using ionic gelation followed by the coacervation method.

Observations: The prepared system has been characterized by particles size, PDI, zeta potential and entrapment efficiency, which were found as 272.8 nm, 0.184, 17.9 mV and 77.05 % respectively. FTIR studies proved the user interaction of the drug with the polymeric shells of the system. Moreover, it's in vitro release has been carried out in various pH media, i.e., 1.2, 6.8 and 7.4 and was found tremendously better than the conventional system. In ovariectomized rat (in vivo) model, its efficiency and safety were proved 7 times and 10 times of the conventional system respectively. Moreover, the formulation was found stable for the period of six months.

Summary & Conclusion: Hence, this is a simple, commercial and easy to scale up method for the preparation of novel drug delivery based nanoparticle system of our choice of drug, i.e., Risedronate

Biography

Supriya Verma has been engaged in experimental laboratory work that includes formulation development, in vitro characterization and in vivo evaluation of the novel drug delivery based formulations i.e., liposomes, niosomes, solid lipid nanoparticles, nanostructured lipid carriers, etc. Her area of research is based on the systematic design and development of a nanostructured delivery system of Aceclofenac and Risedronate. In the last four years of research experience, she has got wonderful exposure on topical and oral drug delivery systems in an industry (Panacea Biotech, Lalru) as well as in an academic institute (University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh). She has not only involved in the research but also undertaking the teaching of Undergraduate and Postgraduate classes. Moreover, she is having collaboration with medical institutes i.e., PGIMER, Chandigarh and AIIMS, New Delhi for the assistance of clinical studies over there. Also, she is writing research articles and book chapters related to her professional domain. She has attended various National as well as International level conferences and been awarded six best paper awards in the last four years...

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