Acta Scientific Pharmacology (ASPC)

Volume 1 Issue 6 June 2020

Short Communication

# Nanoparticle based Drug Delivery Systems for the Controlled Release of Antihypertensive Drugs

**Sindhu Subramanian***

*Assistant Professor, Department of Chemical Engineering and Materials Science, Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham, India*

***Corresponding Author:** Sindhu Subramanian, Assistant Professor, Department of Chemical Engineering and Materials Science, Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham, India.

**Received:** March 26, 2020

**Published:** May 20, 2020



Elevated blood pressure significantly increases the risks of non-communicable diseases such as cardiovascular, nervous and renal related problem. 1.13 billion people worldwide are estimated to have hypertension in which two-thirds were living in under-developing and developing countries. One of the global targets mentioned by WHO is to reduce the prevalence of hypertension by 25% before 2025. Various antihypertensive agents such as Calcium channel blockers, thiazide diuretics, angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) and ß-blockers are used to treat hypertension. Among these, Calcium channel blockers have shown best effect to reduce hypertension compared to the other recommended agents.

Drug delivery is the method or process of administering a pharmaceutical compound to achieve a therapeutic effect in humans or animals. For the treatment of human diseases, oral tablet sustained release drug delivery systems is of much interest to the pharmaceutical scientists as these systems provide prolonged duration of action of drugs having short biological half-life, and reduce dose-related toxicity, dosing frequency, and patient non-compliance. It is observed that the efficiency of most drug delivery systems is directly related to particle size (excluding intravenous and solution). Due to their small size and large surface area, drug nanoparticles show increase solubility and thus enhanced bioavailability and provide a controlled release of medication from a single dose.

Nitrendipine, a water insoluble dihydropyridines calcium antagonist has less oral bioavailability because of high first-pass metabolism. To increase the bioavailability, grafted copolymers are used. Chitosan is a cationic linear polysaccharide. It is composed essentially of (1 → 4) linked glucosamine units with some pro-portion of N-acetylglucosamine units. It is mainly obtained by extensive deacetylation of chitin. Chitosan grafted hydrophilic polymers nanoparticles have achieved more consideration as drug delivery carriers due to their low toxicity, better stability, simple and mild preparation method, and providing adaptable routes of administration.

Nanoparticles made from chitosan grafted acrylamide by solvent evaporation method is used to encapsulate the drug. Characterization such as SEM and FTIR are done to check the dispersion and the presence of drug in the nanoparticle. *In-vitro* drug release studies are carried out to determine the drug release mechanism.