OBJECTIVE OF PRESENT WORK:

The current challenges faced by the pharmaceutical formulator are solubility, oral absorption and stability both in vitro and in vivo that can be overcome through the development of new drug delivery systems like polymersomes. Globally almost 80 million adults, one in three, suffer from one or more forms of cardiovascular disease. Inspite being a global faced problem, cardiovascular diseases are not as much benefited from nanotechnology in terms of drug delivery (other then molecular imaging) as the field of cancer, tumor and others. There are still unmet aspects of cardiovascular drug delivery that need to be worked upon, hence cardiovascular disorders were aimed to be sought out by application of nanotechnology in this study.

Felodpine is used as antihypertensive drug has poor water solubility and hence poor dissolution and with a bioavailability of 15% after oral administration. It undergoes extensive first-pass metabolism. The major drawbacks in the therapeutics application and efficacy of felodipine as oral dosage form is its low aqueous solubility. The rate of dissolution can be increasing the surface area of available by various methods like micronization, complexation, solid dispersion etc. But these approaches have many disadvantages like chemical or thermal instability, in solid dispersion large amount of carriers are used hence large volume dosage form will be formed for drug. Complexation, this technique is not suitable for drugs which are not soluble in both aqueous and organic solvent.

Polymersome is a bilayer structure, which encloses an aqueous interior as opposed to lipid vesicles, polymersomes are considered to be more rigid, stable and versatile. Polymersomes in particular have received increased scientific attention due to improvements in polymer modifications either by physical blending or chemical synthesis. These modern techniques allow precise control over the properties of the copolymer molecules & thereby tuning the properties of the polymersomes as well. For instance, the thickness & mechanical stability, permeability, fluidity, deformability of the vesicle membrane. Polymersome has potential in multi-drug therapy and its attractiveness as a carrier for wide range of hydrophilic & hydrophobic drugs.
Hence polymersome formation of felodipine was aimed at improving the physicochemical properties at nanoscale, modulating its release characters as controlled drug delivery in cardiovascular disorders.

In recent years, although the search for a clinically successful ideal carrier is ongoing, sustained-release systems, such as nanoparticles, liposomes, and hydrogels, are being extensively studied for targeted drug delivery purposes. The advantages associated with long-acting preparations include a longer effect of the drug in the action site and a reduced risk of infection due to numerous injections consequently.

Mefenamic acid (MA) is a potent nonsteroidal anti-inflammatory drug (NSAID) It is highly prescribed in the treatment of rheumatoid arthritis, osteoarthritis, and other joint diseases. However, its oral bioavailability is very low, probably due to poor solubility in water and insufficient dissolution rate. MA also acts as an irritant to the gastrointestinal mucosa when administered orally & its half life is 2 hours which requires frequent dosing. Hence, the present work aimed at formulating intra-articular polymersomes which had potential for targeting drug delivery to affected tissues in treating arthritis.