Chapter-3
Objectives and Plan of work
3. OBJECTIVES AND PLAN OF WORK

3.1. Motivation

Cancers figure among the leading causes of morbidity and mortality worldwide. Although, chemotherapy is one of the most widely used method against cancer, its clinical application is limited by low selectivity towards the cancerous and non-cancerous cells. Targeted delivery systems are thus preferred, to improve the therapeutic indices of the anti-cancer drugs both by increasing the selectivity and decreasing toxicity. Drug-loaded nanoparticles of bio-degradable polymers can be delivered to specific sites by active targeting through conjugation of targeting molecules.

3.2. Objectives

The primary objective of the study was to design and evaluate a tumor targeted nanoparticle drug delivery system.

Figure 3.1. Active targeting of drug by nanoparticle drug delivery system
The secondary objectives were

- To synthesize polymer-ligand conjugates
- To optimize the formulation variables
- To characterize the formulated nanoparticles
- To carry out *in vitro* drug dissolution studies of the developed formulations and to identify the release kinetics
- To find out cytotoxicity of formulated nanoparticles
- To analyze the *in vitro* cell uptake of the new formulation
- To study the cell cycle arrest by flow cytometry.
3.3 PLAN OF WORK

- Review of Literature
- Synthesis of PLGA- Folic Acid and PLGA-Transferrin conjugates
- Pre-formulation studies
- Formulation of polymeric NPs by solvent evaporation method
- Pre optimization, and optimization of the formulation
- Characterization of optimized formulation
- In vitro drug release study
- Cyto toxicity analysis
- In vitro cell uptake studies
- Cell cycle analysis
- Stability studies