3. OBJECTIVE AND PLAN OF WORK

3.1 Aim and Objective

Human immunodeficiency virus (HIV) is a lentivirus and a member of the retrovirus family. On average, it takes more than 10 years to progress from initial HIV infection to AIDS. The latest statistics of the global HIV and AIDS were published by UNAIDS in November 2011, and refer to the end of 2010. At the end of 2010, an estimated 34 million people [31.6 million–35.2 million] were living with HIV worldwide. This reflects the continued large number of new HIV infections and a significant expansion of access to antiretroviral therapy, which has helped reduce AIDS-related deaths. A total of 2.5 million deaths have been averted in low- and middle-income countries since 1995 due to Antiretroviral therapy being introduced, according to new calculations by UNAIDS.

NNRTIs in combination with nucleoside/nucleotide reverse transcriptase inhibitors (NRTI/NtRTIs) are highly effective in suppressing HIV replication. In particular, Nevirapine and Ritonavir are recognized as cornerstones of HIV therapy.

The aim of the present work is to use PEGylated dendrimer, the nanostructures that can be precisely designed and synthesized for a wide variety of applications. The aim of the present work is to develop UV-Method development and improve the solubility and dissolution rate of Ritonavir.
The main objective of study is to investigate whether PEGylated dendrimer could be used as a carrier for delivery of anti-viral agent. The study was to develop a pharmaceutically equivalent, stable, cost effective and quality improved formulation of Nevirapine to present it in the form of IV bolus formulation (sustained release).

The main objective of the study is to enhance the solubility of Ritonavir using PEG 4000. The study was to develop a pharmaceutically equivalent, stable, cost effective and quality improved formulation of Ritonavir.

3.2 Plan of Work

With the above mentioned aims and objectives, the work was planned as follows:

**PHASE A**
1. Literature Survey and Selection of Anti-HIV Drugs
2. Identification and Preformulation Studies of Nevirapine & Ritonavir.
   - ✓ Melting point
   - ✓ FT-IR studies
   - ✓ DSC analysis

**PHASE B**
1. Selection of Dendrimer Based on Preformulation Studies.
   A. Synthesis of Dendrimer
Chapter – 3

Objective and Plan of Work

A.1 Synthesis of G1.5 Citric acid Dendrimer
A.2 Synthesis of G2.5 Citric acid Dendrimer
A.3 Synthesis of G3.5 Citric acid Dendrimer
A.4 Synthesis of PEGylated citric acid dendrimer

B. Determination of physical properties of Dendrimers

✓ Melting point
✓ FT-IR studies
✓ DSC analysis
✓ NMR Studies
✓ Morphology

3. Formulation of Anti-HIV Drug Loaded Dendrimer.

4. Optimization of Formulations by Following In Vitro Studies
   a. Drug Loading and Entrapment Studies
   b. Thermal Stability of Formulations Using Differential Scanning Calorimetry
   c. In Vitro Drug Release Studies
   d. Stability studies

5. In Vivo Studies of Anti-HIV Drug loaded Dendrimer.
   a. Blood Level Studies

6. Selection of Suitable Formulation from the Above Studies and statistical analysis
PHASE C

**PEGylated formulation of Ritonavir**

- Development of UV-method for Ritonavir
- Enhancement of solubility of Ritonavir using PEG 400 as solubilising agent
- *In vitro* release studies
- DSC Analysis
- FT-IR studies for compatibility studies
- *Stability studies*

**PHASE D**

Compilation of Data and Thesis Submission.