# Table of Contents

Chapter 1 Introduction and review of literature .................................................... 1
   Introduction ............................................................................................................. 1
   Ribozymes ................................................................................................................ 3
   DNAenzymes ........................................................................................................... 15
   Antisense oligonucleotides .................................................................................. 19
   siRNA ...................................................................................................................... 20
   Human Immuno deficiency Virus ...................................................................... 23
   HIV structure and genome .................................................................................. 24
   HIV-1 Auxillary proteins ..................................................................................... 26
   HIV-1 Replication cycle ........................................................................................ 40
   Chemokine Receptors as HIV coreceptor ........................................................... 41
   Other genes targeted as an antiviral approach against HIV-1 ...................... 48

Chapter 2 Materials & Methods .............................................................................. 50
   Materials required ................................................................................................ 50
   Methods .................................................................................................................. 52

Chapter 3 DNA-enzyme, Ribozyme and siRNA-Rz bispecific construct against CXCR4 and modulation of its expression by antisense ODNs .......... 63
   Experimental Procedure ...................................................................................... 67
   Results ..................................................................................................................... 78
   Discussion .............................................................................................................. 96

Chapter 4 To determine and design various DNA-enzymes against Vpr gene of HIV-1 subtype B and C ................................................................. 101
   Experimental Procedures ................................................................................... 102
Results ................................................................................................................... 110
Discussion ............................................................................................................ 114
Chapter 5 Comparative functional study of Vpr gene derived from HIV-1 subtype B and C ...................................................................................................... 117
Experimental Procedure .................................................................................... 119
Results ................................................................................................................... 121
Discussion ............................................................................................................ 124
Chapter 6 Genetic and Functional Characterization of HIV-1 VprC Variants from North India ..................................................................................................... 126
Introduction ......................................................................................................... 126
Experimental Procedure .................................................................................... 130
Results ................................................................................................................... 133
Discussion ............................................................................................................ 141
Chapter 7 Summary & Conclusions .................................................................... 145
References ................................................................................................................ 149
Abbreviations .......................................................................................................... 188