# Table of contents

## Chapter 1

Introduction  

## Chapter 2

**Review of literature**  

2.1.  History  
2.2.  Structure and genome  
2.3.  Physicochemical properties  
2.4.  Coding assignments and proteins  
2.5.  Classification and strain diversity  
2.6.  Replication  
2.7.  Epidemiology  
2.8.  Host Range  
2.9.  Clinical symptoms and diagnosis  
2.10.  Propagation in cell culture  
2.11.  Animal model  
2.12.  Pathogenesis and pathophysiology of rotavirus infection  
2.13.  Immunity against rotavirus  
   2.14.1.  Oral Rehydration Therapy (ORT)  
   2.14.2.  Antidiarrheal agents  
   2.14.3.  Probiotics  
   2.14.4.  Active immunization - rotavirus vaccines  
   2.14.5.  Passive immunization  
      2.14.5.1.  Human serum immunoglobulins  
      2.14.5.2.  Bovine colostral antibodies  
      2.14.5.3.  Llama antibodies  
      2.14.5.4.  Chicken egg yolk antibodies  
         2.14.5.4.1.  Structural characteristics  
         2.14.5.4.2.  Biochemical properties  
         2.14.5.4.3.  Advantages of using egg as source of antibody
2.14.5.4.4. Prophylactic and therapeutic uses of egg yolk antibodies against infectious diseases

Chapter 3
Exposition of the study

Chapter 4
Preparation of egg yolk antibodies against human rotaviruses (HRVs)
4.1. Materials and methods
   4.1.1. Cells and viruses
   4.1.2. Antigen capture ELISA
   4.1.3. Infectivity assay
   4.1.4. Purification of virus stocks
   4.1.5. Protein estimation
   4.1.6. Preparation of immunoconjugate
   4.1.7. Generation of anti-HRV egg yolk antibodies (anti-HRV IgY) in hens
      4.1.7.1. Immunization of hens and collection of immune eggs
      4.1.7.2. Purification of IgY from immune eggs
      4.1.7.3. ELISA for detection of anti-HRV IgY in serum and egg yolk
4.2. Results
   4.2.1. Virus stock
   4.2.2. Anti-HRV IgY responses in serum and egg yolk of immunized hens
4.3. Discussion

Chapter 5
Determination of in-vitro neutralizing activity of anti-human rotavirus egg yolk antibodies (anti-HRV IgY)
5.1. Materials and methods
5.2. Results
5.3. Discussion
Chapter 6
Assessment of in-vivo protective efficacy of anti-human rotavirus egg yolk antibodies (anti-HRV IgY) against rotavirus induced diarrhea in infant mouse model

6.1. Establishment of human rotavirus diarrhea in infant mice 52

6.1.1. Materials and methods 52
  6.1.1.1. Virus and cells 52
  6.1.1.2. Animal inoculation and clinical observations 53
  6.1.1.3. Collection and processing of tissue samples 53
  6.1.1.4. Histopathology and immunohistochemistry 54
  6.1.1.5. ELISA 56
  6.1.1.6. Real time PCR 57
  6.1.1.7. In-vitro neutralization assay 58

6.1.2. Results 59
  6.1.2.1. Clinical status of the mice inoculated with rotavirus 59
  6.1.2.2. Pathological changes in different parts of the small intestine 60
  6.1.2.3. Viral shedding in diarrheic stool 63
  6.1.2.4. Distribution of rotaviral RNA in the small intestine 63
  6.1.2.5. Immunolocalization of rotavirus antigens in the ileum 64
  6.1.2.6. Detection and titration of anti-rotavirus neutralizing antibodies in the infected mice 65

6.1.3. Discussion 65

6.2. Effect of pre and post infection administration of anti-human rotavirus egg yolk antibodies (anti-HRV IgY) on rotavirus induced diarrhea in mice 69

6.2.1. Materials and methods 69
  6.2.1.1. Anti-HRV-3IgY treatment of mice infected with rotavirus 69
  6.2.1.2. Real time PCR 70
  6.2.1.3. Pathology 70
  6.2.1.4. Statistical analyses 70
6.2.2. Results
6.2.2.1. Effect of post infection administration of anti-HRV-3IgY on the course of rotavirus infection in mice
   6.2.2.1.1. Diarrhea
   6.2.2.1.2. Histopathology of intestine
   6.2.2.1.3. Rotaviral RNA load in intestine and stool
6.2.2.2. Effect of preinfection administration of anti-HRV-3IgY in mice
6.2.3. Discussion

Chapter 7
Summary and future prospects

Appendix
Bibliography
List of Publications