List of publications

Publications of Ph.D. research work


Manika Buragohain, GS Dhale, GR Ghalshasi, SD Chitambar. Evaluation of hyperimmune hen egg yolk derived anti-human rotavirus antibodies (anti-HRVIgY) against rotavirus infection. World Journal of Vaccines 2011, accepted.


Patent entitled “Use of IgY antibodies against rotavirus infection in children and poultry” has been filed (No. 1998/MUM/2006).

Conferences attended

Manika Buragohain and S. D. Chitambar, Detection of rotavirus antibodies in field chicken sera presented at Virocon March 18-20, 2010, held at Tirupati.


Analyses of clinical, pathological and virological features of human rotavirus strain, YO induced gastroenteritis in infant BALB/c mice.

Buragohain M, Dhale GS, Raut CG, Kang G, Chitambar SD.

Abstract

Experimental studies of human rotavirus infections in mice are limited and there is lack of information on the quantitative assessment of rotaviral replication and its relationship with histological changes. In the present study, consequences of human rotavirus strain, YO induced gastroenteritis in infant BALB/c mice were analyzed for the occurrence of clinical symptoms, histopathology and virological events. The infected animals developed diarrhea and dehydration and showed accumulation of vacuolated enterocytes with lodging of the rotavirus antigens and shortening of villi in the intestine over a period of 5 days. The ileum was identified as the most susceptible and supportive part of small intestine for perpetuation of rotavirus infection in mice. Rotaviral antigen/RNA in stool and RNA in intestine were detected throughout the clinical disease period. At 48-72 h post inoculation, diarrhea was at the peak (90-95%) in the infected animals with increased load of viral RNA and intense pathological lesions suggesting it as the critical time point in the course of infection. The rising titers of antirotavirus neutralizing antibodies ascertained the replication of human rotavirus strain, YO in mice. These data may contribute to the understanding of pathophysiological, immunological and virological characteristics of rotavirus infections in mice.
Evaluation of hyperimmune hen egg yolk derived anti-human rotavirus antibodies (anti-HRVIgY) against rotavirus infection

Manika Buragohain, GS Dhale, GR Ghalshasi, SD Chitambar

Abstract

Oral delivery of specific IgY has been reported to be beneficial against rotavirus infection. However, the production of IgYs against globally prevalent human rotavirus (HRV) serotypes and their evaluation detailing the influence on the virological/histopathological consequences have not been reported to date. In the present study, anti-HRVIgY was generated in the eggs of specific pathogen free hens immunized with HRV serotypes G1-G4 and G9 independently. Purified anti-HRVIgY preparations were tested for the ELISA and neutralizing antibody titers respectively in an indirect ELISA and cell culture based neutralization assay. Efficacy of pre and post infection treatment of anti-HRV-3IgY was assessed in an infant BALB/c mouse model of human rotavirus infection by monitoring percent diarrhea, severity and duration of diarrhea, intestinal viral load and histopathology. High (1:64000-1:512000) titered anti-HRVIgYs were obtained from the egg yolk of immunized hens with peak titer value (1:256000/1:512000) at 40-60 day of immunization. Each of the anti-HRVIgY preparations showed the presence of multiserotypic neutralizing activity with high (1:1600-≥1:6400) homologous and low (≤1:50-1:800) heterologous titers. However, anti-HRV-3IgY neutralized all of the serotypes tested in the study indicating broader in vitro neutralizing activity. Post exposure treatment with anti-HRV-3IgY significantly reduced the extent of diarrhea and intestinal virus load and inhibited histopathological changes whereas pre exposure anti-HRV-3IgY treatment imparted immediate protection from development of rotavirus gastroenteritis in the mice. Thus, the anti-HRVIgY administered orally decreased morbidity and disease incidences in mice suggesting its potential implication in prophylactic and therapeutic usage to reduce rotavirus disease burden in human.
VP6 capsid protein of chicken rotavirus strain CH2: Sequence, Phylogeny and In Silico antigenic analyses

Manika Buragohaina, Sarah S. Cherianb, G. Prabhakarb and Shobha D. Chitambara

Abstract

The inner capsid protein VP6 of group A rotavirus possesses group and subgroup epitope specificities. Avian rotaviruses have a unique VP6 that is antigenically different from its mammalian counterpart. The lack of information on the VP6 protein of chicken rotavirus strain, CH2, at the genetic and antigenic level was a major motivation for this work. Sequencing of the complete cDNA of the VP6 gene of CH2, revealed a nucleotide (amino acid) identity that varied from 78.3 to 98.5% (86.4–98.2%) when compared with other avian rotaviruses. Regardless of its host origin dissimilarity, CH2 VP6 showed a close sequence homology (97.4–98.2%) with turkey and pigeon rotaviruses. Homology-based modeling of the CH2 VP6 from the corresponding crystal structure of the bovine rotavirus, RF strain, demonstrated that the hypervariable region (residue 228–240) does have a critical role in strain specific antigenic characteristics of avian and mammalian rotaviruses. A predicted conformational epitope encompasses experimentally characterized group and subgroup epitopes suggesting that it is a major antibody binding site on the VP6 protein. The VP6 structure modeling and conformational epitope prediction together with enzyme immuno assay of SG MAbs placed CH2 in SGI/II. The study may be helpful in designing peptides for group A rotavirus diagnostic assays and to achieve heterotypic protection against rotavirus serotypes.
Other

