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Original Research

Canine Parvovirus Isolates of India and the Relevance of Canine Parvovirus Type-2 Vaccines

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Abstract

A study was conducted to characterise the field isolates of canine parvovirus (CPV) and an *in vitro* cross neutralisation assay was performed against the vaccinated dog sera. Out of 45 faecal samples processed for virus isolation, 27 samples showed cytopathic effect (CPE) at first passage, which were confirmed positive by CPV variant types specific PCR. The CPV type 2 was not detected in any of the clinical samples. Of these 27 positive samples only 23 samples showed CPE and were further confirmed as CPV by haemagglutination inhibition test, ELISA and immuno-chromatographic strip test. Antigenic typing performed using a panel of monoclonal antibodies revealed that four of the 23 isolates were CPV 2b type and the remaining 19 isolates were typed as CPV 2a. The antigenic typing results obtained using the monoclonal antibodies corroborated the sequencing results reported by our group earlier. The cross neutralization study with polyclonal sera revealed that the sera of original antigenic type CPV 2 can neutralize the antigenic variants 2a and 2b effectively. Thus we conclude that the vaccines containing CPV type 2 virus can be used to immunise the dogs against the prevalent CPV 2a and CPV 2b infection. A live virus challenge study in dogs may further confirm this observation.

Keywords: Canine parvovirus; Isolation; Typing; Vaccine; Neutralisation; India

Introduction

During the 1970s, a new infectious disease of pups characterized by either gastro-enteritis or myocarditis was observed worldwide and the etiological agent was identified as canine parvovirus type 2 (CPV 2) (Appel *et al*., 1979; Burtonboy *et al*., 1979). Canine parvovirus is a highly contagious disease in dogs, characterized by hemorrhagic gastroenteritis, vomiting and high temperature. Though the disease can affect dogs of any age, the disease is often fatal in pups. The CPV type 2 virus underwent genetic and antigenic drift to become CPV type 2a, subsequently to type 2b and type 2c (Parrish *et al*., 1991; Buonavoglia *et al*., 2001; Nakamura *et al*., 2004). Incidence of the original CPV type 2 virus was not reported later and was replaced with the variant types (2a, 2b and 2c).

Most of the available vaccines contain attenuated CPV type 2.When *in vitro* cross neutralization experiments were performed using CPV 2 vaccinated sera against CPV type 2, 2a, 2b and 2c virus, the neutralization titers were significantly lesser with heterologous type virus (2a, 2b or 2c) compared to the homologous type 2 virus (Pratelli *et al*., 2001; Cavalli *et al*., 2008).Though the interference from maternal antibodies and low antibody titer were the common factors responsible for vaccine failure, antigenic variation between the available vaccine strains and the prevalent virus types was also indicated as a possible reason for vaccine failure (Decaro *et al*., 2008). However, Spibey *et al*. (2008) reported that the CPV type 2 protected vaccinated dogs against the experimental challenge with CPV type 2c. The present study was undertaken to evaluate the antigenic relationships of the

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