ネコ糞便内に検出されたロタウイルスの2,3の属性

誌名	Japanese journal of veterinary science
ISSN	00215295
著者	望月, 雅美 堤, ルリ子 原澤, 亮
巻/号	51巻3号
掲載ページ	p. 662-664
発行年月	1989年6月

Some Attributes of a Rotavirus Detected in Cat Feces

Masami MOCHIZUKI, Ruriko TSUTSUMI, and Ryô HARASAWA[1)]

Laboratory of Veterinary Microbiology, Department of Veterinary Medicine, Faculty of Agriculture, Kagoshima University, Kagoshima 890, [1)]Department of Veterinary Microbiology, Faculty of Agriculture, Miyazaki University, Miyazaki 889-21, Japan

(Received 23 November 1988/Accepted 8 February 1989)

Jpn. J. Vet. Sci. 51(3): 662–664, 1989

KEY WORDS: cat, rotavirus.

Most prevalent rotavirus strains in animal and human populations belong to Group A rotaviruses, and atypical rotaviruses from cattle, humans, pigs, sheep and birds, which lack a common (Group A) antigen and possess the 11 genome segments showing a different migration profile from that commonly observed in Group A viruses, are tentatively classified into Groups B, C, and D [18]. In cats, Group A rotaviruses have been found [1, 2, 5, 6, 10, 15–17] and their widespread distribution in cat populations has been evidenced serologically [6, 11, 13, 17], however, they are probably not a very significant cause of gastroenteritis in the field. We have already reported the detection of rotavirus particles in the feces derived from a litter of healthy household kittens by the immune-electronmicroscopy [15]. This brief communication describes some further properties of the cat rotavirus strain.

Since no rotavirus had been recovered from the cat feces in any types of cell culture including MA 104 cells as reported previously [15], a virus-containing fecal extract, prepared by the method described previously [12], was administered orally to a litter of 3 apparently healthy kittens with no anti-rotavirus antibody. Each kitten was received 3.8×10^4 reverse passive hemagglutination (RPHA) units of the cat strain virus. The methods for the RPHA test and the RPHA-inhibition (RPHI) test for serum antibody determination have been described previously [12, 13]. Although the stool condition of one kitten was changed from normal to rather diarrheal for eight days from the third day after administration, all kittens were otherwise normal during the 6 week-observation period. The virus-shedding in feces persisted for eight days from the next day to the eighth day, but not thereafter in all kittens, and their serum RPHI antibody titers were equally converted from less than 1: 10 to 1: 20 at the end of the observation period.

The fecal extracts from both the original field cases and the experimentally inoculated cats were partially purified and concentrated by a method described elsewhere [12], and they were used for analyses of dsRNA genome fractionation and erythrocyte hemaggulutinability (HA) of various animal species. Figure 1 depicts the results of the RNA segment migration patterns of the cat strain and canine rotavirus RS 15 strain [12] by polyacrylamide gel electrophoresis performed by a method described previously [3, 14]. The cat strain possessed 11 discrete genome segments characteristic of Group A rotaviruses showing a "long" pattern, but its migration

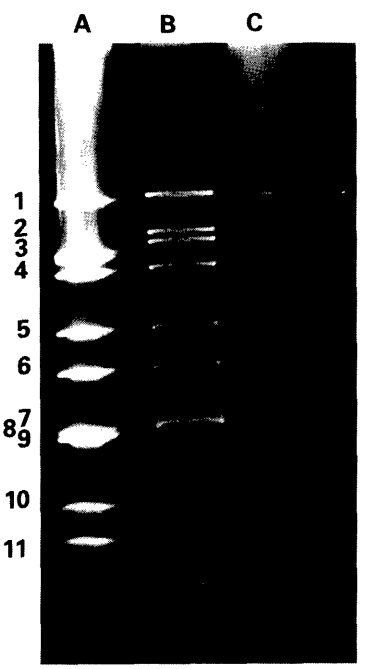

Fig. 1. RNA segment migration patterns of rotaviruses by polyacrylamide gel electrophoresis. A, canine rotavirus RS 15 strain; B, the cat strain in the fecal extract of the original field cases; C, the cat strain in the fecal extract of the experimentally inoculated cats.

profile was different from that of the canine RS 15 strain. The cat strain specifically hemagglutinated no erythrocytes from 14 animal species (cat, cattle, chicken, dog, goat, guinea-pig, hamster, horse, human O, mouse, pig, rabbit, rat, and sheep) under the optimal HA condition for the canine RS 15 strain reported elsewhere [14].

Serotyping of the cat strain was attempted by the plaque reduction neutralization test (PRNT) [8] with an antiserum against the cat strain produced by the method of Kjeldsberg and Mortensson-Egnund [9] and human rotavirus prototype strains. The fecal extract (one dose: 2.6×10^4 RPHA units) was administered orally to two anti-rotavirus RPHI antibody-free rabbits. Each rabbit received a total of four doses at fortnight intervals and the sera were collected two weeks after the last administration. The rabbits manifested no clinical signs for eight weeks after the first administration. As shown in Table 1, only the serotype III human rotavirus strains (MO and YO strains) and the canine rotavirus RS 15 strain were neutralized by the rabbit antisera. It has been revealed in the subsequent studies by Dr. Osamu Nakagomi (Faculty of Medicine, Akita University, Japan) that the RS 15 strain shares antigenic specificity with serotype III of subgroup I of the Group A human rotaviruses (personal communication). We also confirmed that the RS 15 strain had no antigenic relation to human rotavirus Wa strain (serotype I of subgroup II rotavirus) due to PRNT which differed from our previous results [14]. Although the reciprocal PRNT could not be done in the present study because of no *in vitro* growth of the cat strain, it appears that the strain possesses serotype III specificity. All rotavirus isolates from domestic cats thus far have been classified as belonging to the third rotavirus serotype [1, 7] and there may be some antigenic subclasses in the feline isolates [4]. Further comparative virological studies on rotaviruses of these pet animals from a zoonotic aspect are needed and would be worthwhile because cats are strongly suspected to act as a source of rotavirus infection in man [4].

ACKNOWLEDGEMENTS. The authors wish to thank Dr. Osamu Nakagomi of the Faculty of Medicine, Akita University, Japan for kindly supplying the human rotavirus Wa, KUN, and MO strains, Dr. Albert Z. Kapikian, National Institutes of Health, Bethesda, U.S.A., for ST3 strain, and Dr. Shigeo Matsuno, National Institutes of Health, Tokyo, Japan for Wa, S2, YO, and Hochi strains. All human rotaviruses were propagated in cell culture using a roller apparatus at the Kyushu Branch Laboratory, National Institute of Animal Health, Japan.

Table 1. Plaque reduction neutralization test titer of anti-cat rotavirus rabbit sera against human rotavirus prototype strains and the canine rotavirus RS 15 strain

Serotype	Virus strain	Antisera against the rotaviruses in cat feces	
		Rabbit A	Rabbit B
I	Wa[a)]	<10[b)]	<10
	Wa	10	<10
II	KUN	<10	<10
	S2	10	<10
III	MO	160	320
	YO	160	320
	RS 15	160	320
IV	ST3	10	<10
	Hochi	<10	<10

a) The Wa strains were supplied by Akita Univ., and Natl. Inst. Health, Japan, respectively.
b) Reciprocal of the highest serum dilution which showed 50% plaque count reduction or more.

REFERENCES

1. Birch, C. J., Heath, R. L., Marshall, J. A., Liu, S., and Gust, I. D. 1985. *J. Gen. Virol.* 66: 2731–2735.
2. Chrystie, I. L., Goldwater, P. N., and Banatvala, J. E. 1979. *Vet. Rec.* 105: 404–405.
3. Harasawa, R. and Mitsuoka, T. 1984. *Experientia* 40: 390–392.
4. Heath, R., Birch, C., and Gust, I. 1986. *J. Gen. Virol.* 67: 2455–2466.
5. Herbst, W. and Krauss, H. 1988. *J. Small Anim. Pract.* 29: 5–12.
6. Hoshino, Y., Baldwin, C. A., and Scott, F. W. 1981. *J. Gen. Virol.* 54: 313–323.
7. Hoshino, Y., Wyatt, R. G., Greenberg, H. B., Flores, J., and Kapikian, A. Z. 1984. *J. Infect. Dis.* 149: 694–702.
8. Hoshino, Y., Wyatt, R. G., Scott, F. W., and Appel, M. J. 1982. *Arch. Virol.* 72: 113–125.
9. Kjeldsberg, E. and Mortensson-Egnund, K. 1983. *Arch. Virol.* 78: 97–102.
10. Marshall, J. A., Kennett, M. L., Rodger, S. M., Studdert, M. J., Thompson, W. L., and Gust, I. D. 1987. *Aust. Vet. J.* 64: 100–105.
11. McNulty, M. S., Allan, G. M., Thompson, D. J., and O'Boyle, J. D. 1978. *Vet. Rec.* 102: 534–535.
12. Mochizuki, M. and Hsüan, S. -W. 1984. *Jpn. J. Vet. Sci.* 46: 905–908.
13. Mochizuki, M., Minami, K., and Sakamoto, H. 1986. *Jpn. J. Vet. Sci.* 48: 957–964.
14. Mochizuki, M., Sameshima, R., Ata, M., Minami, K., Okabayashi, K., and Harasawa, R. 1985. *Jpn. J. Vet. Sci.* 47: 531–538.
15. Mochizuki, M. and Yamakawa, M. 1987. *Jpn. J. Vet. Sci.* 49: 159–160.
16. Schroeder, B. A., Kalmakoff, J., Holdaway, D., and Todd, B. A. 1983. *N. Z. Vet. J.* 31: 114–116.
17. Snodgrass, D. R., Nugus, K. W., and Gray, E. W. 1979. *Vet. Rec.* 104: 222–223.
18. Tzipori, S. 1985. *Adv. Vet. Sci. Comp. Med.* 29: 104–206.

要　　約

ネコ糞便内に検出されたロタウイルスの２，３の属性（短報）：望月雅美・堤　ルリ子・原澤　亮[1)]（鹿児島大学農学部家畜微生物学講座，[1)]宮崎大学農学部家畜微生物学講座）――ネコ糞便内に検出されたロタウイルスの性状を糞便抽出液を材料として検討した．経口投与後ネコはほとんど消化器症状を呈さず，約１週間，糞便にウイルスを排泄し，血中抗体価の上昇が認められた．このネコ由来株はロタウイルス特有の"long"タイプのRNA分節泳動像を示した．ヒトロタウイルスⅠ～Ⅳ血清型株のうちⅢ型株とイヌロタウイルスRS 15株だけが，糞便抽出液経口投与家兎免疫血清で中和された．