Table 1 Neutralization Index (NI) and Anti-O Polysaccharide Titre by Passive Haemagglutination (HA) of Experimental Antisera

Sera	NI	HA
Rabbit-preimmunization	1.02±0.05*	<1:40
Rabbit 1-anti-Shiga enterotoxin	2.53±0.21	1:640
2-anti-Shiga enterotoxin	3.90±0.37	1:80
Horse International Dysentery Antiserum (WHO)†	3.66±0.14	<1:40
Rabbit anti-cholera enterotoxin	0.96±0.02	NT
Horse anti-choleragenoid (monospecific)	1.03±0.03	NT

* Mean±1 s.e.m.
† 1 : 50 final dilution.

antigen was measured by the microtitre haemagglutination technique of Lee *et al.*[8].

In comparison to pre-immunization sera or rabbit anti-cholera enterotoxin serum, rabbit anti-*S. dysenteriae* 1 enterotoxin antibody contained neutralizing activity (Table 1). Horse anti-Shiga neurotoxin prepared in 1924 by Shiga[9] and supplied to us as International Dysentery Antitoxin by the Statens Serum Institute, WHO, was even more potent in neutralizing capacity. In contrast, horse mono-specific anti-choleragenoid serum[10] contained no shigella anti-toxin antibody.

Studies with human sera are shown in Table 2. In 25 of 26 sera from subjects without history of dysentery and negative HA titres, NI was 1.2 or less. In 24 separate studies of a single HA negative serum from one of us (G. T. K.) with a negative history for shigellosis mean NI was 0.99±0.03 (range 0.8–1.2). However, to minimize false-positive results we have extended the range of NI considered negative to 1.4, so that a positive serum must reduce effective toxicity of an administered TC_{50} dose of toxin by at least 25% (NI≥1.5). Of 12 sera collected in Guatemala in 1965 prior to the outbreak of epidemic Shiga dysentery in 1969 (ref. 11), maintained frozen at INCAP and HA negative, only 2 (16.6%) had a positive NI (Table 2*a*). In contrast nearly 75% (20/27) with positive HA titres had toxin-neutralizing activity. During the epidemic 17 of 18 acutely ill patients with Shiga infection (14 proven bacteriologically, and 4 by clinical, epidemiological and serological criteria[11]) and all of 5 convalescent patients had positive NI. The magnitude of the HA rise and the NI did not correlate well, however, even in bacteriologically proven patients.

Table 2 Serum Neutralizing Capacity vs. *S. dysenteriae* 1 Enterotoxin

Sera	Neutralization index Positive/total	Mean	Median
a			
Control (Guatemalan)	1/7	1.3	1.2
Control (American)	0/19	1.0	1.0
Pre-epidemic (1965)			
HA negative	2/12	1.3	1.2
HA positive-Al	20/27	3.0	1.8
Epidemic (1969)			
Acute (<2 weeks)	17/18	4.8	2.8
Convalescent (>4 weeks)	5/5	2.9	2.1
b			
Shigella A_2	5/5	3.7	3.9
Shigella B	12/15	2.5	1.9
Shigella D	4/5	2.5	1.7

Sera from subjects with evidence of Shigella infection other than A_1 also neutralized the enterotoxin of *S. dysenteriae* 1 (Table 2*b*). These included 5 of 5 sera with positive HA titres only to *S. dysenteriae* 2, 12 of 15 sera from patients with acute *S. flexneri* and 4/5 with *S. sonnei* infection proven by HA and/or stool culture.

Our data show that sera from patients with evidence of infection due to a variety of *Shigella* species neutralize at least one biological activity of the protein exotoxin isolated from *S. dysenteriae* 1. This suggests that the toxin is made *in vivo* as well as *in vitro* by the latter organism, and also that antigenically similar material must also be made *in vivo* by *flexneri* and *sonnei* strains. A pathogenetic role for toxin in shigellosis[4] thus appears more likely. This may even be related to the high incidence of seizures noted in children with all *shigella* infections[12].

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Erratum

IN the article "Syncytial Assay for the Putative Human C-type Virus, RD-114, utilizing Human Cells transformed by Rous Sarcoma Virus" by Kenneth H. Rand and Cedric Long (*Nature New Biology*, **240**, 187; 1972), reference 14 should read: Oroszlan, S., Hatanaka, M., Gilden, R. V., and Huebner, R. J., *J. Virol.*, **8**, 816 (1971).

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