HEMAGGLUTINATION INHIBITION AND PLAQUE NEUTRALIZATION ANTIBODY RESPONSES IN CHILDREN WITH ISOLATION PROVEN DENGUE INFECTIONS, 1978

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OBJECTIVE : To determine if the infecting dengue virus serotype can be correctly identified by assay of acute and convalescent sera for HAI and PRNT antibodies in primary and secondary dengue infections.

BACKGROUND : Although the neutralizing antibody response in primary dengue virus infections is generally accepted to be homotypic, little information on the neutralizing antibody response in patients with secondary flavivirus infections is available. We therefore sought to examine the neutralizing antibody response in the serum from patients with known, typed viruses isolated from their blood in the acute phase of illness.

METHODS : Serum specimens from children with DHF were collected at Children's Hospital, Bangkok and stored forzen at -70°C until assay. Concurrently samples of plasma and leukocytes were assayed to detect viruses on LLC-Mk2 cells and in *toxorhynchites mosquitoes* as previously described (AFRIMS Annual Report, 1978-1979, pp. 142-153). Acute and convalescent sera were assayed for hemagglutination inhibiting antibodies per AFRIMS routine and for $PRNT_{50}$ antibodies on LLC-Mk2 cells in 24 well plastic microtiter trays against prototype viruses. All specimens collected during 1978 were included in the study for which there were available (1) a typed virus isolate (2) adequate volumes of acute and convalescent (at least $\geq$ 7 day of illness) serum specimens.

RESULTS : Results are presented in Table 1. Only two patients had "primary" type antibody responses (D78-051, D78-091). In case D78-051 there were broadly reactive $PRNT_{50}$ antibodies in the acute serum, presumably maternal in origin.

Most of the specimens analyzed were from patients with secondary type antibody responses from whom D2 was isolated. In these patients neither the $PRNT_{50}$ or HAI response to D2 is sufficiently different from the response to the other dengue types to accurately identify the infecting type; indeed the magnitude of the response to the homotypic D2 is often less than to other heterotypic antigens, suggesting an "original antigenic sin" type of amnestic response.

Table 1. HAI and PRNT-50 antibody assays on acute and convalescent serum specimens from children with isolation proven acute dengue virus infections, Children's Hospital, 1978

Case No.	AFRIMS No.	Serum No.	Days after onset of illness	Virus type	PRNT-50 TITER					HAI TITER				
					D1	D2	D3	D4	JE	D1	D2	D3	D4	JE
D78-051	289-78	2476-78	4	2	80	40	20	20	10	10	40	20	40	20
		2525-78	18	-	95	140	84	76	20	80	320	160	640	640
D78-091	373-78	2644-78	4	2	0	25	0	0	0	0	0	0	0	0
		2699-78	18	-	15	170	55	50	0	20	80	40	160	20
D78-009	148-78	1737-78	3	2	5,600	550	2,300	640	40	640	320	1,280	1,280	2,560
		2197-78	27	-	25,000	1,650	3,800	1,600	90	1,280	2,560	5,120	2,560	2,560
D78-014	160-78	2192-78	3	2	40,960	1,700	1,600	750	110	5,120	2,560	>10,240	>10,240	2,560
		2221-78	16	-	100,000	19,000	9,000	1,650	150	10,240	5,120	5,120	5,120	1,280
D78-025	219-78	2315-78	3	2	ND	ND	ND	ND	ND	40	20	20	10	0
		2358-78	17	-	>40,960	44,000	1,500	2,400	170	40,960	5,120	2,560	1,280	160
D78-044	268-78	2414-78	3	2	130	32	50	40	ND	40	20	40	80	80
		2491-78	17	-	8,200	11,300	2,700	1,800	640	5,120	2,560	5,120	2,560	1,280
D78-050	284-78	2465-78	2	2	64	0	58	70	0	0	20	20	0	0
		2586-78	29	-	3,700	400	>10,240	640	105	640	640	5,120	1,280	640
D78-052	290-78	2477-78	4	2	160	96	105	80	185	1,280	1,280	2,560	>10,240	>10,240
		2517-78	7	-	2,800	250	1,600	2,000	270	10,240	10,240	10,240	40,960	5,120
D78-054	293-78	2480-78	4	2	540	160	550	300	10	320	80	320	320	160
		2527-78	18	-	8,800	6,600	6,400	5,900	160	40,960	2,560	20,480	10,240	2,560
D78-078	348-78	2598-78	4	2	960	190	430	200	10	160	160	160	640	640
		2646-78	18	-	ND	ND	ND	ND	ND	5,120	2,560	>10,240	>10,240	5,120
D78-080	353-78	2606-78	5	2	60,000	3,500	3,500	640	640	5,120	2,560	5,120	5,120	2,560
		2666-78	19	-	11,300	100,000	10,500	1,650	200	10,240	5,120	10,240	10,240	2,560
D78-097	389-78	2670-78	5	2	1,950	15,500	3,800	11,600	110	20,480	5,120	10,240	20,480	2,560
		2863-78	43	-	2,000	2,250	2,400	2,800	ND	10,240	5,120	5,120	10,240	2,560

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					D1	D2	D3	D4	JE	D1	D2	D3	D4	JE
D78-099	396-78	2690-78	5	2	92	35	130	30	ND	10	0	40	20	0
		2798-78	26	-	17,000	110	70,000	17,500	40	>10,240	>10,240	>10,240	>10,240	>10,240
D78-112	413-78	2716-78	4	2	10	0	40	30	0	0	0	0	0	0
		2779-78	16	-	300	2,300	64,000	2,100	640	>10,240	>10,240	>10,240	>10,240	2,560
D78-117	418-78	2738-78	2	2	91	130	270	180	150	10	10	40	40	20
		2815-78	16	-	ND	ND	ND	ND	ND	2,560	2,560	>10,240	>10,240	>10,240
D78-130	442-78	2775-78	5	2	3,400	2,500	2,300	3,700	270	1,280	1,280	2,560	5,120	1,280
		2864-78	19	-	3,800	4,250	2,000	2,560	ND	5,120	2,560	20,480	5,120	1,280
D78-133	447-78	2790-78	1	2	350	350	240	150	160	10	0	10	10	10
		2872-78	15	-	6,200	5,700	1,280	1,400	640	5,120	2,560	2,560	2,560	1,280
D78-135	449-78	2792-78	1	2	ND	ND	ND	ND	ND	20	10	320	40	10
		2873-78	15	-	5,120	2,700	10,240	2,800	ND	10,240	5,120	40,960	5,120	1,280
D78-136	452-78	2802-78	4	2	ND	ND	ND	ND	ND	1,280	1,280	>10,240	>10,240	2,560
		1832-78	10	-	4,250	43,000	10,240	15,900	ND	20,480	10,240	81,920	20,480	20,480
D78-145	466-78	2828-78	4	2	285	640	470	400	10	640	160	320	320	320
		2866-78	10	-	5,800	33,000	1,280	1,600	40	10,240	2,560	2,560	1,280	640
D78-159	489-78	2884-78	3	2	2,900	1,280	1,200	640	40	1,280	640	5,120	1,280	640
		2947-78	17	-	9,400	5,400	80,000	2,150	160	5,120	2,560	5,120	2,560	1,280
D78-108	409-78	2711-78	3	3	500	180	180	125	20	40	80	80	160	80
		2813-78	19	-	40,000	6,600	15,400	7,000	70	2,560	5,120	>10,240	>10,240	>10,240
D78-055	298-78	2489-78	4	4	10,700	5,500	1,200	1,800	110	2,560	2,560	5,120	2,560	2,560
		2587-78	27	-	42,000	8,800	1,280	6,200	230	5,120	2,560	5,120	10,240	2,560
D78-059	312-78	2516-78	4	4	6,300	1,700	1,800	400	160	2,560	640	2,560	2,560	1,280
		2588-78	18	-	100,000	15,000	2,000	1,380	100	>10,240	>10,240	>10,240	>10,240	5,120