Further Consideration of a Suggested Simple Laboratory Test for Poliomyelitis Virus[1]

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A preliminary note (*1*) reported findings which suggested that an interference phenomenon may have resulted in a relative protection of mice, inoculated with material containing poliomyelitis virus, against a subsequent inoculation with the Lansing strain of virus. It was hoped that these findings might become the basis of a simple laboratory test for the presence of poliomyelitis virus.

TABLE 1

EFFECT OF PRELIMINARY INTRACEREBRAL INOCULATION OF EXTRACTS OF HUMAN STOOL OR MONKEY SPINAL CORD, CONTAINING OR FREE OF POLIOMYELITIS VIRUS, ON REACTION OF MICE TO SUBSEQUENT INTRACEREBRAL INJECTION OF LANSING VIRUS

Material injected intracerebrally 2 days before Lansing virus			No. of mice paralyzed or dead at indicated time after intracerebral injection of Lansing virus (1×10^{-2})*		
Group	Type	Strain	10 days	14 days	28 days
Presence of poliomyelitis virus in aliquot samples demonstrated by tests in monkeys	Stool	J.H.	7/10	9/10	10/10
	"	E.D.	6/10	7/10	10/10
	"	D.Y.	4/10	6/10	6/10
	"	L.W.	4/10	8/10	9/10
	Monkey spinal cord†	B.H.	5/10	6/10	9/10
	"	L.W.	5/10	5/10	7/10
	"	J.F.	5/10	7/10	9/10
	"	J.R.	4/10	6/10	9/10
	"	J.H.	3/10	4/10	9/10
No poliomyelitis virus found by tests in monkeys	Stool	....	6/10	6/10	10/10
	"	....	5/10	8/10	10/10
Normal monkey spinal cord			4/10	7/10	9/10
No preliminary inoculation Lansing virus controls	10^{-2}	Group I	7/10	9/10	9/10
		Group II	6/10	6/10	7/10
	10^{-3}		3/10	5/10	8/10
	10^{-4}		0/10	0/10	6/10
	10^{-5}		0/10	0/10	1/10

* Based on the control titer of this virus at 28 days, this dose contains 50 PD_{50} of virus.

† Strains of human origin—second or third generation in rhesus monkeys.

Since the preliminary report was based mainly upon the results obtained with extracts of 5 individual human stools collected during a single epidemic period, it was considered desirable to repeat the experiments on a larger scale with different strains of virus. The availability in the Cincinnati laboratory of a number of frozen specimens of known potency, based on recent tests in monkeys, permitted prompt repetition of this work.

The results of these tests, shown in Tables 1 and 2, indicated that (a) the incubation period among different groups of mice inoculated with the Lansing virus alone was much more variable than appeared to be the case in the preliminary tests, and (b) intracerebral inoculation of mice with strains of poliomyelitis virus of proved pathogenicity for monkeys does not interfere with the action of the Lansing strain, regardless of whether or not those strains are immunologically related to it.

TABLE 2

EFFECT OF PRELIMINARY INTRACEREBRAL INOCULATION OF THE IMMUNOLOGICALLY RELATED "MV" VIRUS ON REACTION OF MICE TO SUBSEQUENT INJECTION OF LANSING VIRUS

Series	Group*	No. of mice paralyzed or dead at indicated time after inoculation of Lansing virus 1 : 50		
		10 days	14 days	28 days
0.03 cc of 20% suspension of monkey spinal cord—"MV" virus—injected intracerebrally 2 days before Lansing virus	I	5/5	5/5	5/5
	II	3/5	5/5	5/5
	III	3/5	5/5	5/5
	IV	3/5	4/5	5/5
	V	1/5	4/5	5/5
No preliminary inoculation Lansing virus controls	I	5/5	5/5	5/5
	II	4/5	5/5	5/5
	III	3/5	4/5	4/5
	IV	2/5	3/5	5/5
	V	2/5	3/5	4/5

* All mice were inoculated simultaneously with the same material and divided into groups of 5 each in order to determine the random distribution of paralysis and death in samples of this size.

The tests were also repeated in the Paris laboratory with extracts of the stools used in the original tests, and the results were similar to those shown in Tables 1 and 2—irregularity in the prolongation of the incubation period among the preinoculated mice, and greater variation than was previously observed among the controls.

The results of this work lead to the conclusion that interference with the Lansing virus in mice cannot be the basis of a simple laboratory test for poliomyelitis virus. It is also noteworthy that Sabin and Ward (*2*), who tested many strains of poliomyelitis virus of recent human origin for their capacity to protect mice against a challenge dose of Lansing virus administered 2 months after the original inoculation rather than 2 days, as in the present tests, also obtained only negative results.

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References

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2. SABIN, A. B., and WARD, R. *J. exp. Med.*, 1941, **73**, 771.