

THE CONTROL OF POLIOMYELITIS BY LIVE POLIOVIRUS VACCINE

EDITED

BY

J. WEISSFEILER

INSTITUTE OF EXPERIMENTAL MEDICINE OF THE HUNGARIAN ACADEMY OF SCIENCES
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STUDIES ON MASS VACCINATIONS IN HUNGARY,
IN THE USSR, IN CZECHOSLOVAKIA
AND IN THE GERMAN DEMOCRATIC REPUBLIC
INTRODUCTORY ADDRESS BY A. B. SABIN

PAPERS PRESENTED AT THE 9TH HUNGARIAN—SOVIET MEDICAL CONFERENCE,
SEPTEMBER 28—30, 1960



AKADÉMIAI KIADÓ, BUDAPEST, 1961

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PREFACE

Live attenuated poliovirus vaccine as developed by A. B. SABIN has been applied on a wide scale in the USSR, where nearly 90 million subjects were fed the vaccine in the years 1959 and 1960. In connection with the mass vaccinations extensive studies were carried out by two groups of Soviet workers, the one led by M. P. CHUMAKOV, the other by A. A. SMORODINTSEV. The highly valuable results of the studies were summarized at the *4th Scientific Conference and International Symposium on Live Poliovirus Vaccine, Moscow, May, 1960*. Since then the studies have been continued and the results obtained by CHUMAKOV up to January 1, 1961, are presented in this issue.

In July, 1959, a severe epidemic of poliomyelitis broke out in Hungary, although a high percentage of the child population had received Salk vaccine in the period 1957—1959. In face of the epidemic situation the *Microbiological Committee of the Scientific Council of the Hungarian Ministry of Health* on the basis of the favourable experience obtained in the USSR proposed in July, 1959, wide-scale application of the live attenuated vaccine. At the *2nd Congress of the Hungarian Association of Microbiologists, September, 1959*, CHUMAKOV reported on the vaccinations carried out in the USSR, and offered 100 000 doses of trivalent vaccine. In addition, he assured to supply Hungary with $2\frac{1}{2}$ million doses of live vaccine to immunize the child-population of the whole country. Vaccination was begun in November, 1959, in Győr—Sopron county, where the trivalent vaccine was administered. One month later the campaign was extended to the whole country, with monovalent vaccines, administered in the order type 1, type 3 and type 2. To evaluate the effectiveness of the vaccinations, epidemiological, virological, serological and clinical investigations were organized. The *Epidemiological Department of the*

Ministry of Health, the State Institute of Hygiene, Budapest, the Institute of Microbiology of each of the four Medical Universities (Budapest, Szeged, Debrecen, Pécs), the Institute for Vaccine Production and Research "Human", Budapest, and the László Central Hospital for Infectious Diseases, Budapest, shared in executing the plan. At the 9th Hungarian—Soviet Medical Conference, Budapest, September, 1960, the results of approximately one year's studies were reported. At the same time, invited by the Poliomyelitis Committee of the Hungarian Association of Microbiologists and the Ministry of Health, A. B. SABIN gave two lectures in Budapest, the one on the eradication of poliomyelitis, the other on the vaccination of newborns with the live poliovirus vaccine. He pointed out that Hungary had been the first country in preparing the eradication of wild polioviruses by immunizing nearly 100 per cent of her susceptible population. V. ŠKOVŘÁNEK (Prague) and W. BELIAN (Berlin) reported on the immunizations carried out in Czechoslovakia, and in the German Democratic Republic, respectively. These papers are published in this issue.

The results of the epidemiological, virological and serological studies unequivocally indicate that with the live poliovirus vaccine we are in possession of the most potent tool to eradicate poliomyelitis.

J. WEISSFEILER

PART 1

COMMUNICATIONS FROM THE USA, USSR, ČSSR AND GDR.

INTRODUCTORY ADDRESS AT THE 9th HUNGARIAN—SOVIET MEDICAL CONFERENCE

By

A. B. SABIN

Cincinnati, Ohio, USA

Kedves magyar kollégáim (dear Hungarian colleagues) i daragii Sovietskie druzia (and dear Soviet friends)! (These words were spoken in the Hungarian and Russian languages, respectively.)

I am sorry that this is all I can say in Hungarian or Russian. I am very happy to have the opportunity to participate in the Hungarian—Soviet Conference on Poliomyelitis and to add the results of some of our own studies to those that will be presented here by the other lecturers. I would like to emphasize how very fruitful and important has been the cooperation that developed between my colleagues and friends in the Soviet Union and myself. Without this cooperation we could not have proceeded so far in acquiring the knowledge needed for the elimination of poliomyelitis and of the causative paralytic viruses. Nor could the incidence of the disease have been brought to such an incredibly low level in many parts of the world without the leadership and extraordinary energy of one, most remarkable man. This man is Professor MIHAIL PETROVITCH CHUMAKOV. Without him there would not have been such an enormous amount of vaccine available for the Soviet Union in 1960. Nor would the remarkable elimination of poliomyelitis in 1960 from Hungary and several other countries have been possible without the vaccine provided to them by the Soviet Union.

I know, and you should also know, that Professor CHUMAKOV had to overcome considerable opposition from certain colleagues in the Soviet Union to achieve these results, and I am very happy that he won.

Now I should like to discuss the vaccination of newborn children in the first days of their lives. The main reason for considering vaccination of the newborn shortly after birth is not to protect them against paralytic poliomyelitis during the first weeks of life because they are then usually protected by maternal antibody, but because they are then free of other

intestinal viruses and because they provide susceptible intestinal tracts in which polioviruses in the community may multiply.

Oral vaccination immediately after birth is more important in those countries where it is difficult to reach the children for vaccination two or three months after their births, than in countries with widespread free health services.

There are certain difficulties, however, during this period. Within an hour or so after birth, a particularly high level of gastric acidity develops which protects the baby against various microbes that it may swallow. It is well known that such a high concentration of gastric acid may also destroy the virus of poliomyelitis. Also breast milk and amniotic fluid can contain polio antibodies.

These considerations had an important influence in designing the studies I am going to speak about. In the United States, 3 groups carried out studies on newborn children using vaccine that I supplied. The same lots of vaccine were used so that the results are comparable. The first group in my own laboratory working with Dr. S. KRUGMAN in New York City vaccinated more than 400 newborns in a big city hospital during the period from October, 1959, to February, 1960. In Cleveland, Ohio, 154 babies received only the type 1 vaccine under the direction of Dr. F. ROBBINS. In New Orleans, under the direction of Drs. H. GELFAND and J. FOX various groups of infants, two to three days of age, received

Table I

Schedule for live poliovirus vaccine administration to newborn infants

Vaccine fed*	Group	Method	Dose & dilution of vaccine	Day given**
Type 1 only	1	Mouth	1 cc undiluted	0
	2	"	1 cc undiluted	0, 1, 2
	3	"	1 cc 1 : 10	0
	4	"	1 cc 1 : 10	0, 1, 2
	5	Throat	Undiluted	0, 1, 2
Types 1 + 2 + 3	6	Mouth	1 cc undiluted	0
	7	"	1 cc undiluted	0, 1, 2
	8	"	1 cc 1 : 10	0
	9	"	1 cc 1 : 10	0, 1, 2
	10	Throat	Undiluted	0, 1, 2
None	11	—	—	—

* Sabin strains

Type 1 (L Sc, 2 ab) — 2×10^7 PFU/ml.
 Type 2 (P712, Ch, 2 ab) — 1.5×10^7 PFU/ml.
 Type 3 (Leon, 12 a₁ b) — 1×10^7 PFU/ml

** 0 = birth to 11 hours.

1 = 12 to 35 hours

2 = 36 to 59 hours