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Allergic Reactions in Polio-Convalescent Children After Intracutaneous Injection of Heat-Inactivated Poliomyelitis Virus.*

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The experiments here reported represent a logical continuation of work previously published,[1] on the accelerated febrile response of convalescent monkeys to reinoculation with poliomyelitis virus. We interpreted our findings as indicating that recovery from poliomyelitic infection left the animals in a state of hypersensitiveness against the specific agent of the disease. The present paper purports to show that a similar condition may be demonstrated in children who have convalesced from a previous attack of infantile paralysis. We are much indebted to Dr. Charlton Wallace, Surgeon-in-Chief, and to Drs. J. M. Moore and F. J. O'Malley, Senior and Junior Resident Physicians of the New York State Reconstruction Home at West Haverstraw, N. Y., for their most helpful support in this investigation.

Twenty-seven children and youths (3 to 22 years old) with a proven history of a previous attack of poliomyelitis several years ago, were inoculated intracutaneously on one arm with 0.2 cc. of the Berkefeld filtrate of a 5% monkey virus emulsion, which had been inactivated by heating for one hour at 65°C.† A similar amount of a filtered and heated 5% emulsion of normal monkey cord was injected intracutaneously on the other arm. Both preparations had been tested before use by culture and animal experiment not only for bacteriological sterility (including *B. tuberculosis*) but more particularly for freedom from live virus by intracerebral inoculation of one monkey. All of the 27 individuals reacted to the killed virus in a typical allergic manner with local redness and slight swelling, which increased steadily from the fifth hour to the 24th hour after inoculation. A slight urticarial reaction which appeared in some children during the first 2 hours after injection of the control material completely subsided over night, so that only

* Under a grant from the International Committee for the Study of Infantile Paralysis, whose work is being financed by Jeremiah Milbank.

[1] Jungeblut, C. W., *J. Exp. Med.*, 1931, **53**, 159.

† We have since found that different filtrates may vary considerably in potency and that prolonged extraction of the cord is essential in order to obtain a maximum concentration of reacting substances in the filtrate.

the prick from the needle wound could be detected. The specific reactions were easily read after the 24-hour interval. The area of erythema was usually about 3 by 4 cm. in diameter, few reactions exceeding and fewer yet not attaining these dimensions. In almost half of the cases there was a darker center surrounded by a lighter halo. The reactions faded out rather rapidly, so that with occasional exceptions only a local area of browning persisted at the end of the 48-hour interval. Four more convalescent children were inoculated subcutaneously, 2 receiving 0.5 cc. of the killed virus filtrate and 2 a similar dose of the normal cord filtrate. The 2 individuals injected with the control material exhibited no local reaction whatsoever, while the 2 which had received the virus material showed marked redness and induration around the point of inoculation. In no case was there any significant change of the body temperature.

Our experience with normal individuals, although too limited at present to warrant detailed discussion, indicates a preponderance of positive reactions in adults over those obtained in younger children. A correct interpretation has frequently been made difficult by the tendency of adults to react with the control material.

Although we had failed before to obtain clearcut evidence for the possibility of producing local reactions in convalescent monkeys under similar conditions, we believe there can be little doubt that the febrile reaction in the monkey and the local reaction in the human are manifestations of the same state of allergy against the virus. If it is true, as the trend of present research would suggest, that the majority of older children and adults are protected against poliomyelitis by past latent infection, which in turn has induced virucidal antibodies, we should expect to obtain a large percentage of positive reactions in normal individuals of the older age groups and a smaller incidence among children under 5 years of age. A test in that form might then conceivably serve as a means of recognizing susceptibility to the disease. Experiments are now under way to compare the skin reactivity with the content of neutralizing substances in the serum.