SCIENTIFIC PROCEEDINGS.

VOL. XXVI. JANUARY, 1929. No 4

Peking Branch.

Peking Union Medical College, November 1, 1928.

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Kusama's "Typhus Bacillus Immune Horse Serum" in Experimental Typhus Fever in Guinea Pigs.

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Kusama[1, 2] reported the isolation of a gram-positive bacillus as the etiological agent of typhus fever. Later,[3] he reported that immune horse serum ("Typhus Bacillus Immune Horse Serum") prepared with this bacillus was of distinct value in the prophylaxis and treatment of experimental typhus fever in monkeys. In regard to the etiology of typhus, Kusama differs from the generally accepted view, and his results could not be confirmed by Rix.[4] It seemed of importance to test the action of his serum in guinea pigs infected with a strain of typhus virus kept in this laboratory for 9 months. Kusama kindly placed samples of the serum at our disposal.

The prophylactic and therapeutic action of the serum was tested in guinea pigs which were experimentally infected with a strain of typhus virus during its 20th passage through guinea pigs. The intraperitoneal injection of the virus (1/20 brain from an infected animal) into guinea pigs produced the characteristic typhus fever reaction. After an incubation period of 6 or 7 days the temperature rose to 40° or 40.5° C. and lasted for 10 or 11 days. All animals recovered.

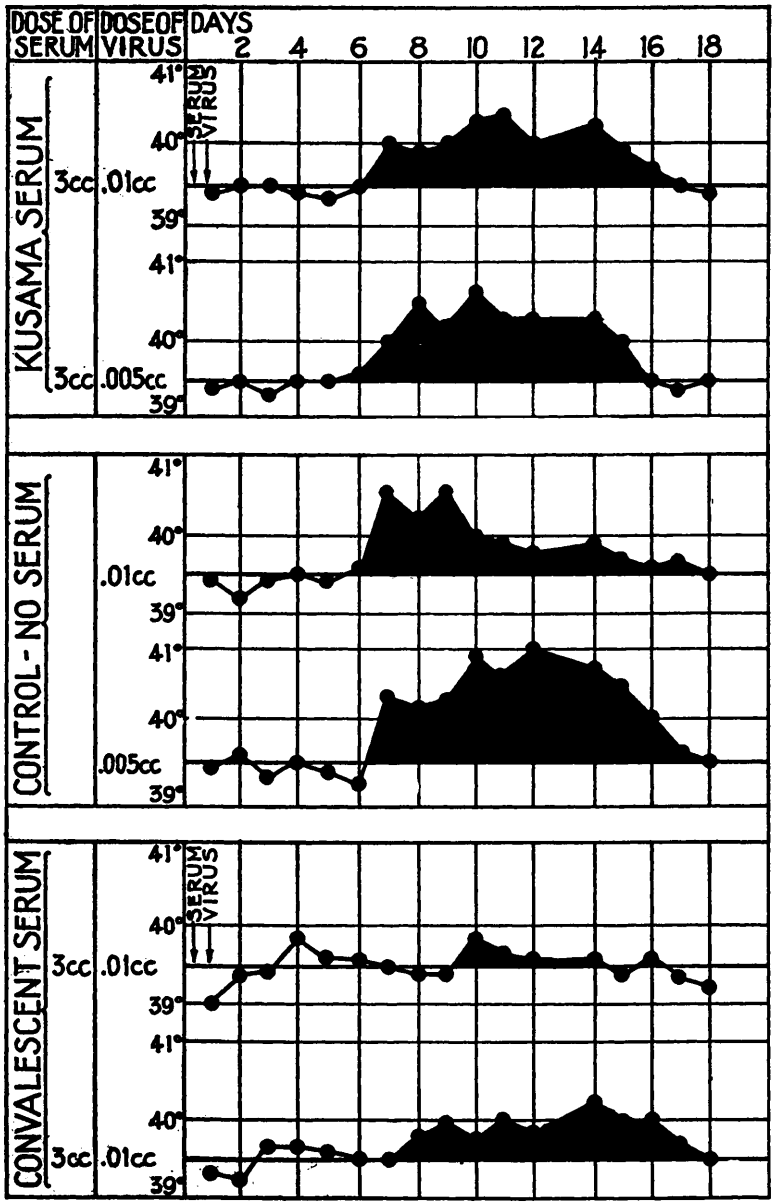
[1] Kusama, S., Yoshioka, S., and Ando, K., *Kitasato Arch. Exp. Med.*, 1925, vi, 199.

[2] Kusama, S., *Trans. 6th Cong. Far Eastern Assn. of Trop. Med.*, Tokyo, 1925.

[3] Kusama, S., Tsuchiya, H., and Nakajo, G., *Jap. Med. World*, 1927, vii, 161.

[4] Rix, E., *Zeit. f. Hyg.*, 1927, cviii, 103.

Prophylactic tests. 3 groups of 5 guinea pigs each were studied. One group received 3 cc. of Kusama's immune serum intraperitoneally 3 days before inoculation of typhus virus. In the second group



Experimental typhus fever reactions in guinea pigs uninfluenced by Kusama's serum compared with untreated controls and with animals partially protected by convalescent serum.

some of the animals received 3 cc. of Kusama's immune serum intraperitoneally and others the same amount subcutaneously 4 hours before injection of the virus. The last group received immune serum intraperitoneally 3 days after infection. For control tests 8 guinea pigs received virus alone while 6 were given 3 cc. of convalescent typhus serum subcutaneously 4 hours before infection. Convalescent serum is known to be of definite value in the prevention or modification of experimental typhus fever. In this experiment convalescent serum was obtained from guinea pigs on the 7th day after the temperature had returned to normal.

The guinea pigs were infected with graded amounts of brain virus ranging from 1/20 brain (0.05 cc.) to 1/200 (0.005 cc.).

The results of a typical experiment are shown in the chart. It is evident that the fever reactions of the guinea pigs which received Kusama's serum immediately before infection are about as severe and prolonged as in the control animals which were not given serum. On the other hand one of the animals injected with convalescent serum developed only a slight fever of short duration after an incubation period of 10 days. The other guinea pig showed a slight prolongation of the incubation period and a modification of the fever curve. Several guinea pigs receiving larger doses of virus (1/20 brain) were not protected by convalescent serum.

None of the animals which received Kusama's serum were immunized against infection with typhus fever virus while convalescent typhus serum appeared to have definite protective properties.

Therapeutic tests. Experiments were made in which Kusama's serum was administered daily in 3 cc. doses subcutaneously during the febrile period of experimental typhus fever in 3 guinea pigs. No beneficial effects either in the form of suppression of the fever or of shortening the febrile period were observed.

Conclusion: Kusama's "Typhus Bacillus Immune Horse Serum" had no influence on the prevention or course of experimental typhus fever in guinea pigs.