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Experimental Production of Tuberculous Intestinal Lesions in Guinea Pigs.

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In several hundred autopsies of guinea pigs with generalized tuberculosis, produced chiefly by subcutaneous, intraocular, intratesticular and intraspinal inoculation of tubercle bacilli, we have failed to discover any true tubercle formation in the intestines, although hypertrophy of the lymph nodes, particularly those in the cecum, do occur. Similarly, feeding guinea pigs with suspensions of virulent tubercle bacilli for a long time, or with food contaminated with fly specks containing the organisms, was unsuccessful in producing intestinal lesions.

On the other hand, inoculation of a virulent human strain (H 37) into the left ventricle of 23 normal pigs, either in single doses of 34,000 and upwards, or in three repeated doses of 30,000 to 5,000,000 organisms, resulted in 17 animals developing definite tubercles in the lymph follicles of the gut. The cecum is most frequently involved, and next in order the ascending colon and ileum. In a few cases, feeding contaminated sputum did not alter the typical lesion. Grossly, the lymphoid follicles are enlarged, and

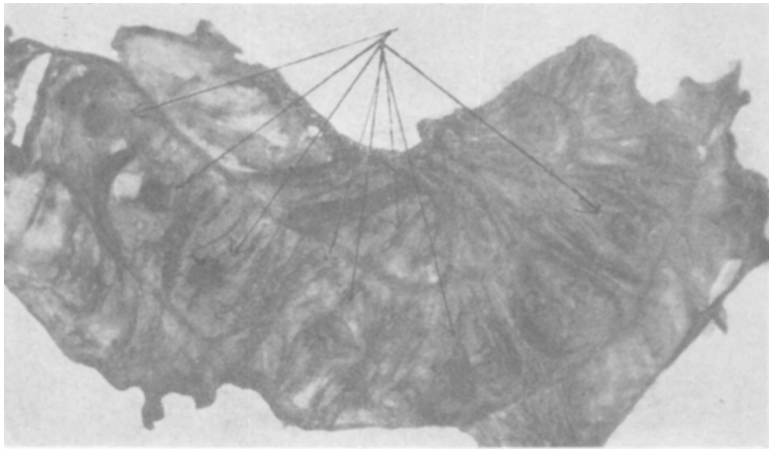

FIG. 1.

Photograph of the cecum of G. P. No. A220. This animal received a single dose of 0.25 cc. of an emulsion in saline of H 37 containing clumps and made by triturating a six weeks old colony on gentian-violet egg medium in 3 cc. of saline.

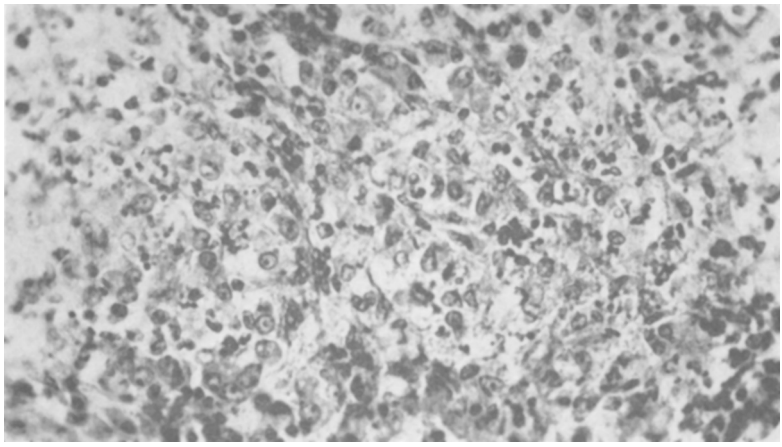

FIG. 2.

Microphotograph of one of the lesions in the lymphoid follicle of the cecum of G. P. No. E41, which died 64 days after a single inoculation of 34,000 H 37 into the left ventricle. Eosin Methylene-Blue Stain. X 400.

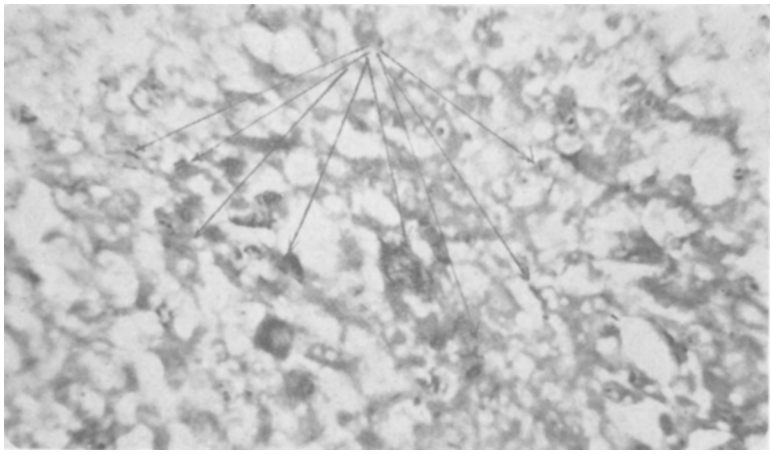

FIG. 3.

Microphotograph of the same section showing the acid-fast organisms. Ziehl-Neelsen Stain. X 900.

contain one or more small caseous tubercles. These are situated around the vessels, forming an irregular yellow tracery. Isolated tubercles are also to be found around vessels in the wall of the cecum distant from the follicles. In no case in normal animals have true ulcers been observed. The animals die in 34 to 79 days of generalized tuberculosis.

Microscopically, the lesions occur in the submucosa, especially in the lymphoid tissue of the cecum. The process is essentially a mononuclear infiltration, and cells with 2 and 3 nuclei are found. Polymorphonuclears, lymphocytes and nuclear debris make up the other constituents, while acid-fast organisms are to be found in the lesions, often in large numbers, either extra-cellular or phagocytosed. This lesion in every respect resembles the tubercles formed in normal animals in contradistinction to reinfected animals.

These observations raise the question of the hematogenous origin of infection in intestinal tuberculosis, rather than of direct transplantation through the gut wall. It is interesting that in guinea pigs, as in man, it is that portion of the gut supplied by the ileocecal branch of the superior mesenteric artery which is most often involved, and the glandular structure in this situation particularly.

This is a preliminary report.

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Relation of Temperature to Susceptibility of Host to Disease.

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In a previous paper[1] experiments were reported indicating that insolation or immersion in water for short intervals lowers the resistance of guinea pigs to a trypanosome infection. Since the insolation produced a rise of 1.5° C., and, immersion a fall of 2.5° C. in body temperature, there was a possibility that the effect might be referable to temperature changes. Experiments were therefore undertaken to ascertain the effect of low and high environmental temperatures on the relative susceptibility of animals to infection.

In the present series of experiments white rats were used instead of guinea pigs. Rats of the same age and weight were injected intraperitoneally with the same dose of trypanosomes *(Tr. evansi)* and divided into two groups. One set was placed in a dark room maintained at a temperature of 28° to 30° C., and a relative humidity of 45, the other was placed in a similar room and kept at a temperature of 10° to 12° C. and relative humidity of 70 to 80. In some experiments the rats were kept at the respective temperatures throughout the duration of the test; in others, groups of rats were transferred at short intervals from the hot room to the cold room and vice versa.