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DEPARTMENT OF THE ARMY
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Frederick, Maryland

The experimental development of associated infections of tuberculosis and brucellosis in the guinea pig.

by W. Sarnowicz

Since tuberculosis and brucellosis are frequently associated in cattle we propose to study the effect that one of these diseases is capable of exerting on the development of the other.

According to the studies of Roussacroix and Schaffer, a single injection of a suspension of Bang's bacillus killed by heat into a guinea pig already infected by Koch's bacillus does not appear to modify the development of the tubercular lesions; on the contrary 3 successive injections have a very marked effect: the ganglions do not delay in softening and suppurating, and the subjects succumb 48-54 days after the third injection; this is about 3 times behind (slower) the tuberculation.

Sanctis Monaldi and his colleagues, who studied the effect of the secondary infection caused by Bang's bacilli on the tuberculosis bacilli experimentally in guinea pigs, have stated that the action of the secondary infection caused by the Bang's bacilli mobilize the tuberculosis virus and make its investigation in the blood very easy.

For our experiments we have utilized living Bang's bacilli so as to mix the two infections and have obtained eventually as definite an action as possible of the Bang's bacilli on tuberculosis.

First series of experiments: effect of Bang's bacilli on tuberculosis.- We have ~~worked~~ worked on guinea pigs infected with tuberculosis, after 1, 2 and 3 months, some infected by human bacilli and others by bovine bacilli (1/10000 mgr of the germ).

After the delay indicated above they receive 0.5 cc of an emulsion of agar culture of Bang's bacilli, the stock from the research laboratory of Alfort, aged 48 hours (5 cc. of physiological water per tube). This stock has been made available to us by M. Binjard, adjutant director of the Laboratory of research to whom we address our heartfelt thanks. 6-8 control guinea pigs are associated with each of the series listed above, some with tuberculosis, others with Bang's bacilli. The guinea pigs were ~~infected~~ infected after one month and all died 80-95 days later of generalized tuberculosis with the ganglions enlarged and in process of supuration. The guinea pigs of the series which were infected with tuberculosis after two months died 60-80 days later. The subjects of the third series died after about 6 weeks rarely in about 2 months. For the two latter series it was difficult for us to determine the ~~acceleration~~ acceleration effect of the Bang's bacillus on the development of the lesions of the ganglions merely due to the tuberculosis. The control animals were living 3 to 4 months after the inoculations except for 2 which died after two months. The organs of the subjects in the experiment were removed immediately upon their death. A small part served for inoculating the culture and ordinary bullion for the study of Bang's bacilli; the remainder were treated with Sulfuric acid to isolate Koch's bacilli which were then inoculated into Lowenstein's medium.

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The culture was then placed on the other media; that is to say, on potato glycerine, on Sabouraud agar and on egg media.

Second series of experiments: The effect of Koch's bacillus on brucellosis:- The animals in the experiment received intraperitoneally 0.5 cc of an emulsion of Bang's bacilli containing 2 to 3 billion bacilli per cc; the bacilli came from an agar culture of 24 hours. After a delay of 2-3 months the guinea pigs were tuberculized by inoculation of $1/1000^{\text{th}}$ mgr of Koch bacilli (bovine stock). It should be noted here the the brucellosis infection evolved generally was of a very benign and inapparent form and that the animals would recover by themselves in a certain time. However, a certain number of the subjects infected by us were perhaps well at the time when we gave them tuberculosis. In the two groups the subjects ordinarily die in about a month. Some survived a month and a half or more while others died in about 15 days. Some subjects lived a little longer than the control animals; this could probably be attributed to their spontaneous recovery from brucellosis. The most striking symptom was a very rapid emaciation although the development of the tuberculosis was at times less marked.

Immediately after the death of the animals, we proceeded in the same manner as in the first series of experiments, in view of the same bacteriological studies. We have studied on the one hand Bang's bacillus and on the other hand Koch's bacillus. As in the first series of experiments we retrieved both of these bacilli. Nevertheless in some subjects the study of Bang's bacilli proved negative, especially in those which lived longer than the controls.

Conclusions:- The results of these two series of experiments allow us to make the following remarks.

- 1) ~~The association of the two diseases which we considered has generally in the subject an unfavorable although little important effect.~~ *in the subject.*
- 2) This association is especially bad when one inoculates Koch's bacilli into guinea pigs which have brucellosis.

*Transfr. French
by Robins*