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Susceptibility of the Hamster to Tuberculous Infection.

JOHN H. KORNS AND GEORGE Y. C. LU.

From the Department of Medicine, Peking Union Medical College.

The white mouse is known to be extremely resistant to both the bovine and the human strains of the tubercle bacillus. Koch found the field mouse more susceptible than the white mouse, but it is not known with what species of field mouse he worked. Certainly it was not the striped hamster, which is not found in Central Europe.

The striped hamster (*Cricetus griseus*) is very susceptible to infection with *Leishmania donovani* and these micro-organisms seem to mobilize the same type of cell that is mainly concerned in phagocytizing tubercle bacilli and initiating tubercle formation. So it was but natural to wonder if the hamster is not susceptible to tuberculous infection. The experiments here cited show this to be the case.

Known bovine and human strains of tubercle bacilli have been introduced by the subcutaneous, intra-abdominal and oral routes. The guinea pig was used chiefly to test the pathogenicity of the strains employed, as it is known to react to infection in a more or less uniform way. In the subcutaneous and intra-abdominal inoculations, homogeneous suspensions of 0.1 mgm., dried weight, of tubercle bacilli were administered to hamsters and white mice, and 1.0 mgm. to guinea pigs, as the weight of the latter was approximately ten times that of the former. In the feeding experiments an excess of tubercle bacilli was mixed with the feed, no attempt being made to measure the amount ingested. One animal of each series

was sacrificed weekly. At autopsy gross studies were made, and microscopic examination of sections of lung, liver, spleen and tracheo-bronchial lymph nodes was done, and it was found that after six weeks of infection a gross diagnosis of tuberculosis of the lungs could be made in nearly every hamster, whereas this could not be done in the majority of the white mice. The gross lesions in the hamster were not so large as in the guinea pig and showed less tendency to caseate, but tubercle bacilli were much more numerous in the hamster's tissues and usually could be found easily in smears from the lungs, tracheo-bronchial lymph nodes and spleen. In the feeding experiments sections from the intestines were studied. In 4 out of 10 hamsters that had been infected with the human strain

TABLE I.
Incidence of Tuberculous Infection of Hamsters and Guinea Pigs from Subcutaneous Inoculation of Tonsils and Pleural Fluids.

Case No.	Inoculation	Hamster.			Guinea Pig.		
		Amt.	Gr.	Mic.	Amt.	Gr.	Mic.
1	L. T.	0.4	0		4.0	0	0
	R. T.	0.4	0	0	4.0	0	0
2	L. T.	0.4	+	+	4.0	+	+
	R. T.	0.4	+	+	4.0	+	+
3	L. T.	0.2	0	0	2.0	0	0
	R. T.	0.4	0	0	4.0	0	0
4	L. T.	0.1	0	0	1.0	0	0
	R. T.	0.1	0	0	1.0	0	0
5	P. F.	1.0	0	0	4.0	++	++
	P. F.	0.5c*	0	0	4.0c*	0	++
6	P. F.	1.0c	0	0	4.0c	0	0
	P. F.	1.0	0	0	4.0	0	0
7	P. F.	1.0c	0	0	4.0c	0	0
	P. F.	1.0	0	0	4.0	0	0
8	P. F.	1.0c	+	+	4.0c	+	+
	P. F.	1.0c	+		4.0c	+	†
9	P. F.	1.0	+		4.0	+	+
10	P. F.	1.0	0	0	4.0	0	0
	P. F.	1.0c	0	0	4.0c	0	0
11	P. F.	1.0c	+	+	14.	0	0‡

*Centrifugalized sediment. † and ‡ see text.

for more than 5 weeks the duodenal wall showed tubercles; in 4 out of 10 infected with the bovine strain the duodenal wall likewise showed tubercles and the wall of the colon showed them in three. The white mice were all negative. Apparently the hamster develops generalized tuberculosis through ingestion as readily as does the guinea pig. Yet, in 200 careful autopsies, we have not seen spontaneous tuberculosis in the hamster. At autopsy the spleen was weighed routinely and was found to have increased markedly in the infected hamsters but only slightly in the white mice.

The dosage was large, and it might be wondered whether the hamster is sufficiently susceptible to be useful as a diagnostic medium for tuberculosis in the hospital. Table I illustrates a parallelism between the hamster and the guinea pig in susceptibility to tuberculous infection, even when relatively small numbers of bacilli are introduced. The tonsils in Case 2 did not show tuberculosis histologically, though serial sections were not made. None of the pleural fluids showed tubercle bacilli when examined microscopically. In Case 11 the hamster showed tuberculosis while the guinea pig did not. The latter was inoculated intraperitoneally. There is another discrepancy in Case 5 where the hamsters are negative and the guinea pigs positive. A plausible explanation lies in the fact that the second guinea pig of Case 8, which was in the same cage with those of Case 5, died on the nineteenth day after inoculation and was found largely eaten by the guinea pigs of Case 5. As the former was tuberculous the latter could have become infected in this way. Elsewhere¹ the more practical usefulness of the hamster for this type of diagnostic work in China is discussed.

¹ Korns, J. H., *China Medical Journal*. In press.