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OF GREAT GERBILS TO P. PESTIS DURING
THE DEVELOPMENT OF THE EPIZOOTOLOGICAL PROCESS

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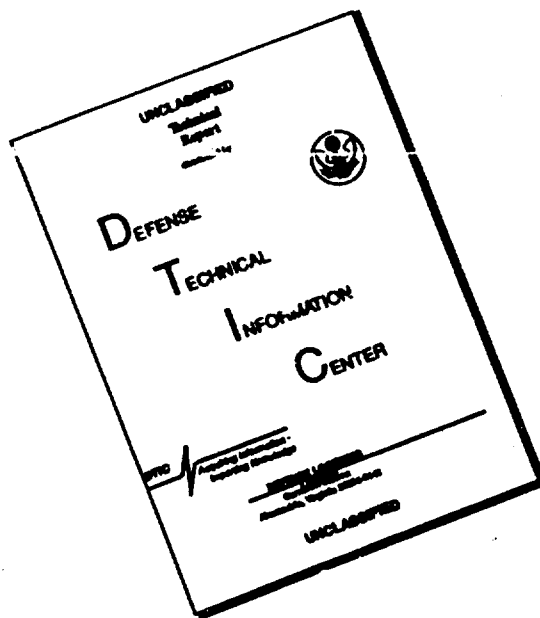
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OBSERVATIONS ON THE ROLE OF THE REACTIVITY
OF GREAT GERBILS TO P. PESTIS DURING
THE DEVELOPMENT OF THE EPIZOOTOLOGICAL PROCESS

Report I. The Sensitivity of the Great Gerbils to Plague Infection As An Index of the Contact of Their Populations with P. Pestis.

[Following is the translation of an article by L.A. Peysakhis and K.M. Muminov, published in the Russian-language periodical Materialy Nauchnoy Konferentsii po Prirodnoy Ochagovosti i Profilaktike Chumy (Materials from the Scientific Conference on the Natural Focalness and Prophylaxis of Plague), Alma-Ata, Chimkent, Feb., 1963, pages 171--173. Translation performed by Sp/7 Charles T. Ostertag, Jr.]

The problem concerning the reactivity of non-hibernating carriers of the plague microbe in the development of the epizootic process remains subject to discussion.

We carried preliminary observations on the study of the sensitivity of great gerbils on the territory of Yuzhniy Pribalkhash, which is an active part of the huge Central Asian Desert focus of plague (Peysakhis, 1961). In 1961--1962 in searching for the interrelation between the reactivity of the main carriers of infection to the plague microbe and the regularities of the epizootic process, we conducted a series of experiments in an active plague focus -- Muyun Kum (Chu-Talasskoye interfluvial area).

The work in Muyun Kum was carried out with great gerbils which were captured in three sectors which differed sharply in epizootic characteristics.

1. Batyshkudukskiy sector. Here in 1958--1959 a very acute and diffused plague epizootic was recorded. In the second half of 1959 the epizootic process began to transform into the phase of depression, and in 1960--62 only sporadic cases of plague infected gerbils were observed.
2. The Karachardinskiy sector with sporadic cases of plague infected gerbils in 1958--1960, and the aggravation of the process in 1961 in the form of a local but quite acute epizootic.
3. The Vostochnyy sector, the epizootic investigation of which up until the fall of 1962 did not reveal the presence of the plague microbe in great gerbils.

In April, May and September 60 adult great gerbils were captured from

each of these sectors and following a six-day containment their degree of sensitivity to the plague microbe was studied by means of determining the LD50. 12--15 gerbils from each sector were infected with a certain dose. For infection we used the typical gerbil strain of the plague microbe 31 with a stable virulence (the DCL for guinea pigs is 100 microbial bodies). All told over a period of two years six series of tests were carried out on 994 gerbils.

The indices of sensitivity of great gerbils to the plague microbe are presented below (expressed in the logarithms of the LD50).

	<u>Sectors</u>		
	<u>Karachardinskiy</u>	<u>Batyshkuduškiy</u>	<u>Vostochnyy</u>
1961 April	8.02	8.52	8.0
May	8.86	8.42	8.4
September	8.3	7.0	6.9
1962 April	8.8	6.8	5.4
May	8.2	8.0	7.0
September	9.0	8.8	9.0

It is apparent from the table that gerbils inhabiting a zone of active and a recently occurring epizootic (Karachardinskiy sector) were distinguished by a stabler and comparatively high resistance to the plague microbe. An analysis of the sensitivity of the animals to the plague causative agent in the former epizootic Batyshkuduškiy sector and in the former non-epizootic Vostochnyy sector did not reveal any existing differences. Along with this, in both sectors the fluctuation in the sensitivity of gerbils was expressed significantly more sharply than in the epizootic Karachardinskiy. Here it must be stressed that the resistance of gerbils in the Vostochnyy sector in three cases out of six reached that of animals which inhabited the zone of an active epizootic.

A study of the frequency and intensity of bacteremia in test gerbils which were captured in sectors with various epizootic characteristics did not expose any significant differences.

On the basis of the work which was carried out in the foci of Yuzhnyy Pribalkhash and Muyun Kum, and also the materials presented by us earlier (Peysakhis, 1961), we came to the following conclusions.

In general the population of great gerbils are characterized by a relatively high susceptibility, but a low sensitivity, to plague infection. Apparently this is a physiological peculiarity of great gerbils as a species.

Nevertheless the greatest resistance is displayed by gerbils from sectors of foci in which the epizootic process is beginning to die out. This

is probably explained by a certain selection in the process of an epizootic of the most resistant specimens of the population as a result of the dying off of highly sensitive and the accumulation of immune animals.

Resistance to the plague microbe on the part of populations of great gerbils, residing in epizootic sectors, is an unstable phenomenon, and as part of the cessation of the epizootic quite rapidly evens out with that of animals in nonepizootic zones. This we endeavor to explain by the yearly intensive change of specimens in the population of great gerbils.

The sensitivity of great gerbils to the plague microbe, both in former epizootic and nonepizootic territories, undergoes very perceptible changes in various years and seasons. In a number of cases the indices of resistance of animals to plague infection in a nonepizootic territory are no lower in gerbils which had resided in epizootic sectors.

Apparently, based on the degree of sensitivity of great gerbils to the plague microbe, an authentic judgement cannot be made on the existence in the past or of the present contact of this or that population of animals with the causative agent.