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(Preliminary Report)

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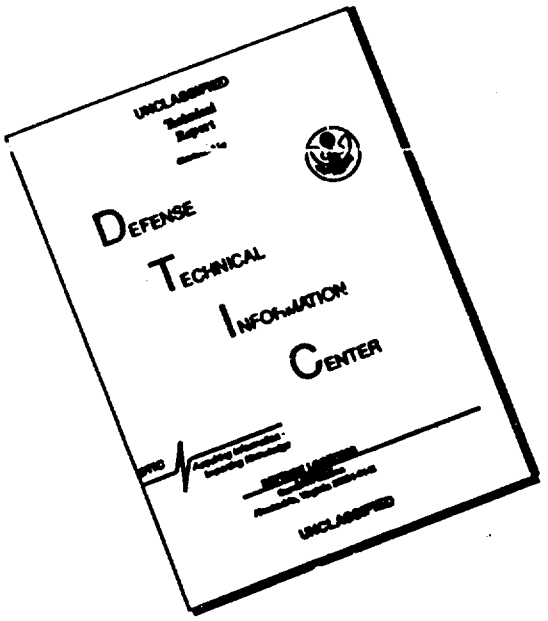

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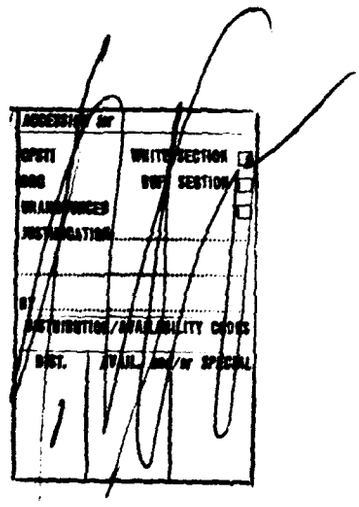

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AEROSOL VACCINATION WITH TISSUE CULTURE VACCINE AGAINST ORNITHOSIS
(Preliminary Report)

[Following is the translation of an article by I.I. Tersikh and A. Yu. Bekleshova, Institute of Virology imeni D.I. Ivanovskogo, AMN, USSR, Moscow, published in the Russian-language periodical Voprosy Virusologii (Problems of Virology), No 1, 1965, pages 99--100. It was submitted on 16 Jul 1963. Translation performed by Sp/7 Charles T. Ostertag, Jr.]

It is known that among workers in the poultry industry or on poultry farms there is around a 30% incidence rate with ornithosis with loss of labor up to one month. Besides this, in a certain number of cases there are after-effects: Pneumosclerosis, affliction of the cardiovascular system, hepatitis.

At the present time the measures for prophylaxis are individual protection (use of respirators), general hygienic measures, ventilation of the premises, and others, which often are not fully observed by individuals and therefore do not always achieve their aim.

For these collectives there is great importance in the possibility of establishing a specific prophylaxis for ornithosis. Up until the present time ornithosis vaccine is in the stage of experimental development. Different authors (Wagner, Maykidzhon, and others, 1946) were more successful in creating a resistance in vaccinated animals to the ornithosis virus (in doses of 100 and 1000 LD_{50}) only when it was administered intraperitoneally. In an attempt to test the resistance of an animal with the natural mechanism of infection, that is, with the respiratory route, the animal turned out to be unprotected.

Taking into consideration that during ornithosis cellular immunity is most expressed, then for the protection of an animal against the natural mechanism of infection the appropriate method of vaccination should be tested, that is the aerogenic route. With this aim we developed a method of aerosol vaccination with a killed tissue culture vaccine. From our point of view the following requirements are set forth for the method: The vaccine being sprayed should not contain serum protein and should be hyaline; vaccination should be carried out in a chamber with a finely dispersed sol (particle dimension of the sol around 1 micron).

For preparation of the vaccine we selected a culture of chick fibroblasts to which the virus (strain B) was adapted. Such an adapted strain accumulates intensively in a tissue culture. After 72 hours the titers of the virus are equal to LD_{50} 10^8/0.03 ml (with intracerebral titration on white mice). For the vaccine we used a culture of the virus on medium No 199 without serum. Inactivation of the virus was achieved by the prolonged influence of a mild temperature (37°) and the presence of merthiolate (preservative). Such treatment did not lower the antigenic activity of the vaccine.

Antigenic properties were studied on hamsters, rabbits and guinea pigs. After a triple immunization complement fixing antibodies (1:32) built up in the blood serum of these animals, and the neutralization index corresponded to 1.5--2 lg. For testing the resistance of the animals we carried out an aerosol immunization in an IVK_2 chamber (and the IVK_1). The vaccine was sprayed with a new design metal sprayer* and the dimensions of the sol did not exceed 1 micron for 80% of the particles. Such an aerosol dispersion created a persistent mist of vaccine, in which the animals breathed freely. When testing the various methods of immunization it was established that a triple immunization with a long interval (7--10 days) gives the best results in tests on mice, hamsters and guinea pigs. Such a vaccination protected white mice from aerosol infection with the virus (Lori and B strains) in doses of 100 and $1000LD_{50}$. After infection with such a dose of virus in an aerosol 70--65% of the vaccinated mice survived. All the other animals survived in 100% of the cases (with the complete death in the control).

For a conclusive evaluation of the tissue vaccine against ornithosis it is necessary to carry out tests on monkeys. In this case it is necessary to carry out x-ray examination (dynamically) of the animals' lungs after they had been subjected to aerosol infection with the virus following vaccination. This more thorough method of evaluating the resistance of an animal was developed in our laboratory (1955--1959). As the investigations showed it should be compulsory that the effectiveness of the ornithosis vaccine be approved in tests on monkeys with infection by a virus aerosol. After conclusive tests on monkeys it will be possible to resolve the problem of putting the vaccine into practice.

* A. I. Gromyko and I. V. Kashin, 1952.