Stability of Specific Bacteriophage Stored on Filter-Paper Strips for the Rapid Identification of Pasteurella pestis

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The use of bacteriophage specific for Pasteurella pestis, stored lyophilized on strips of filter paper as described by Cavanaugh and Quan (Amer. J. Clin. Pathol. 23:619, 1953) and by Baltazard et al. (Bull. World Health Organ. 14:457, 1956), has recently been recommended for the identification of the plague bacillus (Harris and Coleman [ed.], Diagnostic procedures and reagents, 4th ed., American Public Health Association, New York, 1963). In this method, strips of filter paper are impregnated with bacteriophage, lyophilized, and sealed under nitrogen. For identifying suspect organisms, the phage strip is overlaid across streaks of the organisms to be tested, with a known strain of P. pestis included as a positive control and a strain of P. pseudotuberculosis as a negative control. Incubation overnight at 20°C results in zones of lysis, extending from the filter paper outward, in the P. pestis growths.

The length of time these preparations can be stored was given as 2 to 5 years. We have found this estimate to be valid, as phage prepared on 19 May 1960, by the method described, has been used successfully for over 4 years.

However, at the time of this lyophilization in 1960, additional strips of filter paper were impregnated with the phage and sealed under nitrogen without being lyophilized. These strips, kept at 4°C during the past 4 years, have recently been tested. When compared with the 4-year-old lyophilized material and with freshly prepared strips both lyophilized and moist, the phage on the 4-year-old moist strips lysed the test cultures with no difficulty. In fact, no differences in rate or extent of lysis were apparent among the four types of preparations. These results were obtained with strains of P. pestis from several sources, ranging from avirulent laboratory strains to freshly isolated, virulent bacilli. Replicate trials produced identical results. It appears, therefore, that freeze-drying of the phage preparations is not necessary, and that the lyophilization procedure, which is time-consuming and injurious to a proportion of the virus particles, can be eliminated.

In the rapid identification of P. pestis, these observations: (i) confirm the value of specific bacteriophage stored on filter-paper strips for several years, and (ii) simplify the method of preparation of these strips. The results suggest that the bacteriophage can be stored on filter-paper strips for periods of time up to several years, without the need for lyophilization, and be used successfully.