teriophage. Briefly, the method depends upon the fact that with a set concentration of growing phage-susceptible bacteria and varying concentrations of phage, the time of lysis is a function of the initial phage concentration. An arbitrary turbidity standard is chosen as an end-point and the periods of time required to reduce to this level the dense bacterial suspensions in unknowns and in dilutions of "Standard phage" are recorded. (Standard phage is readily prepared in quantity. Its titer is defined in terms of arbitrary activity units and it may be kept at 4° C. for months without change in titer). By plotting the time required for the unknown to reduce the suspension to the standard end-point, the activity of the unknown solution may be calculated in terms of the activity of the standard phage with an accuracy of about ± 3 per cent.

Necessary conditions for satisfactory results are: (1) Constant temperature; (2) mechanical rocking of the test series to avoid settling of the bacteria; (3) accurate determinations of numbers of bacteria both in setting up the test and in reading bacterial concentrations during lysis;[2] (4) careful dilution technique and accurate time measurements.

Routine daily use of the method has brought out the following points in its favor: (a) Twenty to thirty unknowns may be conveniently run at once; (b) time required for the entire test is < 5 hours; (c) results are accurate to within ± 3 per cent., a figure based upon an analysis of the last 60 series run in this laboratory; (d) the procedure is definitely more reliable and is more easily carried out than either the plaque count or dilution technique ordinarily used in determining phage titers; (e) kinetic analysis of the phage-bacterium reaction predicts the relationship between phage concentration and time of lysis on which the quantitative determination depends.[3]

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THE MECHANISM OF ENHANCEMENT OF INFECTIONS BY TESTICLE EXTRACT[1]

IN a series of publications Reynals has reported the observation that testicle extract to a marked degree, and certain other organs to a less extent, enhance the lesions produced by vaccine virus and staphylococcus infections.[2] Hoffman has obtained similar results with several other viruses[3] and Pijoan with a number of other bacteria.[4] A possible explanation of the enhancement mechanism was suggested by the observation that the wheals resulting from intracutaneous injections of the infectious agents with testicle extract disappeared more rapidly than those resulting from injections of the agents with inactive organ extracts. On the basis of this clue a large series of experiments has been carried out in order to determine the effect of testicle extract on the diffusion of inert substances in the skin.

For the main experiments India ink was used as the test substance. A mixture of this suspension was made with equal amounts of the various organ or tissue extracts, and 0.25 cc of each mixture was injected intracutaneously in the shaved skin of rabbits. The maximum spread of all mixtures was reached within an hour, so this period was selected for measurements. The results of a number of experiments were as follows. The average size of the area of spread for India ink-testicle extract mixture was 4.5 x 3.5 cms, while that for the control of India ink and Ringer's solution was 2.5 x 2.1 cms. The other extracts with India ink gave less striking differences. Kidney and to a less degree spleen extracts gave spreads larger than the controls, but rat and rabbit serum seemed to be without effect on the diffusion of the ink.

Another point noted, which may have a bearing on the enhancing power of testicle extract, is that the ink particles were not only spread through a wider area under the influence of the factor, but great numbers of the particles were found either in the cells or adhering to the cells. With the inert extracts the injected particles lay in the tissue spaces with no especial contact with the cells. This suggests a second effect of the enhancing substance, namely, an increased permeability of the local host cells. The activity of the testicle extract in enhancing infections as well as increasing the spread of inert particles is destroyed by heating at 60° for 30 minutes.

The tentative conclusion indicated by these observations is that the enhancing property of testicle extract on infections is at least partly due to the fact that it increases the area of spread of the injected material and increases cell permeability. The details of the experiments with a fuller discussion will be given in a subsequent publication.

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