

Inside the membrane	Live staphylococci	Live staphylococci	Dead staphylococci	Dead and live staphylococci
Outside the membrane	Bacteriophage	Dead staphylococci Bacteriophage	Live staphylococci Bacteriophage	Bacteriophage
Results	Lysis inside	Lysis inside None outside	Lysis outside No lysis inside	Lysis inside of dead and live staphylococci

The ferment-like substance responsible for lysis of dead bacteria is easily adsorbed on the clay filter; it is heat labile, and is quickly inactivated on standing. In these respects it differs markedly from the substance to which transmissible lysis of live bacteria is due.

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Changes in viscosity during lysis of bacteria by bacteriophage.

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The fact has been observed that prior to lysis in the presence of the bacteriophage, bacteria usually undergo more or less marked swelling. The extent of swelling and the relative proportion of swollen bacteria, as well as the actual relation between swelling and lysis are difficult to establish by direct microscopic examination, because the swelling and lysis of bacteria go on simultaneously and continuously, and because the degree of swelling of individual bacteria varies to such an extent that results of such an analysis must, of necessity, be highly subjective. Moreover, in the case of cocci it is very difficult to decide whether or not swelling takes place at all.

It seemed, therefore, that since swelling of bacteria increases the relative volume occupied by the solids in the medium, the swelling of the total bacterial mass (with proper correction for growth) should bring about an alteration in viscosity of the solution.

Measurements were made both by means of a capillary viscosimeter of Ostwald and in the torsion viscosimeter of du Noüy. It was found that in general the viscosity of the mixture of bacteria with a corresponding bacteriophage increases steadily up to the time when visible lysis sets in, at which time the viscosity begins to diminish until it gradually reaches the original level.

In general, the greater the relative concentration of phage, the sooner the maximum viscosity is attained. The greater the number of bacteria (within the limits compatible with the concentration of phage present) the greater is the percentage of change in viscosity. At its maximum, the increase in viscosity of the mixture has varied in the experiments thus far performed, between 14 and 50 per cent, depending on the relative concentration of bacteria and bacteriophage. When calculated according to the formula of Kunitz¹, these results indicate an average increase of the volume occupied by bacteria of from 6 to 12 times. If, in place of living, susceptible bacteria, one employs a culture of homologous, resistant variant, or heterologous bacteria, or homologous, susceptible bacteria killed by heat, the viscosity remains unchanged. The heated bacteriophage which is devoid of its lytic power does not induce swelling of bacteria, and the viscosity of the original mixture remains unchanged.

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The production of antirachitic properties in human milk resulting from irradiation of the mother.

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Since it has been established that exposure to sunlight or to ultra-violet rays from artificial sources is able to protect animals or infants from rickets, the question arises whether this protective quality can be transmitted through the milk by the mother

¹ Kunitz, M., *J. Gen. Phys.*, May, 1926, Vol. ix, No. 6.