

Bacteriophage as a Specific Antigen

Bacteriology

J. BRONFENBRENNER, in *The Newer Knowledge of Bacteriology and Immunology* (Univ. of Chicago Pr.):

It has just been suggested that the particles seemingly endowed with the power of initiating transmissible lysis may not represent autonomous "corpuscles" of a parasite, but serve merely as a vehicle on which the active principle is absorbed. The active agent itself, however, may still be particulate, i. e., may consist of minute aggregates composed of a number of molecules each, and these small aggregates may still possess all the characteristics previously ascribed to larger carrier-particles. These aggregates, though perhaps considerably smaller than 20 $\mu\mu$ in diameter, may still represent, according to the definition of D'Herelle, "colloidal micellae which differ from other forms of life only in their size." That the active agent may not be a crystalloid is suggested, for instance,

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berries in drooping clusters instead of the crowded erect masses of black seeds of the upland sumacs.

It is possible to insure oneself against ivy and sumac poisoning. If you know you are susceptible, wash your hands and face in a five per cent. solution of ferric chloride in water—your druggist can mix it for you—and let it dry on the skin. A little glycerine added will make it more agreeable to apply. That will neutralize the poison when you meet it.

If you have not taken this precaution, and find yourself poisoned, then use a three to five per cent. solution of potassium permanganate, which your druggist can also supply. Swab it on with a bit of cotton. It will sting a bit, but it will kill the poison. The brown stain on the skin can be removed afterward with a one per cent. solution of oxalic acid.

Science News-Letter, May 26, 1928

by its behavior with respect to solubility. Once dried, the preparations of bacteriophage cannot be brought to the state of initial dispersion in water. This is particularly true of purified preparations of bacteriophage deprived of all, or nearly all, of the extraneous material. The colloidal nature of the active agent is further evidenced by the fact that it acts as an antigen and causes the production of specific antibodies when introduced parenterally into experimental animals. While the antisera thus obtained are capable of neutralizing the activity of the bacteriophage, they usually show simultaneously the presence of agglutinins, opsonins, precipitins, and complement-fixing antibodies for homologous bacteria. Moreover, purely antibacterial sera apparently possess the power to inhibit the progress of lysis by homologous bacteriophages. In spite of the inference suggested by these findings, it has been possible to establish that the active principle possesses independent (autonomous) antigenic value. Thus, when sera prepared by immunization with filtrates of lysed cultures are absorbed with homologous bacteria, they no longer react with bacteria and their products, but retain their power to neutralize the bacteriophage unimpaired. If the filtrates of lysed cultures are purified by removal or digestion of bacterial protein, leaving only the active principle, the anti-sera obtained by immunization with such purified preparations do not react with bacteria, while they do neutralize the phage. Moreover, in the case of phages capable of acting on several related species of bacteria, the antigenic specificity of the filtrate is constant for each phage and is independent of the bacterial substratum which was used to obtain the active filtrate.

As for the phage-inhibiting activity of antibacterial sera, it has been demonstrated that this action is not directed against the phage, but against the bacteria, rendering them less susceptible to lysis. It has been suggested that this effect is probably due to the saturation by agglutinins of receptors susceptible to union with phage.

It appears then that when filtrates of lysed cultures are used in immunization of animals, the agent of transmissible lysis acts as a specific antigen, independently of other anti-

gens, notably those of bacterial origin, present in the filtrates at the same time. The question naturally arises: Is the active agent therefore to be considered an autonomous, organized being, totally foreign to bacteria and multiplying at their expense, or can it still be a product of bacteria, accumulating in the culture during the growth or during the lysis of bacteria, but antigenically distinct from them?

Science News-Letter, May 26, 1928

New flying rules established by the Department of Commerce prohibit acrobatic maneuvers at less than 1,500 feet.

The barking sands in the Hawaiian Islands give forth a sound like the barking of a dog when rubbed together or slid over.

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