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Cutaneous Reactions with Streptococcus Filtrates in Rabbits Rendered Allergic with Extracts of Guinea Pig Kidneys.

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In a series of articles published in *La Pediatria,* Di Cristina, Sindoni, and Caronia[1] describe a small diplococcus which they are able to obtain in culture from scarlet fever. These authors attribute certain specific reactions to this diplococcus which resemble the reactions obtained with the hemolytic streptococcus isolated from cases of scarlet fever in this country. The diplococcus has been obtained in blood cultures from scarlet fever and grown in media containing fragments of guinea pig tissue. When the filtrates of these cultures are injected intracutaneously, the response is apparently identical with that resulting from an intracutaneous inoculation with a filtrate of *Streptococcus scarlatinae.* These authors have prepared vaccines which they believe are capable of inducing an active immunity in persons susceptible to scarlatina.

In 1925 Brokman[2] and his associates undertook a comparison of the properties of scarlatinal hemolytic streptococcus and this diplococcus of Di Cristina and Caronia. Carbolized vaccines prepared with whole cultures of the diplococcus were employed to immunize both rabbits and human subjects. In both instances serum obtained after immunization agglutinated the hemolytic streptococcus in low titre. The rabbit serum neutralized the cutaneous reaction obtained with the streptococcus filtrates. As a control experiment, rabbits were immunized with the uninoculated Tarozzi-Noguchi medium employed in culturing the diplococcus for the vaccines. Autolyzed guinea pig tissue was contained in one type of medium and not in the other. Serum from the rabbits injected with the first type of medium agglutinated the hemolytic streptococcus, and neutralized the toxic effects of intracutaneously injected filtrates. Several volunteers, showing positive cutaneous scarlatinal tests, were negative after immunization with this uninoculated broth. The broth without guinea tissue was impotent. The authors conclude that guinea pig kidney and the hemolytic streptococcus associated with scarlet fever contain related antigens.

As we have been interested in sensitization with filtrates of *Streptococcus scarlatinae,* we undertook a study of the reactions occurring

during intravenous immunization with autolyzed guinea pig kidney. The kidney was removed and hashed under sterile precautions, then allowed to autolyze at 37° C. in physiologic saline solution. This solution was passed through a Berkfeld filter. Four rabbits were then tested with two extracts of guinea pig kidneys, and with filtrates of streptococci from scarlet fever and erysipelas. One of these rabbits gave faint cutaneous reactions with both streptococcal filtrates. All other initial tests were negative. These animals were given four intravenous inoculations with one of the solutions of autolyzed kidney at intervals of about 12 days. Before each intravenous injection serum was obtained for agglutination and precipitin reactions, and the skin of each rabbit was tested with small amounts (1/10 cc.) of the two kidney extracts, and with similar amounts of scarlatinal and erysipelas filtrates. Tests were made with both heated (98° C. for two hours) and unheated filtrate.

The sera obtained from these rabbits were tested for agglutinins with two strains of streptococcus from scarlet fever, and two from erysipelas, but no agglutinins could be demonstrated. There was no precipitation with the filtrates from the cultures of these strains but the sera from two of the rabbits gave weak precipitin reactions with both kidney filtrates. Precipitation was apparent with a 0.1 dilution of the antigen 11 days after the initial inoculation and with a 0.01 dilution with sera obtained at later intervals.

The rabbits showing the positive precipitin tests were likewise cutaneously sensitive to the filtrates of the streptococcus cultures, and to the kidney extracts. One of the rabbits reacted to the unheated scarlatinal and erysipelas filtrates on the 11th day, but these were the only positive reactions obtained in this animal at any time thoughout the experiment. The second animal was sensitive to the unheated streptococcal filtrates by the 10th day, to both kidney extracts by the 20th day and to the heated filtrates at the end of 4 weeks. All these positive reactions persisted in this rabbit until the 6th week, when the animal was shocked by an intravenous injection of the kidney extract. Following the shock all the reactions were negative. During the course of the experiments controls were made with broth and with 2 atoxic *staphylococcus aureus* filtrates. These injections gave no cutaneous reactions. With the exception of the fact that the reactions with the streptococcus filtrates were at no time neutralized by either scarlatinal or erysipelas antitoxic sera the reactions resembled those obtained in rabbits rendered allergic with filtrates of scarlatinal and erysipelas strains.

The question of sensitization to bacteria is exceedingly complex. It seems unwise to draw too concrete conclusions from experimental

work along these lines. This is especially true in the present experiments on account of the limited number of animals which we were able to study. We may say, however, that rabbits can be rendered allergic to certain streptococcal filtrates by injections of autolyzed guinea pig kidney solution, and that the cutaneous reactions in these rabbits show no specificity for either the scarlatinal or erysipelas groups. The reactions are probably not due to toxin, since reactions are obtained with filtrates which have presumably been heated until atoxic. None of the rabbits studied reacted with broth or with *staphylococcus aureus* filtrates. The reactions with the streptococcus filtrates were always the earliest to appear and were the most prominent of all. They appeared simultaneously with the occurrence of the kidney precipitin. For these reasons we must assume that the filtrates and the kidney solutions contain related allergens possessing some degree of mutual specificity. This is a complete report.

[1] Caronia, G., and Sindoni, M., *La Pediatria*, 1923, xxxi, 14. Di Cristina, G., and Caronia, G., 1925, i, 1. Caronia, G., *La Pediatria*, 1925, xxxiii, 7.

[2] Brokman, H., Fejgin, B., Hirszfeld, H., Meyzner, M., and Przesmycki, F., *Compt. rend. Soc. d. Biol.*, 1925, xciii, 946; *ibid*, 944.

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The Reaction of Vesicular Stomatitis Virus to Ultra Violet Light.

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Since bacteriological methods have so far failed to yield direct evidence of the nature of the active agent of vesicular stomatitis of horses, which is classed as a filterable virus disease, we have sought indirect evidence of its character in a comparison of the behavior of this virus with that of a common bacterium, *S. aureus*, under exposure to ultra violet light. The reactions of *S. aureus* to measured amounts of monochromatic energy at various frequencies may be considered typical of the behavior of bacterial protoplasms, and we have used the loss of transmissibility of a fixed vesicular stomatitis virus, active for guinea pigs, and the failure of subsequent colony formation by *S. aureus*, as indices of a similar reaction under ultra violet irradiation.

Active vesicle contents from lesions in the posterior foot pads of guinea pigs was aspirated and diluted 1:10 in buffered peptone broth