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Influence of Secretions of the Upper Respiratory Tract on Tissue Resistance.

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Duran-Reynals¹ and others have shown that extracts from certain organs such as testicle greatly enhance the invasion of tissue by various bacteria and viruses. This can be demonstrated by injecting into the shaved skin of a rabbit a living suspension of pathogenic bacteria mixed with the organ extract to be tested and at another site an equal number of bacteria in plain broth or saline. After 24 hours a comparison of the size of the lesions and the relative degree of necrosis furnishes an index of the enhancing rôle of the tissue extract.

We have investigated a similar effect exerted by secretions from the upper respiratory tract. In most of our experiments we have employed a virulent strain of *B. lepi-septicum* (R. D.) as this organism is quite pathogenic for rabbits and produces a slowly progressing cutaneous lesion which has become familiar to us from previous experiments. The experimental material was obtained by irrigating with plain broth the nasal passages of various individuals both normal and those suffering from acute colds. This material was passed through Berkefeld or Seitz filters and tested aerobically for sterility. This was then concentrated by distillation *in vacuo* to approximately one-fifth the original value and preserved in the ice-box with cystein 0.25% under vaseline seal. In other cases, fresh material was used without concentration. As control some of the broth was treated in an identical manner. In most of our experiments .2 cc. of the washings were mixed with .1 cc. fresh, thin saline

¹ Duran-Reynals, *J. Exp. Med.*, 1929, **50**, 327.

emulsion of *B. lepi-septicum* and .2 cc. of this mixture injected into one flank of a rabbit while in the opposite side an identical preparation of organisms and control broth was injected. In approximately 40 experiments it has been noted that with the presence of nasal excretions the areas of infection were much larger and more necrotic than those where control material was used. Within a few hours the areas receiving the washings were more puffy and tended to gravitate more readily down the flank of the animal, indicating that a local oedema and cellular alteration is probably the cause of the phenomenon. The infection spreads rapidly on the infected side and usually causes the death of the animal in about 5 days.

The nasal secretion will not only facilitate the spread of fresh infection, but when injected into a healing quiescent lesion will frequently light up the process, causing extension of the infection. Its action is also striking in immune animals where ordinarily the bacteria produce only trivial lesions when injected into the skin, but when mixed with nasal secretion, produce large necrotic lesions which, however, do not spread beyond the limits of the initial infection and do not cause death of the animal.

The nasal secretions of various individuals differ in the capacity to enhance infection. Material obtained from some persons apparently free of respiratory infection showed this action. However, washings obtained during an acute cold, in most instances, accelerated infection more than those taken during a normal period. This phenomenon seems to be analogous to that described by Reynals for tissue extracts and is chemical in nature. It probably does not depend upon the filterable agent described by Dochez and his co-workers² which when inoculated into human volunteers produces colds. Dr. Dochez has very kindly furnished us with tissue cultures containing this agent and no consistent spread of infection was produced by material presumably active. Saliva showed the effect to a moderate degree but tears were inert. Washings from rabbits with acute snuffles are as active as those obtained from humans. Heating at 80° C for ½ hour decreases but does not totally destroy the action.

Further work is being done to determine whether nasal secretion may play an enhancing rôle for organisms transmitted from one individual to another in the course of natural infection.

² Dochez, A. R., Mills, K. C., and Kneeland, Y., Jr., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **28**, 513.