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Identity of Animal Anaphylaxis and Human Allergy (Protein Hypersensitiveness).

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The assumption that the symptoms of anaphylactic dyspnea in the guinea pig and the symptoms of dyspnea in the asthmatic patient can be explained on the common basis of anaphylactic hypersensitiveness was believed by the earlier investigators. Curiously enough this logical conclusion seems to have created a point of departure which resulted in a large series of studies particularly championed by Coca, Cooke and their co-workers to differentiate anaphylaxis in the animal and hypersensitiveness in the human being. This has succeeded in complicating one of the most important fundamental problems in hypersensitiveness.

In a most recent summation of his differentiation between anaphylaxis in the lower animal and human hypersensitiveness, Coca[1] makes the following statements. Anaphylactic antibodies in the lower animal react with antigen and cause shock; antibodies neutralize antigen and thus produce desensitization; they sensitize smooth muscle but not human skin.

In the differentiation of anaphylaxis and hypersensitiveness Coca found it necessary to devise the new terms "atopy" and "reagin". By atopy Coca would designate certain clinical forms of hypersensitiveness in human beings; these individuals do not acquire their sensitization as do the lower animals, but are born with this particular hypersensitiveness that is inherited. The substance present in the blood of such atopic individuals is not an anaphylactic antibody but a specific body which he terms "skin-sensitizing reagin". Individuals born with true reagins are exquisitely sensitive. Reagins can be passively transferred to a normal human skin but cannot sensitize smooth muscle. There is no phenomenon of desensitization in human hypersensitiveness.

Many attempts have been made to transfer human hypersensitiveness passively into the animal. In a general sense the results obtained were only suggestive. There has been a definite passive

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[1] Coca, A. F., *J. Allergy*, 1929, i, 74.

transfer of reagins from one human being to another. Coca attempted to transfer antibodies from a sensitive animal to the human skin but his series of experiments resulted negatively. However, Spain and Cooke[2] recently refuted these results by definitely transferring anaphylactic antibodies from the animal to the human skin.

In a paper by Ella Grove,[3] who worked in Coca's laboratory, she reports the attempt to transfer reagins to the lower monkey and chimpanzee. She succeeded in transferring this hypersensitiveness in 2 instances but in her discussion chooses to deny the validity of her results and concludes that the human reagin must be differentiated from the anaphylactic antibody.

The details of our experiments will be presented later.

In formulating our experiments we desired to parallel the situations in the human being and the lower animal. This experiment is difficult since many negative results are obtained because of factors which will be discussed in the complete report.

In these experiments we took the blood serum of a human asthmatic sensitive to horse dander and passively transferred this serum into normal guinea pigs and into normal human skin (B. R. and H. L. G.). 48 hours later these animals were injected with horse dander extract and several animals showed definite anaphylactic symptoms, in one instance anaphylactic death occurred. The transfer of the human serum to the normal human skin was positive in all instances.

In a second series of experiments, guinea pigs were sensitized with horse dander, not by parenteral injection, but by induction of respiratory anaphylaxis (asthma) in a manner previously described by us.[4] We took the blood serum of these animals 3 weeks later and transferred it to our skins intradermally and to normal guinea pigs intravenously. The transfer of guinea pig serum to the human skin resulted in a positive allergic skin reaction in certain instances. The passive transfer to the guinea pig gave positive results in certain instances.

In the human experiments, 6 asthma patients were used; 4 were negative, and 2 gave positive results. Of one of these patients, where blood was drawn at 2 different times, there was passive transfer to 6 of 15 animals, and in the second patient where blood was drawn at 3 different times, passive transfer was demonstrated in 5 out of 9 animals. Positive uterine contraction was obtained in

[2] Cooke, R. A., and Spain, W. C., *J. Immunol.*, 1929, xvii, 295.

[3] Grove, E., *J. Immunol.*, 1928, xv, 3.

[4] Ratner, B., Jackson, H. C., and Gruehl, H. L., *Am. J. Dis. Child.*, 1927, xxxiv, 23.

one. Positive transfer to the human skin was accomplished in these latter 2 cases.

In the animal experiments, in 14 animals in whom asthma was produced, there was one passive transfer to the human skin, and 3 suggestive transfers. In the passive transfer to normal guinea pigs there were 2 positive and 7 suggestive reactions in 16 animals injected.

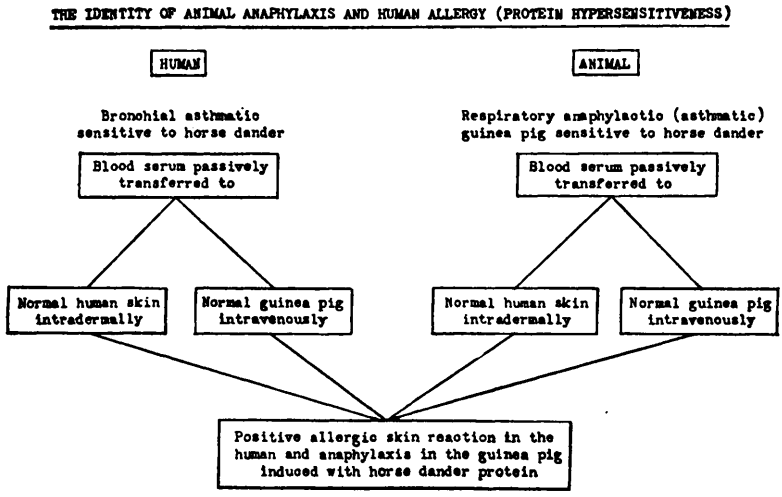

FIG. 1.

In Fig. 1 the results are correlated and show that the blood of a human asthmatic and the blood of an asthmatic guinea pig can passively sensitize the normal human skin and normal guinea pigs.

We deem our results indicate that hypersensitiveness in man and anaphylaxis in the lower animal are fundamentally dependent on a common anaphylactic antibody and that the distinction between anaphylactic antibody and the atopic reagin is untenable.

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Adsorption of Glucose Galactose Mixtures in the Intestine.

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Plant and animal membranes exhibit selective permeability for chemically related substances. The diffusion of simple carbohydrates through the glomerular membrane of the kidney, through the