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# ANAPHYLAXIS IN THE LARGER ANIMALS

BY

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## PART I.—INTRODUCTION.

### A GENERAL CONSIDERATION OF THE SUBJECT OF ANAPHYLAXIS.

#### *First observations on anaphylaxis and subsequent work.*

The first observations on induced hypersensibility to injections of alien proteins may be dated back to 1839 when Magendie found that rabbits which had tolerated two intravenous injections of egg albumin without any ill effects immediately succumbed to a further injection made after a few days.

This does not appear to have attracted much attention or to have been followed by further research.

Between 1895 and 1901 Knorr, Hericourt and Richet, Behring and Kitashima recorded similar observations using tetanus toxin and eel serum. This was followed by the work of Richet and Arthus. The fundamental works on the subject of anaphylaxis were carried out in 1900-03 by Richet in the dog and Pirquet and Schick on the "Maladie des serum" in man.

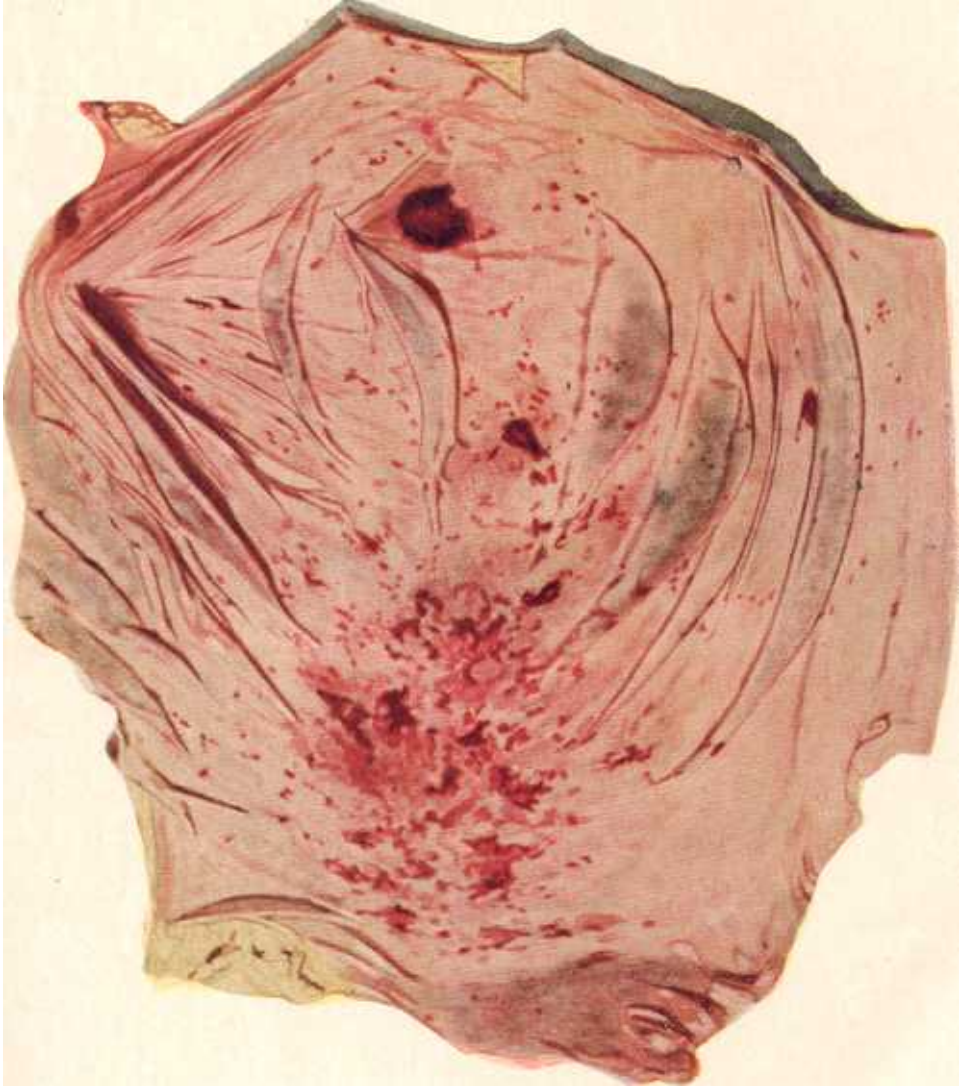
The systematic study of the phenomenon of anaphylaxis may be said to have commenced with the work of Otto.

Theobald Smith drew the attention of Ehrlich to the fact that guinea-pigs which had been used for the purpose of diphtheria antitoxin testings frequently succumbed rapidly to a second injection of diphtheria antitoxin. Otto, working under the direction of

Ehrlich, confirmed this observation, and showed that fresh untreated guinea-pigs did not suffer in any way from the injection of amounts of diphtheria antitoxin which produced symptoms of anaphylaxis and even death in animals which had received a previous injection. Otto showed further that the phenomenon could be produced by the use of diphtheria antitoxin obtained from the goat, and excluded the dependence of the phenomenon on diphtheria toxin or antitoxin as such by showing that normal horse serum behaves in the same way as antitoxic serum, or a toxin-antitoxin mixture. It was shown that a certain period of time must elapse after the first injection before the second injection becomes toxic for the sensitised animal.

During the last five years the subject of anaphylaxis has aroused widespread interest and has been the subject of careful study by a large number of investigators in Europe and America, and the literature on the subject has now reached enormous proportions. As a result of these investigations certain facts of great interest have been established. It has been shown that a serum which is not normally toxic for a certain species of animal, acts as a powerful poison when injected into an animal which has received some time previously, an injection of the same serum. It has been found that very minute quantities of serum suffice to sensitise the animal to a second injection, that the first injection is followed by a period of resistance, during which time a second injection may be given without ill effect, but after this resistant period has passed the animal becomes, and remains for a long period in a state of increased susceptibility, when a second injection produces symptoms, mild or severe, and in many cases death. The phenomenon, moreover, is not confined to serum. Vegetable proteins, bacterial proteins and the proteins of the egg behave in much the same way as the serum proteins. If a small quantity of serum from an animal which has been sensitised to a particular protein be injected into a healthy animal and if this animal be injected on the following day with the protein under investigation (*i.e.*, the same protein as was used for sensitising the first animal) symptoms of anaphylaxis

are developed, this phenomenon being known as "Passive anaphylaxis." Afterwards it was found that if the serum from the sensitised animal and the protein which is being investigated be mixed, in vitro, symptoms of anaphylaxis are developed when the mixture is injected into a healthy animal. Hypersusceptibility to the toxic action of horse serum is transmitted from the mother guinea-pig to her young.



STOMACH OF A BULL DEAD AFTER A SECOND INJECTION OF VIRULENT  
PERITONEAL WASHINGS.

