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Precipitin Reactions of Various Ovalbumins.

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Chicken, pearl guinea fowl and amherst pheasant ovalbumins* were crystallized 4 times by the method previously described for chicken ovalbumin by Cole.[1] These crystallized proteins, together with a purified chicken-blood albumin, were injected into rabbits and the antiserums produced were tested with the various antigens by the precipitin-reaction. Chicken-blood albumin was included in these experiments because we had previously shown that it is immunologically identical with the conalbumin in chicken egg-white,[2] so that an antiserum against this protein may be used to detect the presence or absence of conalbumin in supposedly pure preparations of the other proteins in egg-white. The results obtained are summarized in Tables I and II. The figures represent the highest dilu-

TABLE I.
Precipitin Reactions of Various Ovalbumins.

Antigens	Serums Against			
	Chicken Ovalbumin (1957)	Chicken Conalbumin (1958)	Pearl Guinea Fowl Ovalbumin (1963)	Amherst Pheasant Ovalbumin (1965)
Chicken Ovalbumin	100,000	0	10,000	10,000
Chicken Conalbumin	0	100,000	0	0
Pearl Guinea Fowl Ovalbumin	0	0	10,000	100,000
Mother Liquor, P. G. F. Ovalbumin	0	10,000	10,000	10,000
Amherst Pheasant Ovalbumin	0	0	10,000	100,000
Mother Liquor, Amherst Pheasant Ovalbumin	0	1,000,000	1,000,000	100,000

* We are indebted to Mr. Rudyerd Boulton, of the Field Museum of Natural History, for the amherst pheasant and pearl guinea fowl eggs used in this investigation.

1 Cole, A. G., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 1162.

2 Hektoen, L., and Cole, A. G., *J. Infect. Dis.*, 1928, **42**, 1.

TABLE II.
Absorption Experiments with Various Ovalbumins.

Antigens	Chicken Ovalbumin Antiserum	Pearl Guinea Fowl Ovalbumin Antiserum		Amherst Pheasant Ovalbumin Antiserum	
	+ Chicken Ovalbumin	+ Chicken Ovalbumin	+ P. G. F. Ovalbumin	+ Chicken Ovalbumin	+ Amherst Pheasant Ovalbumin
Chicken Ovalbumin	0	0	0	0	0
Pearl Guinea Fowl Ovalbumin	0	100,000	0	100,000	0
Amherst Pheasant Ovalbumin	0	10,000	0	10,000	10,000

For these experiments, 0.5 cc. antiserum was mixed with 0.1 cc. of a 1% solution of the antigen indicated. After standing for one hour at room temperature, the precipitate formed was centrifuged off and the undiluted supernatant liquid was used for precipitin tests with fresh portions of each antigen.

tion of the antigen which, when layered over some of the undiluted antiserum, still gave a visible precipitate at the interface between antigen and antiserum in one hour at room-temperature.

As indicated in Table I, the antiserum against chicken ovalbumin is specific, reacting only with the homologous antigen. On the other hand, the antiserums against the pearl guinea fowl and amherst pheasant ovalbumins react not only with the homologous antigens, but also with the other 2 crystallized ovalbumins. None of these crystallized proteins react with conalbumin-antiserum, while their mother-liquors, which contain some of the crystallizable as well as the non-crystallizable albumin in the egg-white, give strong reactions with this antiserum. These reactions of the mother-liquors with an antiserum against chicken conalbumin indicate that the conalbumins in these various egg-whites are either similar or identical, and, judging from the results of our earlier work on chicken-blood albumin and conalbumin, that the blood-albumins of these fowl are also similar or identical. The complete absence of cross-reactions between the crystallized ovalbumins and the conalbumin indicates that each of the ovalbumins used in these experiments is a pure substance, entirely free from contamination with the conalbumin which appears to be a common constituent of all these egg-whites. We are thus led to the conclusion that whereas chicken ovalbumin gives rise to a single, specific antibody, the injection of pearl guinea fowl or amherst pheasant ovalbumin leads either to the formation of several distinct antibodies, or else a single antibody capable of reacting with the various ovalbumins. In an attempt to choose be-

tween these two possibilities, absorption-experiments were carried out with the various antigens and antiserums. The results, summarized in Table II, indicate that chicken ovalbumin removes its own, specific precipitin from all 3 antiserums, and has no effect on any other precipitins which may be present in the serums. On the other hand, the pearl guinea fowl ovalbumin removed all of the precipitins from the pearl guinea fowl antiserum, while the amherst pheasant ovalbumin, in the amount added to the amherst pheasant antiserum, removed all heterologous precipitins but not the homologous one. In these cases, therefore, it appears that the injection of an apparently pure, homogeneous antigen has led to the formation of at least 2, and possibly more, distinct precipitins. These results are in accord with those of Hooker and Boyd[3] on chicken and duck ovalbumins and of Landsteiner[4] on azoproteins. This work is being extended to include a number of other ovalbumins.

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Chondroitin in Canine Anaphylaxis.

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The accidental discovery of Crandall and Roberts[1] that the administration of chondroitin sulphuric acid to patients with migraine frequently results in marked relief has not been explained. Since both the physiological action of chondroitin and the pathogenesis of migraine are only imperfectly understood, the therapy is of course empirical. Migraine has, however, been considered by a number of investigators as an allergic manifestation. Also chondroitin has been shown to have a protective action against liver injury due to a variety of causes.[2] The relationship between the liver and the anaphylactic reaction in the dog is well known. Consequently it was hoped that a study of the effect of chondroitin administration upon

[3] Hooker, S. B., and Boyd, W. C., *J. Immunol.*, 1936, **30**, 41.

[4] Landsteiner, K., The Specificity of Serological Reactions, Springfield, Charles C. Thomas, 1936.

[1] Crandall, L. A., and Roberts, G. M., *Ill. Med. J.*, 1933, **63**, 513.

[2] Crandall, L. A., Roberts, G. M., and Snorf, L. D., *Am. J. Dig. Dis. and Nutr.*, 1936, **3**, 289.