

Benacerraf B, Ovary Z, Bloch K J & Franklin E C. Properties of guinea pig 7S antibodies. I. Electrophoretic separation of two types of guinea pig 7S antibodies. *J. Exp. Med.* 117:937-49, 1963; **Ovary Z, Benacerraf B & Bloch K J.** Properties of guinea pig 7S antibodies. II. Identification of antibodies involved in passive cutaneous and systemic anaphylaxis. *J. Exp. Med.* 117:951-64, 1963; and **Bloch K J, Kourilsky F M, Ovary Z & Benacerraf B.** Properties of guinea pig 7S antibodies. III. Identification of antibodies involved in complement fixation and hemolysis. *J. Exp. Med.* 117:965-81, 1963.
[Depts. Pathol. and Med., New York Univ. Sch. Med., New York, NY]

Guinea pigs hyperimmunized with single protein antigens or hapten conjugates emulsified in complete adjuvants produced two types of precipitating antibodies with different electrophoretic mobilities. $\gamma 1$ Antibodies were demonstrated to mediate passive systemic or cutaneous anaphylaxis. $\gamma 2$ Antibodies were demonstrated to fix complement in the presence of antigen and to sensitize antigen-coated, tanned erythrocytes for lysis in the presence of complement. [The *SCJ*[®] indicates that these papers have been cited in over 355, 410, and 345 publications, respectively.]

Different Biological Properties for Different Classes of Antibodies

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February 6, 1990

In 1962, while in the Department of Pathology at New York University School of Medicine, I initiated a collaborative project with my friend and colleague Zoltan Ovary to study the biological properties of the two classes of 7S guinea pig antibodies. This study was undertaken with the active collaboration of two hardworking and dedicated postdoctoral fellows, Kuri J. Bloch and François M. Kourilsky, who, as expected of postdoctoral fellows, carried out most of the work to be reported in the three papers describing these experiments in the *Journal of Experimental Medicine* under the general title of "Properties of guinea

pig 7S antibodies." It should be noted that both postdoctoral fellows were destined to have spectacular careers. Bloch is currently professor of medicine at Harvard Medical School and the Massachusetts General Hospital, and Kourilsky, after directing the Institut d'Immunologie at Marseilles Luminy for several years, is presently head of the French National Research Council.

This study was motivated by a chance observation of my colleague and former postdoctoral fellow, Jeannette Thorbecke, who showed me an immunoelectrophoresis plate of purified 7S guinea pig antibodies I had prepared, which indicated that the antibodies could be electrophoretically separated into two populations with distinct electrophoretic mobility and different antigenic determinants.

Because of Ovary's and my own interest in anaphylaxis and complement, and because the issue whether one could assign different biological properties to different classes of antibodies had not been settled at that time, we undertook a thorough study of the biological properties of the two classes of guinea pig 7S antibodies that we had described and characterized. We were very fortunate to demonstrate that the ability to sensitize passively for anaphylaxis was the property of guinea pig $\gamma 1$ antibodies, whereas the ability to fix complement and lyse cells was exclusively the property of the $\gamma 2$ class of antibodies. These data demonstrated for the first time that different biological properties should be assigned to different classes of antibodies and paved the way for the further demonstration that the heavy chains and more particularly the Fc fragments^{1,2} of these antibodies contained distinct sequences responsible for their biological properties.

[Editor's note: A historical perspective of immunoglobulin G subclasses has recently been published.³]

1. Ovary Z & Tarenta A. Passive cutaneous anaphylaxis and antibody fragments. *Science* 140:193-5, 1963. (Cited 35 times.)
2. Berken A & Benacerraf B. Properties of antibodies cytophilic for macrophages. *J. Exp. Med.* 123:119-44, 1966. (Cited 580 times.)
3. Schur P H. IgG subclasses—a historical perspective. *Monogr. Allergy* 23:1-11, 1988.