Reactions of Serum Sickness and Infectious Mononucleosis Sera in Tissue Cultures.* (28861)

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It has been known for more than 30 years that the sera of patients suffering from serum sickness and infectious mononucleosis contain rather potent agglutinins for sheep erythrocytes. The antigens combining with these agglutinins are called heterogenetic antigens because they are distributed among several animal species. They are different from the Forssman antigen since both serum sickness and infectious mononucleosis antigens are shared by erythrocytes of ox, a Forssman negative species(1-4).

The purpose of this paper was to examine serum sickness and infectious mononucleosis antigens in cultures of guinea pig and bovine cells using the mixed agglutination technique. Mixed agglutination in tissue cultures was developed by Högman(5) and by Epsmark and Fagraeus(6); it has been used in this laboratory for studies of viral antibodies(7) and of antibodies against species-specific and Forssman antigens(8,9). The procedures outlined in previous communications were followed. The indicator system employed in the present studies was designed to demonstrate the binding of human gamma globulin (antibody) to the cell culture monolayer. It was composed of a suspension of tanned sheep erythrocytes coated by Cohn's Fraction II of pooled human serum and agglutinated by rabbit antiserum against human gamma globulin.

Five serum sickness sera and 5 infectious mononucleosis sera were tested against primary cell cultures of guinea pig, bovine and monkey kidney by the mixed agglutination technique. As can be seen from Table I, 4 serum sickness sera gave definite positive reactions; 3 of them reacted with cell cultures of both guinea pig and bovine kidney, and one reacted only with guinea pig kidney. All infectious mononucleosis sera acted upon bovine kidney cultures but none of them upon guinea pig kidney cultures. Finally, none of the sera combined with cell cultures of monkey kidney.

Two serum sickness sera and 2 infectious mononucleosis sera were selected for absorption experiments (Table II). Guinea pig kidney powder removed from serum sickness sera antibodies combining with both guinea pig and bovine cell cultures. Bovine kidney powder removed from the same sera only antibodies combining with bovine cell cultures but it did not affect the reaction titer with guinea pig cell cultures. The activity of infectious mononucleosis sera against bovine kidney cell cultures disappeared after absorption with bovine kidney powder, but it was not influenced by absorption with guinea pig kidney powder.

According to Tomcsik and Schwarzweiss (9), the thermostable substance of bovine erythrocytes contains serum sickness and infectious mononucleosis antigens. On the other hand, guinea pig kidney contains the serum sickness but not the infectious mononucleosis antigen. The present study demonstrated serum sickness and infectious mononucleosis antigens on bovine kidney cell cultures just as they appear in bovine erythrocytes. The presence of serum sickness antigen in guinea pig kidney was also confirmed. The first part of the absorption experiments might be explained by Schiff's assumption(3) that the serum sickness antigen is composed of partial antigens which are distributed in various ways in different species. Apparently some of these antigens are shared by guinea pig and bovine kidney cells whereas others are present only in guinea pig kidney cells. The second part of the absorption experiments confirmed the observation that the infectious mononucleosis antigen exists in bovine but not in guinea pig cells.

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TABLE I. Mixed Agglutination Test. Reactions of serum sickness and infectious mononucleosis sera with cell cultures of guinea pig, bovine and rhesus monkey kidney.

		Titer of agglutination of sheep red blood cells	Titer of mixed agglutination with cell culture of:		
			Guinea pig kidney	Bovine kidney	Rhesus monkey kidney
Serum sickness	L.N.	900	1.250	<10	<10
	F.S.	150	1,250	1,250	<10
	V.H.	50	1,250	250	<10
	C.S.	10	50	50	<10
	H.E.	<10	<10	<10	<10
Infectious mononucleosis	O.C.	810	<10	50	<10
	C.	810	<10	50	<10
	P.V.	810	<10	1,250	<10
	S.N.	270	<10	1,250	<10
	V.P.	90	<10	1,250	<10

TABLE II. Mixed Agglutination Test with Cell Cultures of Guinea Pig Kidney (A) and of Bovine Kidney (B). Effect of absorption of serum sickness and infectious mononucleosis sera on the titer of reaction.

			Titer of reaction with:		
			Unabsorbed serum	Serum absorbed with:	
				Guinea pig kidney powder	Bovine kidney powder
Serum sickness	F.S.	A	1,250	<10	1,250
		B	1,250	<10	<10
	V.H.	A	1,250	<10	1,250
		B	250	<10	<10
Infectious mononucleosis	V.P.	B	1,250	1,250	<10
	S.N.	B	1,250	1,250	<10

Summary. By means of the mixed agglutination technique, the serum sickness antigen was demonstrated in guinea pig and bovine kidney cell cultures. The infectious mononucleosis antigen was shown in cell cultures of bovine but not of guinea pig kidney.

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