

J. W. Rebeck *et al.*, 1957, Academic Press, Inc., 163.

10. Berman, I., Kaplan, H. S., *Radiation Res.*, 1959, v11, 24.

11. Asano, M., Odell, T. T., Jr., Upton, A. C., unpublished data.

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Behavior of Different Geographic Strains of *Schistosoma japonicum* as Determined by the Circumoval Test.* (26967)

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Species specificity of *Schistosoma haematobium*, *S. mansoni*, and *S. japonicum* has been demonstrated serologically by the circumoval test(1). As *S. japonicum* consists of at least 4 distinct geographic strains, Chinese, Formosan, Japanese, and Philippine(2), it is of interest to know whether these 4 strains are distinct in the circumoval test.

Materials and methods. Four geographic strains of *S. japonicum* were used: the Chinese (C), Formosan (F), Japanese (J), and Philippine (P). The cercariae of the C strain were obtained from *Oncomelania hupensis* originating in Kashing, Chekiang, China; the F strain, from *O. formosana* obtained from Changhua, Taiwan, China; the J strain, from *O. nosophora* obtained from Kofu, Japan; and the P strain, from *O. quadrasi* obtained from Leyte, in the Philippines.

Eight rabbits divided into 4 groups of 2 each were infected by the cutaneous route with the 4 strains of *S. japonicum*. Each rabbit was infected with 70 male and 70 female cercariae of a strain of the parasite and was bled on the 70th day after schistosome eggs were found in the stools. The sera obtained from these 8 rabbits were the antisera (AS) used in the circumoval test. Sera from 2 normal rabbits were used as controls. The antisera and normal sera (NS) were inactivated at 56°C for 30 minutes before use.

The eggs of *S. japonicum* were obtained from the liver of infected mice. Twenty-four mice divided into 4 groups of 6 each were infected with the 4 strains of *S. japonicum*.

Each mouse was exposed to 100 cercariae of balanced sexes of one strain of *S. japonicum*. These mice were sacrificed on the fifth day after eggs were found in stools. The livers of the mice were ground and schistosome eggs were then concentrated by repeated natural sedimentation with normal saline. The last concentration was accomplished by centrifugation.

Single drops containing these centrifuged eggs were then mixed with single drops of either antiserum or normal serum on a slide. These serum-egg mixtures were then covered with 22 mm square coverglasses and rimmed with paraffin. The slides were kept at 37°C in an incubator, and the results were read after 24 hours' incubation. Only the eggs (E) which contained active mature miracidium were recorded as the number of eggs examined in this test. The antigen-antiserum precipitates which appeared on the egg surface were carefully differentiated from the other precipitates noted occurring with normal serum. Only the former were recorded as eggs with positive reactions. As the degrees of the positive reactions are prone to subjective errors, they were not classified in this study.

In the accompanying table, the following abbreviations are used: CE refers to eggs of Chinese strain; FE, the Formosan strain; JE, the Japanese strain; PE, the Philippine strain. CAS refers to antiserum of the Chinese strain; FAS, the Formosan strain; JAS, the Japanese strain; and PAS, the Philippine strain.

Results. Twenty sets of egg-serum tests, divided into 4 series, were made. The results

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TABLE 1. Percentage of eggs of 4 geographic strains of *S. japonicum* showing positive circumoval precipitation in homologous, heterologous, and normal sera.

Series	Eggs vs serum	No. of eggs	Eggs with positive reactions	
			No.	%
CE	CE vs CAS	215	129	60.0
	CE vs FAS	175	59	33.7
	CE vs JAS	282	127	45.0
	CE vs PAS	168	42	25.0
	CE vs NS	100	0	.0
FE	FE vs CAS	777	248	31.9
	FE vs FAS	606	461	76.0
	FE vs JAS	781	263	33.7
	FE vs PAS	447	57	12.8
	FE vs NS	100	0	.0
JE	JE vs CAS	274	109	39.8
	JE vs FAS	288	93	32.3
	JE vs JAS	310	235	75.8
	JE vs PAS	177	68	38.4
	JE vs NS	100	0	.0
PE	PE vs CAS	109	39	35.8
	PE vs FAS	100	32	32.0
	PE vs JAS	150	85	56.7
	PE vs PAS	120	82	68.3
	PE vs NS	100	0	.0

were shown in Table 1. In all of the 4 series, eggs with normal serum showed no reaction. The percentages of eggs showing positive re-

actions were much higher with the homologous antiserum than with the heterologous antisera. The difference between the percentage of the eggs showing positive reactions with the homologous antiserum and the percentages with the heterologous antisera was found to be significant at the 5 % level in each series by the chi square test.

Discussion and conclusion. Although the circumoval reaction is species specific for *S. japonicum*, the results of the present studies show that with this test, there were cross reactions among the 4 geographic strains. A significantly larger proportion of eggs showing positive circumoval precipitation, however, was seen when the eggs were incubated with the antisera of the heterologous strains. This indicates that the geographic strains of *S. japonicum* have already become partly distinct in their serological characteristics.

1. Oliver-Gonzalez, J., Bauman, P. M., Benenson, A. S., *J. Infec. Dis.*, 1955, v96, 95.

2. Hsü, H. F., Hsü, S. Y. Li, *Proc. 6th Internat. Congr. Trop. Med. & Malaria*, 1958, v2, 58.

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Isomerized Fat and Serum Cholesterol in Swine.* (26968)

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Although the effect of saturation of fatty acids on serum cholesterol levels in a variety of experimental animals and in man has been studied extensively, no investigation dealing with fatty acid isomerization in this relationship has been noted. The present study was designed to measure the relative effects of natural (cis) fats and hydrogenated fat which contains isofatty acids including transisomers on serum cholesterol level. In addition relatively pure triolein (cis) was compared with trielaidin (trans).

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Experimental. Adult sows, ranging in age from approximately 3 to 7 years and in weight from 300 to 500 lbs, were used as the experimental animal. A purified diet (composition shown in Table I) was fed at a constant level for each animal in an amount that just maintained body weight. The diet was mixed with water to form a slurry and was fed in 2 equal portions during each day. Extra water was provided only at feeding times. The pigs were housed individually in a closed barn, but temperature was not constant. Body weight was measured weekly.

The pattern of feeding was to give a low fat diet for 3 weeks followed by 3 weeks on a diet containing the test fat at a level of