

FACTORS INFLUENCING REAGIN FORMATION IN EXPERIMENTAL HUMAN SENSITIZATION TO ASCARIS LUMBRICOIDES ANTIGEN*†

II. THE INFLUENCE OF SEX AS A FACTOR IN RATE OF SENSITIZATION

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THE data obtained in the previous studies performed successively on a male tuberculous group, a mixed non-tuberculous group, and a female tuberculous group¹ suggested that males and females might differ in the rate of reagin response to stimulation with *Ascaris* antigen. However, the reliability of the findings was impaired by certain variables in the technique, such as aging of the antigenic extract, irregularity in the administration of the antigenic doses in ambulatory subjects, and disparities in the sizes of the groups which were compared. In order to eliminate some of these weaknesses, numerically equal groups of males and females were sensitized simultaneously in the present study. To insure regularity of attendance, tuberculous patients of Sea View Hospital were employed as subjects.

A fresh *Ascaris lumbricoides* stock solution was prepared from dried finely pulverized worms. Ten grams of the powder were extracted with 100 ml. of buffered saline under toluol for forty-eight hours at 37° C. The extract was then filtered through paper and through a Seitz filter. The stock solution containing 4.6 mg. total N per ml. was diluted with buffered saline to produce the working concentration of 0.1 mg. N per ml.

The study was started Oct. 2, 1945, and was terminated, after ten sensitizing injections, on Dec. 3, 1945. At the onset, there were twenty-nine males and twenty-eight females in the group who showed no immediate cutaneous reaction to an intracutaneous test with 0.025 ml. of a 0.01 mg. N solution nor to the intracutaneous test of 0.1 ml. of a 0.1 mg. N solution given the following week. Thereafter, at weekly intervals, these intracutaneous tests with 0.1 ml. of the 0.1 mg. N extract were made until a definite immediate positive reaction developed. Positive reactors were routinely retested a week later to confirm the presence of sensitivity. At S₁₀, the final sensitizing dose, twenty-six females and twenty-six males remained, comprising Group 4 in this series of studies.

Among the female patients, the ages ranged from 17 to 74 years, with an average of 34 years, and among the males from 19 to 70 years, with an average of 43 years. Eighteen of the twenty-eight females were Negro. Of the twenty-nine males, two were Negro and two were Chinese. This disparity in color

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distribution among the males and females was accidental and resulted from the unequal race population in the male and female wards at the time this study was made.

RESULTS ON GROUP 4

At S_3 , fourteen days after the original skin test, one of the Negro females showed a positive reaction to the extract (Tables I A and I B). At S_4 , 11 per cent of the entire female group were sensitized, but no males showed positive reactions. From S_5 on, the percentage of positive reacting males exceeded that of the females. At S_5 , 29 per cent of the males were sensitized, in contrast to 18 per cent of females. The greatest difference between the sexes was at S_6 when 39 per cent of males and 26 per cent of females were sensitized.

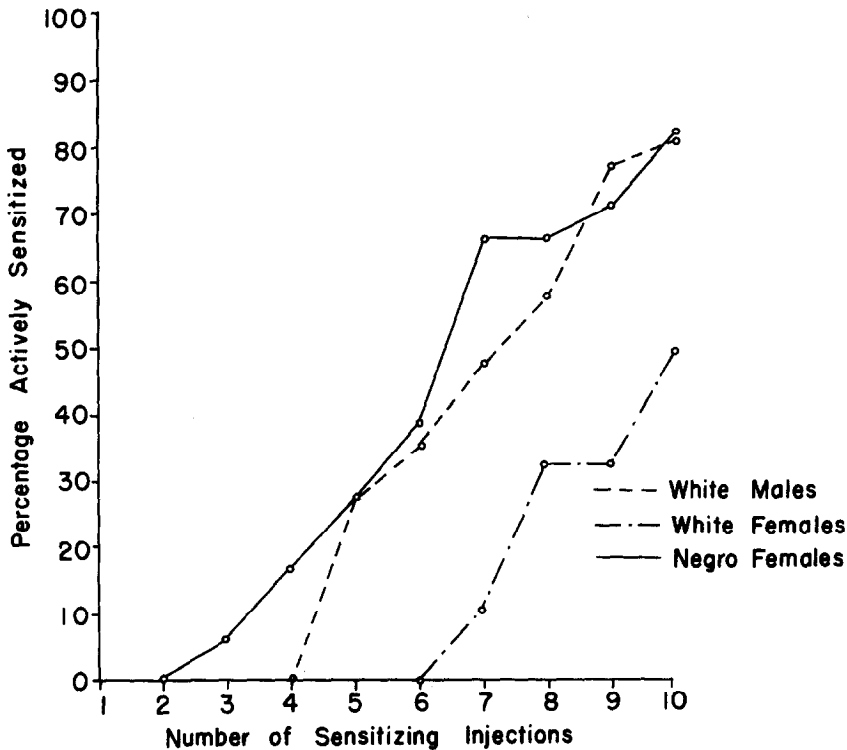


Fig. 1.—Sensitization rates for white males, white females, and Negro females.

TABLE I A. RATE OF SENSITIZATION IN MALE SUBJECTS (GROUP 4)

WEEKLY SENSITIZING DOSE	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}
No. of patients	29	29	29	29	28	28	28	28	27	26
No. of positive reactors (+)	0	0	0	0	8	11	14	16	20	21
Per cent positive reactors	0	0	0	0	29	39	50	57	74	81

It appeared, at first, that in this study the difference between the two sexes was not so pronounced as in the previous studies. In fact, the only positive reactors to the earlier doses were females. It was noted, however, that all of the

TABLE I B. RATE OF SENSITIZATION IN FEMALE SUBJECTS (GROUP 4)

WEEKLY SENSITIZING DOSE	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀
No. of patients	28	28	28	28	28	27	27	27	27	26
No. of positive reactors (+)	0	0	1	3	5	7	12	15	16	19
Per cent positive reactors	0	0	4	11	18	26	43	56	59	73

females who developed positive reactions before S₇ were Negro. Further analysis of the results of sensitization was therefore made on the basis of race as well as of sex. These data are presented in Tables II A, II B, II C, and Fig. 1, and furnish information on three main subgroups consisting of twenty-five white males, ten white females, and eighteen Negro females. The results obtained on the two Negro and two Chinese males were insufficient for analysis and were excluded from Table II A.

TABLE II A. RATE OF SENSITIZATION IN WHITE MALES (GROUP 4)*

WEEKLY SENSITIZING DOSE	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀
No. of patients	25	25	25	25	25	25	25	24	21	20
No. of positive reactors (+)	0	0	0	0	7	9	12	14	18	18
Per cent positive reactors	0	0	0	0	28	36	48	58	78	82

*Not included in above table are two Negro males, one positive at S₅ and one negative at S₁₀, and two Chinese males, one positive at S₅ and one at S₁₀.

TABLE II B. RATE OF SENSITIZATION IN WHITE FEMALES (GROUP 4)

WEEKLY SENSITIZING DOSE	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀
No. of patients	10	10	10	10	10	9	9	9	9	8
No. of positive reactors (+)	0	0	0	0	0	0	1	3	3	4
Per cent positive reactors	0	0	0	0	0	0	11	33	33	50

TABLE II C. RATE OF SENSITIZATION IN NEGRO FEMALES (GROUP 4)

WEEKLY SENSITIZING DOSE	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀
No. of patients	18	18	18	18	18	18	18	18	18	18
No. of positive reactors (+)	0	0	1	3	5	7	12	12	13	15
Per cent positive reactors	0	0	6	17	28	39	67	67	72	83

It may be noted that in Negro females the sensitization rate was much more rapid than in white females. In fact, it exceeded the sensitization rate of white males most of the time (Fig. 1). As in the previous studies, however, the sensitization rate of the white males was much more rapid than that of the white females.

These studies fortified the impression suggested by the earlier investigations that sex may be a factor in the rate of experimental sensitization to *Ascaris lumbricoides*. The experimental findings also suggested, for the first time, that race might be another factor in the rate of reagin formation to *Ascaris*. The absence of data on an adequate number of male Negroes, however, necessitated further investigation of this factor.

SUMMARY

1. The impression gained in previous investigations that sex may be a factor in experimental active sensitization to *Ascaris* antigen was strengthened in this study.

2. Evidence was uncovered which suggested that there is a more rapid rate of experimental active sensitization with *Ascaris lumbricoides* in the Negro race than in the white.

REFERENCE

- Davidson, A. G., Baron B., and Walzer, M.: Factors Influencing Reagin Formation in Human Sensitization to *Ascaris Lumbricoides* Antigen. I. Influence of Chronic Infection (Tuberculosis) on Rate of Sensitization, 18: 359, 1947.