ON THE GROUP-SPECIFIC SUBSTANCE OF *ASCARIS LUMBRICOIDES*.

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Oliver-González *et al* (1), (2), (3), (4) reported the presence of A and B group substances as well as Forssman's antigen in each of *Ascaris lumbricoides*, *Ascaris suum*, *Trichnella spiralis*, *Necator americanus*, *Schistosoma mansoni*, *Cysticercus cellulosae* and *Taenia solium*.

Yamaguchi (5) found the existence of A partial antigen of A group substance and Forssman's antigen in the larva of *gnathostoma spinigerum*. In 1952 Ota (6) confirmed that A_{IV} partial antigen of A group substance, C group substance and Forssman's antigen were contained in *Ascaris Lumbricoides* and that both of *Ancylostoma duodenale* and that both of *Ancylostoma duodenale* and *Taeniarhynchus saginatus* had at least A_{IV} partial antigen of A group substance.

MATERIALS AND METHODS

Ascaris lumbricoides was washed with water and crashed. Ten volumes of physiological saline were added to the crashed materials and shaken sufficiently. The supernatant fluids were used for the following tests.

Absorption test. The absorbent material was added to the antisera and allowed to stand at 37 C for 2 hours, then 2 C over night being shaken. When the absorption was considered to be insufficient, the absorption procedure was repeated.

Immunization. Blood cells of human B and O group, rabbit, white rat and guinea-pig were washed sufficiently with physiological saline and diluted to ten per cent. These blood cell suspensions were injected 7 times intravenously at 2 to 3 days intervals to healthy mature domestic fowls previously proved free of normal precipitins.

Precipitin reaction. The usual ring method was used at the room temperature.

EXPERIMENTAL

Preparation of anti B, anti B_I, anti B_{II} and anti B_{III} precipitin. After absorption of anti human B group blood cells domestic fowl sera with human A group blood cells, anti B precipitin sera presented positive precipitin reaction with only human BS and ABS type saliva. When anti B precipitin sera were absorbed sufficiently with rabbit blood cells, anti B_I precipitin sera were confirmed to show positive precipitin reaction only with human BS and ABS type saliva. Anti B_{II} precipitin sera were prepared by means of absorption of anti rabbit blood cells domestic fowl sera with human A Group blood cells or guinea-pig blood cells. These anti B_{II} precipitin sera were found to react with only human BS and ABS type saliva.

Anti B_{III} precipitin sera obtained by absorption of anti guinea-pig blood cells domestic fowl sera with human A group blood cells were determined to present positive precipitin reaction with human BS and ABS type saliva.

Preparation of anti O_I, anti O_{II} and anti O_{III} precipitin. When anti human O group blood cells domestic fowl sera were absorbed with human AB group blood cells or further with rat blood cells, those absorbed sera reacted with only human OS type saliva, thus anti O_I precipitin were obtained.

Similary, anti O_{II} and anti O_{III} precipitin sera were prepared respectively by means of absorption of anti rat blood cells domestic fowl sera with human AB group blood cells or further with rabbit blood cells, and by means of absorption of anti rabbit blood cells domestic fowl sera with human AB group blood cells.

Precipitin reaction between the extract of Ascaris lumbricoides and anti B precipitin sera was positive in dilution up to 1:16. When anti B precipitin sera containing anti B_I, anti B_{II} and anti B_{III} precipitin were absorbed with guinea-pig cells, anti B_{III} precipitin was absorbed and, therefore, both of anti B_I and anti B_{II} precipitin were remained. The extract of *Ascaris lumbricoides* presented negative reaction with anti B_I or anti B_{II} precipitin sera.

Precipitin reaction between the extract of Ascaris lumbricoides and anti B_{III} precipitin sera was positive in dilution up to 1:8. Though these antisera showed also positive precipitin reaction with human BS type saliva in dilution up to 1:128, the reaction became negative by absorption of the antisera with the extract of *Ascaris lumbricoides*.

Precipitin reaction between the extract of Ascaris lumbricoides and anti B_I or anti B_{II} precipitin sera was proved negative. Anti B_I precipitin sera showed positive reaction with human BS type saliva in dilution up to 1:128. But when

anti B_I precipitin sera were absorbed with the extract of *Ascaris lumbricoides*, the precipitin titer did not become low. Anti B_{II} precipitin sera presented positive reaction with human BS type saliva in dilution up to 1:256, and there were no remarkable changes of reactions after the absorption of the sera with the extract of *Ascaris lumbricoides*.

Precipitin reaction between the extract of Ascaris lumbricoides and anti O_{III} precipitin sera was positive in dilution up to 1:32. These anti sera also showed positive reaction with human OS type saliva in dilution up to 1:128. But when the sera were absorbed with the extract of *Ascaris lumbricoides*, they showed negative precipitin reactions.

Precipitin reaction between the extract of Ascaris lumbricoides and anti O_I precipitin sera was found negative. Anti O_{II} precipitin sera showed positive reaction with human OS type saliva in dilution up to 1:128, and anti O_I precipitin sera showed also positive reaction with human OS type saliva in dilution up to 1:128. Both of anti O_I and anti O_{II} precipitin sera presented very little decrease of precipitin titers, when they were absorbed with the extract of *Ascaris lumbricoides*.

DISCUSSION

From the fact that anti B_{III} and anti O_{III} precipitin sera presented positive precipitin reactions with the extract of *Ascaris lumbricoides* and these precipitins could be absorbed completely by the extract of *A. lumbricoides*, we confirmed that *A. lumbricoides* contained B_{III} partial antigen of B group substance as well as O_{III} partial antigen of O group substance. On the other hand, the fact that the extract of *A. lumbricoides* did not react with anti B_{II}, anti B_I, anti O_{II} and anti O_I precipitin sera and these precipitins could not be absorbed by the absorption test demonstrated that *A. lumbricoides* contained none of B_{II} and B_I partial antigens of B group substance, O_{II} and O_I partial antigens of O group substance. In the previous paper Ota, one of the authors, had already reported the presence of A_{IV} partial antigen of A group substance, C type substance and Forssman's antigen in *Ascaris lumbricoides*. From the results of the previous and the present experiments, it must be concluded that there are A_{IV}, B_{III} and O_{III} partial antigens, C group substance and Forssman's antigen in *Ascaris lumbricoides*.

On the fundamental of the experimental results obtained by Oliver-González *et al* in which the presence of A and B substances in *Ascaris lumbricoides* were confirmed, we further analyzed the partial antigens contained in *A. lumbricoides* in detail. The fact that we could determine the existence of group specific

substances in *A. lumbricoides* by means of analysing partial antigens would be considered to be a new finding.

SUMMARY

We prepared anti B, anti B_I, anti B_{II}, anti B_{III}, anti O_I, anti O_{II} and anti O_{III} precipitin sera in order to try precipitin tests and absorption tests with the extract of *Ascaris lumbricoides*. In these studies, the presence of B_{III} partial antigen of B group substance and O_{III} partial antigen of O group substance were confirmed in *Ascaris lumbricoides*.

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