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☐ **Brief Communication** ☐

Seroprevalence of toxoplasmosis in the residents of Cheju island, Korea

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Abstract: This study was performed to evaluate the epidemiological status of toxoplasmosis among the residents of Cheju island. The sera of local students from 18 high schools (boys 2110, girls 2460) and those of adults (474 admitted to Cheju Chungang General Hospital) were collected and checked for the IgG antibody titers against *Toxoplasma gondii*. Serum samples collected from both the students and adults showed sero-positive rate of 5.5% and 12.9%, respectively. Although the rates were not significantly different between the sexes (5.4% for the boys and 5.5% for the girls attending school), the geographical difference showed a significant difference between the urban (4.6~6.9%) and rural areas (5.6~8.8%) ($p<0.05$). Based on the high positive rates, it should be necessary to control toxoplasmosis in Cheju island.

Key words: *Toxoplasma gondii*, seroprevalence, ELISA

Toxoplasmosis is a worldwide distributed zoonotic disease caused by the ingestion of undercooked meat or the water contaminated with oocyst or tissue cysts of *Toxoplasma gondii* (Dubey and Beattie, 1988). Recently, the occurrence of toxoplasmosis has been increasing due to the opportunistic infection of immunocompromised patients, such as acquired immune deficiency syndrome (AIDS) (Navia et al., 1986). Diagnosis of toxoplasmosis are performed by the isolation of parasite from patients and more commonly by serological tests such as ILA and ELISA.

There have been several reports with respect to the screening of anti-*T. gondii* antibody among Koreans. The prevalence of toxoplasmosis in Cheju island has been reported by Choi et al. (1989), which showed 5.8% positive rate among out-patients from the Cheju Medical Center. This study was planned to evaluate the levels of anti-*Toxoplasma* antibody in high school students and the local residents (adults) in Cheju island using ELISA.

Sera of 18 high schools (2,110 boys and 2,460 girls) and those of adult groups (>20 years of age, 474 patients admitted to the Cheju Chungang General Hospital) were used

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for this study. The sera were preserved at -20°C until used further. The crude extract was prepared from a collected tachyzoites of RH strain of *T. gondii*. General methods of antigen preparation were adopted by Choi et al. (1992) and the procedures for an ILA test was carried out by the manufacture's instruction of Toxo kit (Eiken Co., Tokyo, Japan). After repeated tests, agglutinations at 1:32 or higher dilution were regarded as positive. Methods of ELISA was performed by the modification of Choi et al. (1992). The absorbance was read at 490 nm with a 96 well plate reader (ELx 800, Bio-Tek instruments, USA). The cut-off value was determined by the modification of Choi et al. (1992). Randomly selected 200 sera were subjected to ILA and ELISA analysis. Based on the result of ILA, the cut-off absorbance for the positive reaction by ELISA was determined to be 0.25 which was the mean absorbance of ILA 1:32 titer group. Statistical comparisons were made using -χ^2 test ($p<0.05$).

Serological positive rate of toxoplasmosis in high school students in Cheju island was 5.5% (Table 1). According to the geographical localities, the seroprevalence of toxoplasmosis in high school students residing in rural area (Northern, 5.6%; Southern Cheju County, 8.8%) was higher than the urban area (Cheju, 4.6%; Seogwipo, 6.9%). The differences in the positive rate among high school students were also observed with respect to different age and sex (Table 2). The sero-positive rate in adult groups was 12.9% which was higher than that of high school students (5.5%). However, there are no significant differences between schoolboys (5.4%) and schoolgirls (5.5%) ($p<0.05$).

The positive rates of anti-*Toxoplasma* antibody in Korean people vary from 1.9% (Choi et al., 1983) to 7.2% (Kim and Choi, 1983). Also, Choi et al. (1989) reported the serological positive rate on toxoplasmosis to be 5.57% (45/780) using ILA from the patients admitted to the Cheju General Hospital.

Seroprevalence of toxoplasmosis is known to increase with ages (Dubey and Beattie, 1988). In this study, it was shown that there was a significant difference in serological positive rate between younger high school students (5.5%) and the adult group (12.9%) with respect to toxoplasmosis. It has been reported that the seroprevalence of toxoplasmosis is not significantly different according to different sex (Beverley et al., 1976). Accordingly, there were no apparent differences noticed in the positive rate of toxoplamosis in high school students.

Seropositive rate of *T. gondii* in Cheju island is relatively high compared to that of the past 30 years data in Korea. Some risk factors of toxoplasmosis in pregnant women have been suggested, which include poor hand hygiene, consumption of undercooked beef, domesticating a pet cat, frequent consumption of raw vegetables outside the home, and the consumption of undercooked lambs (Baril et al., 1999). Habitual factors might be responsible for this relatively high serologically positive rate in Cheju island. In Cheju island, pigs rearing in the conventional farms showed higher positive rate than that of specialized farms (Kim YJ, 1988); therefore, it must take account for the ingestion of the infective form in the incomplete cooked porcine meat, and

Table 1. Positive rate of toxoplasmosis in Cheju island according to locality of high schools

Locality	Anti-*Toxoplasma* antibody*	
	Negative	Positive
Cheju City	2729 (95.6%)	43 (4.6%)
Northern Cheju County	506 (94.4%)	30 (5.6%)
Seogwipo City	658 (93.1%)	49 (6.9%)
Southern Cheju County	427 (91.2%)	41 (8.8%)
Total	4320 (94.5%)	250 (5.5%)

* Cut-off value of ELISA was 0.25

Table 2. Positive rate of toxoplasmosis in Cheju island according to age and sex

Age & Sex	Anti-*Toxoplasma* antibody[a)]	
	Negative	Positive
High school students	4,320 (94.5%)	250 (5.5%)
High schoolboy	1,996 (94.6%)	114 (5.4%)
High schoolgirl	2,324 (94.5%)	136 (5.5%)
Adults	413 (87.1%)	61 (12.9%)

[a)]Cut-off value of ELISA was 0.25.

mammals such as pigs and deer may play a transmitter as a reservoir hosts in Cheju island.

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