

Toxoplasma antibodies in sera from Hong Kong

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Before carrying out the Sabin-Feldman dye-test on the sera of children in Hong Kong suspected of toxoplasmosis, sera from a number of the population were tested to determine the incidence of toxoplasma antibodies and thus to help in estimating the significance of positive results obtained in suspected cases. Surveys on the incidence of toxoplasma antibodies have been reported from many parts of the world but we think our results have proved sufficiently unusual and unexpected to justify publishing them here.

METHODS

As it was obviously impracticable to test a true random sample of the Hong Kong population, sera from the following groups were tested for toxoplasma antibodies: 32 adult females (30 antenatal and two others), 35 male patients suffering from various complaints and aged 20–48 years, 46 men working as butchers or slaughterers, and nine children aged 1 week to 17 years mainly suspected of toxoplasmosis. Sera from 31 pigs, imported from China and slaughtered in Hong Kong, were also tested.

The sera were despatched in the frozen state and received still frozen at the Leeds Public Health Laboratory where they were maintained at -20°C . until tested. They were examined by the Sabin-Feldman dye-test by the technique routinely employed in the laboratory.

RESULTS

Table 1 shows the results obtained. Out of a total of 113 adult human sera tested only seven were positive (6.2%). The titres obtained with the seven positive human sera were all low, five positive at 1/8 and two at 1/32. The 22 positive pig sera included six with titres of 1/512 to 1/8192. Sera from nine children of all ages mainly suspected of toxoplasmosis were all negative.

DISCUSSION

At the onset of this investigation 30 antenatal sera from Hong Kong were tested and all gave negative dye-tests. In Britain the incidence of toxoplasma antibodies is such that one would have expected about 10 positive results in 30 antenatal

sera. Further sera were therefore tested and although a few positive results were found the incidence still remained very low, even among meat workers, who are normally found in other parts of the world to have a higher incidence than the rest of the population. The results strongly suggest there may be an exceptionally low incidence of toxoplasma infection in the population of Hong Kong. Clinical cases are rare.

Table 1. *Toxoplasma dye-test antibodies in man and pig in Hong Kong*

Group	Total	No. positive	% positive
Adult females	32	0	0
Adult males	35	2	5.7
Male meat workers	46	5	10.9
Children (1 week-17 years)	9	0	0
Pigs	31	22	71

An incidence as low as this has never previously been reported in a large tropical city and only rarely in other environments. Feldman & Miller (1956) reported an incidence of 6% in Navajo Indians and 11% in Icelanders, and toxoplasmin skin tests were all negative in 183 persons living round two Egyptian oases (Rifaat *et al.* 1965).

Findings in Europe and the Americas generally range from 17% in Portland, Oregon (Feldman & Miller, 1956) to 84% in France (Desmonts, Couvreur & Ben Rachid, 1965). The only exception we have found to this is an incidence of 0.8% in 478 blood donors in Cracow, Poland (Starzyk, 1959). The incidence in Africa is also high, but although not much work has been reported from the Far East such figures as are available suggest that the incidence there may be rather lower. Murakami (1964) found an incidence of 12.6% in Nagasaki City, Sery *et al.* (1959) reported an incidence of only 2.9% positive skin tests in Vietnam, and V. Zaman (personal communication) found 17% of blood donors in Singapore positive by the haemagglutination test.

A low incidence is usually associated with a hot dry climate or with cold conditions, but the climate of Hong Kong is hot and wet in the summer. The incidence tends to be lower in towns than in the country but the incidence in Hong Kong is apparently much lower than that normally reported from Western urban areas. When one considers the size of Hong Kong and its closely packed population it would appear that spread by person-to-person contact cannot be a common mode of transmission. The high incidence of antibodies in the pigs examined (71%) indicates an important potential source of infection and pork is a common food in Hong Kong. French workers consider that the high incidence in their country may be due to the eating of undercooked meat. Perhaps the Chinese population in Hong Kong escape infection from pork by their custom of eating pork in small lumps and only when well cooked. It is their belief that eating undercooked pork may cause 'madness' in the consumer. Undercooked fish and beef, on the contrary, are considered relatively harmless to the consumer. This could also account for their low incidence of *Taenia solium* infection in spite of heavy infestation of the local pigs. Further study of the cooking methods and social customs of the people

combined with more detailed serological studies of special groups is needed in attempting to explain the low incidence of infection. Whatever the explanation, it may be there is a common cause affecting the Far East as a whole, for so far there have been no reports of a high incidence comparable with the high rates found in Europe, tropical Africa and Central and South America.

SUMMARY

Toxoplasma antibodies were absent from the sera of 32 adult Hong Kong women and were present in only two of 35 adult males and five of 46 meat workers, an overall incidence of 6.2%. This is the lowest incidence recorded in a large tropical city and lower than the incidence reported for most areas of the world, whether rural or urban. The reasons for this are unknown. Of 31 sera from swine imported from China and slaughtered in Hong Kong, 22 (71%) were positive for toxoplasma antibodies.

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