Successful development of "Brugia pahangi" in T-cell deprived CBA mice

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Successful development of *Brugia pahangi* in T-cell deprived CBA mice

R. R. Suswillo, M. J. Doenhoff, D. A. Denham

**Summary**

CBA mice were thymectomized and treated with anti-thymocyte serum. Seven such mice were given 90–100 infective larvae of *Brugia pahangi* each by intraperitoneal (ip) injection and 5 given 99–100 larvae each by subcutaneous (sc) injection. From 62 days after infection 6 of 7 mice infected ip had microfilariae in their peritoneal cavities. Only one mouse infected by sc injection showed microfilariae in peripheral blood and this not until 98 days. At autopsy 5–45 adult worms were recovered from the ip infected mice. Only 2 of the 5 sc infected mice had adults and these only 3 each. No microfilariae or adult worms were detected in similarly infected unthymectomized CBA mice.

*Key words:* *Brugia pahangi;* CBA mouse; thymectomy; anti-thymocyte serum.

*Brugia pahangi,* a filarial nematode which in nature parasitizes many mammalian species in Malaysia and Indonesia, will successfully develop in jirds (*Meriones unguiculatus*) (Ash and Riley, 1970) and golden hamsters (*Mesocricetus auratus*) (Malone et al., 1974) but not in normal mice (Chong and Wong, 1967; Ahmed, 1967; Suswillo et al., 1980). It is very similar to *Wuchereria bancrofti* and *Brugia malayi* which are important pathogens of man.

Suswillo et al. (1980) and Vincent et al. (1980) found that *B. pahangi* developed to full maturity and produced microfilariae in athymic nude mice. In one experiment Suswillo et al. (1980) found microfilariae in 12 of 20 nude mice which had been inoculated with infective larvae of *B. pahangi.* In view of these results we decided to attempt to infect T-cell deprived mice with *B. pahangi* to determine whether the susceptibility of nude mice was due to their lack of a thymus or to some other factor.

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Materials and methods

The general parasitological methods, such as those for the production of infective larvae and enumeration of microfilariae, were those of Denham et al. (1972). The inbred CBA/H-T6T6 mice were bred on site. 12 mice were thymectomized at 8 weeks of age using the method described by Law et al. (1963). On days 1, 3, 5 and 7 after thymectomy they were each given 0.25 ml of rabbit antimouse thymocyte serum (Levey and Medawar, 1966) by subcutaneous injection. 28 days after thymectomy 5 thymectomized mice and 3 intact mice were injected subcutaneously with 90–100 larvae of B. pahangi each and 7 thymectomized and 3 intact mice were injected intraperitoneally with 90–100 larvae each.

From 50 days after infection the mice were monitored for blood or intraperitoneal microfilariae (Suswillo et al., 1980) depending on route of inoculation. 165–167 days after infection the mice were killed. The peritoneal cavities were searched for adults and microfilariae. 1% Evans blue solution was used to dye the lymphatics which were dissected and searched for adult worms (see Denham et al., 1972 for details).

Results

Neither microfilariae nor adult worms were found in the intact mice. Microfilariae were first found in the peritoneal washings 62 days after infection of all the thymectomized mice which had been infected by ip injection. At autopsy microfilariae were found in tail vein blood from 5 of 6 animals tested. Only 1 of 5 thymectomized mice infected by sc injection became microfilaraemic and this was not seen until 98 days post infection.

The adult worm recoveries, and other details, are shown in Table 1. Percentage recoveries (i.e. adults recovered as percentage of larvae inoculated)

<table>
<thead>
<tr>
<th>No. larvae and route of infection</th>
<th>Microfilariae</th>
<th>Number of adults</th>
<th>Percentage recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in blood (100 μl)</td>
<td>in peritoneal cavity</td>
<td>in peritoneal cavity</td>
</tr>
<tr>
<td>94 ip</td>
<td>5</td>
<td>+</td>
<td>142, 132</td>
</tr>
<tr>
<td>100 ip</td>
<td>20</td>
<td>+</td>
<td>302, 152</td>
</tr>
<tr>
<td>100 ip</td>
<td>ND</td>
<td>+</td>
<td>322, 72</td>
</tr>
<tr>
<td>100 ip</td>
<td>0</td>
<td>–</td>
<td>52, 02</td>
</tr>
<tr>
<td>90 ip</td>
<td>4</td>
<td>+</td>
<td>82, 22</td>
</tr>
<tr>
<td>100 ip</td>
<td>5</td>
<td>+</td>
<td>262, 122</td>
</tr>
<tr>
<td>99 ip</td>
<td>2</td>
<td>+</td>
<td>62, 62</td>
</tr>
<tr>
<td>100 sc</td>
<td>0</td>
<td>–</td>
<td>0</td>
</tr>
<tr>
<td>99 sc</td>
<td>3</td>
<td>–</td>
<td>0</td>
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<tr>
<td>100 sc</td>
<td>0</td>
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<td>100 sc</td>
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<td>100 sc</td>
<td>0</td>
<td>–</td>
<td>0</td>
</tr>
</tbody>
</table>

ip = intraperitoneal; sc = subcutaneous

Table 1. Details of experiment in which infective larvae of B. pahangi were inoculated into T-cell deprived CBA/H-T6T6 mice. No adult worms or microfilariae were found in intact controls

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ranged from 5–45 in the mice infected ip. Only two of the mice infected sc had
adult worms which were found in the testicular lymphatics of both mice and in
the heart of one. One mouse had female worms only which contained ova but
no microfilariae and the other yielded 2 gravid females.

Discussion

The results with intact mice are similar to those obtained by Suswillo et al.
(1980). The number of adult worms recovered from deprived mice infected by
sc injection was of the same order as that obtained from nude mice but was
much lower than that obtained from both T-cell deprived and nude mice infect-
ed by ip injection. The mean recovery of adult worms was 25.8% from the ip
infected T-cell deprived mice which compares well with the 11.1% recovered
from nude mice infected by the same route (Suswillo et al., 1980).

The ability of B. pahangi to develop in T-cell deprived mice strongly sug-
gests that the failure of the same parasite to develop in normal mice is due to an
immune response rather than to some innate physiological or biochemical
insufficiency.

It should now be possible by a variety of reconstitution procedures to
determine which components of the immune system are responsible for the
death of B. pahangi in mice. This, in turn, might lead to a better understanding
of the host-parasite relationship in other species of host in which the parasite
survives well, but in which the immune response is as yet less amenable to
manipulation than is that of the mouse. The T-cell deprived mouse has advan-
tages over the nude mouse not the least of which are its greater hardiness and
lower cost.

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1. The resistance of guinea-pig, rabbits and white mice to infection. Ann. trop. Med. Parasit. 61,
93–100 (1967).
Ash L. R., Riley J. M.: Development of Brugia pahangi in the jird, Meriones unguiculatus, with
Malaya 27, 382 (1967).
Parasitological observations on primary infections in cats (Felis catus). Int. J. Parasit. 2, 239–247
(1972).
Law L. W., Bradley T. R., Rose G.: Reversal of the thymus dependent influence in radiation
