

nounced stud-like structures make up the outermost layer of the particle. When cut in certain planes of section these look like capsomeres. Furthermore, there are completely formed cores in all stages of the budding process.

The syncytium-forming agent has not been observed in the original tumour tissues. It has been seen in tissue culture only when most cells formed syncytia. The myxovirus-like and C type particles have been observed in the same lot of culture cells established from lymphomatous cats carrying the adventitious agent.

This work was performed in accordance with a contract and grant from the US National Institutes of Health, Department of Education and Welfare.

JOHN L. RIGGS  
LYNDON S. OSHIRO  
DEE O. N. TAYLOR  
EDWIN H. LENNETTE

Viral and Rickettsial Disease Laboratory,  
California State Department of Public Health,  
Berkeley, California 94704.

Received February 25; revised April 11, 1969.

<sup>1</sup> Dorn, C. R., Taylor, D. O. N., Frye, F. L., and Hibbard, H. H., *J. Nat. Cancer Inst.*, **40**, 295 (1968).

<sup>2</sup> Kawakami, T. G., Theilen, G. H., Dungworth, D. L., Munn, R. J., and Beall, S. G., *Science*, **158**, 1049 (1967).

<sup>3</sup> Laird, H. M., Jarrett, O., Crighton, G. W., and Jarrett, W. F. H., *J. Nat. Cancer Inst.*, **41**, 867 (1968).

<sup>4</sup> Laird, H. M., Jarrett, O., Crighton, G. W., Jarrett, W. F. H., and Hay, D., *J. Nat. Cancer Inst.*, **41**, 879 (1968).

## *Trichinella spiralis* in the Red Fox (*Vulpes vulpes*) in Ireland

SINCE 1835 when Owen<sup>1</sup> described the species *Trichinella spiralis* from man in London, trichinosis has occurred occasionally, sometimes in epidemics, in both Britain and Ireland as well as being endemic in some parts of the world. While infection in wildlife has been reported in at least sixty-five species of mammal<sup>2</sup>, the primary reservoirs are carnivores. Although elsewhere man may be infected by eating bear meat, wild boar or bush pig, the disease, in these islands, is most frequently contracted by eating inadequately cooked or raw pork, especially sausages.

Efforts to find a wild carnivore reservoir in Britain and Ireland have hitherto resulted in the finding of only a single infected red fox at Truro, Cornwall<sup>3</sup>. In Continental Europe, the fox seems to be the main reservoir of infection and, for example, the following rates of infection have been found: Italy, 32 per cent of 639 foxes<sup>4</sup>; Switzerland, 50 per cent of 10 foxes<sup>5</sup>; Germany, 2.6 per cent of 572 foxes<sup>6</sup>; and Finland 3.8 per cent of 105 foxes<sup>7</sup>. Human infections are now generally as infrequent in the latter countries as they are in these islands, although Dr Z. Kozar, director of the International Commission on Trichinellosis (personal communication 1968) says: "It is difficult to determine the prevalence of trichinellosis in Western Europe; it is also questionable either that it is rare or that it is justifiably sometimes described as non-existent in some countries".

Recent epidemics in County Cork (twenty-six cases in 1967)<sup>8</sup> and in County Kerry (fifty cases in 1968)<sup>9</sup> stimulated a search for a reservoir in the wild carnivores found in Ireland. Because of the importance of the fox as a principal maintenance host in Continental Europe, initial studies were concentrated on this species. Fresh thigh muscle was examined by the compression technique and the residue of 10 g of muscle digested in pepsin hydrochloric acid solution for 16 h at 37°C was viewed under a low power microscope.

Of seventy fresh specimens so far examined from Counties Cork, Waterford and Tipperary, three (4.3 per

cent) were infected. In all cases, the encysted *T. spiralis* was seen on compression, and after digestion the number of larvae per gram of thigh muscle was one, two and six. The distribution of infected animals is local, however, as Pavlovsky<sup>10</sup> showed with many zoonoses, because all the infected foxes came from Tallow, County Waterford, where three of the thirty-nine (7.7 per cent) were positive. The foxes from Tallow were captured in the surrounding area of West Waterford, East Cork and South Tipperary, counties in which trichinosis in man has been reported<sup>9,11,12</sup> recently. None of seventeen foxes from Bottle Hill, mid Cork was infected, nor were any of another fourteen which came from various localities scattered through County Cork. Similar results have been reported for example, from southern Hessen, Germany<sup>6</sup>, where Schoop and Lamina showed that, although the overall average infection was 2.62 per cent, some areas had 6 to 7.4 per cent positives. Beresford-Jones<sup>13</sup>, who listed the helminths of 300 foxes from all over Britain, found only one with *Trichinella*, the specimen already recorded from Truro<sup>3</sup>. There were but six foxes from Cornwall, however, and Beresford-Jones only examined by compression some small samples of the diaphragm.

We also examined jaw muscle from twenty foxes from Northern Ireland kindly supplied by Professor Garoth Owen and Dr J. S. Fairly of Queen's University, Belfast. None was positive but the muscle had been preserved in formalin for at least some months. Furnell<sup>14</sup> in 1957 found ten of 202 brown rats (*Rattus norvegicus*) infected, but none of five foxes. All the positive rats came from 135 collected from the City Dump in Limerick which again emphasizes the nidality of this zoonosis.

The level of infection in pigs is no indication of the incidence in wildlife. Thus, in Germany in 1954, the incidence in pigs was only twenty-six per 100,000 compared with a 2.6 per cent incidence in foxes<sup>6</sup> and in 1959 only nineteen infected pigs were found among the 18,996, 242 pigs examined in the German Federal Republic<sup>15</sup>, while Ciurnelli<sup>16</sup>, in the Italian Province of Macerata, found 28,914 pigs negative although eight (6.45 per cent) of the 124 foxes examined were infected. Furnell<sup>14</sup> found none of 2,286 pigs infected and, in Dublin, Redahan<sup>17</sup> found none of 1,000 pigs and thirty-two rats infected in 1964.

Further studies are continuing. This work was supported by the Medical Research Council of Ireland.

JOHN P. CORRIDAN

Department of Social and  
Preventive Medicine,

FERGUS J. O'ROURKE  
MARTIN VERLING

Department of Zoology,  
University College, Cork.

Received April 24, 1969.

<sup>1</sup> Owen, R., *Trans. Zool. Soc. Lond.*, **1**, 315 (1835).

<sup>2</sup> Nelson, G. S., in *Some Diseases of Animals Communicable to Man in Britain* (Pergamon Press, London, 1968).

<sup>3</sup> Oldham, J. N., and Beresford-Jones, W. P., *Brit. Vet. J.*, **113**, 34 (1957).

<sup>4</sup> Marazza, V., *Archo. Vet. Ital.*, **11**, 507 (1960).

<sup>5</sup> Hörmig, B., *Bull. Off. Intern. Epizoot.*, **55**, 1796 (1961).

<sup>6</sup> Schoop, G., and Lamina, J., *Deut. Med. Woch.*, **87**, 335 (1962).

<sup>7</sup> Freeman, R. S., *Suom. Eläenlääk.*, **70**, 279 (1964).

<sup>8</sup> Corridan, J. P., and O'Meara, P. B., *Ir. J. Med. Sci.*, **1**, 109 (1968).

<sup>9</sup> Corridan, J. P., and Gray, J. J., *Brit. Med. J.* (in the press).

<sup>10</sup> Pavlovsky, E. N., *Natural Nidality of Transmissible Diseases* (Univ. Illinois Press, 1966).

<sup>11</sup> Nash, J., Kidney, J. G., Furnell, M., and O'Meara, P. B., *J. Ir. Med. Assoc.*, **40**, 74 (1957).

<sup>12</sup> Drury, M. J., *Ir. J. Med. Sci.*, **7**, 84 (1957).

<sup>13</sup> Beresford-Jones, W. P., *Vet. Rec.*, **73**, 882 (1961).

<sup>14</sup> Furnell, M. J. G., *Ann. Rpt. Med. Res. Coun. Ir.*, 1957, 43 (1958).

<sup>15</sup> Anon., *Die Fleischwirtschaft*, **13**, 317 (1961).

<sup>16</sup> Ciurnelli, M., *Vet. Ital.*, **11**, 545 (1960).

<sup>17</sup> Redahan, E., *Ir. Vet. J.*, **21**, 168 (1967).