

Brief Communication

ISOLATION OF CAMPYLOBACTER SPUTORUM SUBSP.
MUCOSALIS IN NORWAY

Campylobacter sputorum subsp. *mucosalis* (Csm) was first isolated by Rowland *et al.* (1973) in connection with porcine intestinal adenomatosis. The organism was later characterized by Lawson & Rowland (1974). During recent years the organism has further been associated with related conditions, including necrotic enteritis, regional ileitis (Rowland & Lawson 1975) and proliferative haemorrhagic enteropathy (Gunnarson *et al.* 1976, Lomax & Glock 1982). For a review of the various aspects of *Campylobacter* infections, see Garcia *et al.* (1983).

This paper deals with the isolation and propagation of Csm from 2 cases of pseudomembranous ileitis and colitis in weaned pigs.

Csm was isolated from specimens submitted for routine examination from 2 pig farms. Neither farm had any known history of specific intestinal disorders in weaned pigs. One pig originated from a specialized bacon pig production unit where weaned pigs were recruited from several producers. In this farm 10 pigs showed poor appetite and retarded growth after 2 to 3 weeks of the feeding period. They all either died or were euthanized. The pig submitted for examination was approximately 3 months old and had a wasted appearance. Findings at necropsy were haemorrhagic and pseudomembranous enteritis including the posterior jejunum, ileum, caecum and the anterior colon. Histopathological investigation of the affected ileum revealed an extensive destruction of glandular tissue. Adenomatous proliferation in the mucosa was not seen.

The second pig originated from a farm which recruited its own fattening pigs. The pig, which had been weaned 2 weeks previously, died apparently in acute abdominal pain. Main findings at necropsy were a pseudomembranous jejunitis and ileitis and a catharral colitis. No adenomatous changes could be demonstrated by histopathological examination. Phase-contrast microscopy of colonic contents disclosed numerous spirochaetes and a considerable number of *Campylobacter*-like organisms. No other pigs at this farm showed clinical signs of intestinal disturbances.

The mucosa of the affected ileum from both pigs was washed repeatedly with phosphate-buffered saline (0.01 mol/l, pH 7.2) in order to remove all visible intestinal contents (Lawson & Rowland 1974). The epithelium was removed, homogenized with a small volume of reinforced clostridial medium (RCM) (Oxoid) and centrifuged at $1400 \times g$ for 30 s. The supernatant was diluted 1:10 and 1:100 in RCM. Each dilution was inoculated on heart infusion agar (Difco) with 5 % bovine blood both with and without the addition of novobiocin (5 $\mu\text{g/ml}$) and brilliant green (16.7 $\mu\text{g/ml}$). Plates were incubated in Gas Pak jars (BBL) under microaerophilic conditions for 72 h at 37°C. Colonies which proved to be catalase negative and which contained organisms showing the characteristic movement and morphology of *Campylobacter* spp. by phase-contrast microscopy, were subcultured. These colonies were 1.0 to 1.5 mm in diameter, opaque, slightly convex and produced a grey-yellowish pigment. The organisms were oxidase positive, produced H_2S on TSI-agar, reduced nitrate to nitrite but did not hydrolyse sodium hippurate. Slight growth was evident on blood agar incubated at 43°C, but no growth occurred on thioglycolate medium (Difco) with 0.1 % agar and 1 % glycine or 3 % NaCl. Both isolates agglutinated in an anti-serum prepared against a type strain of Csm*. Agglutination was recorded in dilutions 1/320 and 1/640 respectively. The number of Csm isolated from each pig was estimated at $3 \cdot 10^4$ colony-forming units per g of wet weight of intestinal mucosa.

The listed characteristics of the 2 isolates are in accordance with those described for Csm. One isolate was sent to Dr. G. H. K. Lawson who confirmed the diagnosis.

Routine bacteriological examination of colonic contents revealed haemolytic *Treponema hyodysenteriae* in both pigs. In the first case haemolytic *Escherichia coli* was demonstrated in abundant growth.

Rowland & Lawson (1975) suggested a possible relationship between porcine intestinal adenomatosis, necrotic enteritis, proliferative haemorrhagic enteropathy and regional ileitis. This suggestion was based on the presence of adenomatous proliferation of the mucosa and the isolation of Csm. They could not isolate Csm from typical cases of swine dysentery (Lawson & Rowland

* The strain (253/72) (NCTC 11 000) was kindly supplied by Dr. G. H. K. Lawson, Department of Veterinary Pathology, Royal School of Veterinary Studies, Edinburgh, Scotland.

1974). They therefore concluded that C_{ssm} was specifically related to intestinal disorder with adenomatous proliferations. However, they were not able to reproduce the disease experimentally with C_{ssm} (Roberts *et al.* 1980).

Bacteriological examinations from intestinal contents in these 2 cases have demonstrated the presence of C_{ssm}, haemolytic *Treponema hyodysenteriae* and haemolytic *Escherichia coli*. Pathological findings were consistent neither with those seen by porcine adenomatosis nor with swine dysentery.

An investigation by Lawson *et al.* (1980) on C_{ssm}-antibodies in pig sera revealed titres above 1/320 both in pigs originating from farms having experienced adenomatosis and in pigs deriving from farms selected at random. This finding further emphasizes the parasitic and opportunistic role of C_{ssm}.

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