Experimental infection of layer hens with a human isolate of *Brachyspira pilosicoli*

Abdollah Jamshidi† and David J. Hampson

Division of Veterinary and Biomedical Sciences, Murdoch University, Murdoch, Western Australia 6150, Australia

The anaerobic intestinal spirochaete *Brachyspira pilosicoli* commonly colonizes the large intestine of a number of species, including chickens and human beings. The purpose of the current study was to determine whether an isolate of *B. pilosicoli* recovered from an HIV-infected patient with diarrhoea could infect and cause disease in adult chickens. Over a 4-week period following experimental infection, a group of eight inoculated chickens showed a persistent and significant increase in faecal water content (~6–7 %). The faeces of three of the eight birds became culture-positive, and remained so. At post-mortem examination, no specific pathological changes were found, and no spirochaetal attachment to the caecal epithelium was observed. These findings confirm that *B. pilosicoli* strains can infect across species barriers and cause chronic mild diarrhoea in intact adult chickens.

**INTRODUCTION**

The anaerobic intestinal spirochaete *Brachyspira pilosicoli* has been isolated from the large intestine or faeces of many animal species, including pigs (Trott *et al.*, 1996b), chickens (Stephens & Hampson, 2001), dogs (Duhamel *et al.*, 1998) and water birds (Oxberry *et al.*, 1998). A pathognomonic feature of the colonization, seen in only some infected individuals, is the presence of a ‘false brush border’ made up of large numbers of spirochaetes attached by one end to the epithelium of the caecum, colon and/or rectum (Thomson *et al.*, 1997). In pigs, *B. pilosicoli* causes porcine intestinal spirochaetosis, a common and widespread colonic infection of weaner and grower pigs, associated with loose faeces and poor growth rates (Trott *et al.*, 1996b; Thomson *et al.*, 1997). In poultry, infection with *B. pilosicoli* is common in adult layer and broiler breeder flocks (Stephens & Hampson, 1999), and has been associated with delayed and reduced egg production and increased faecal moisture content (Stephens & Hampson, 2002a). *B. pilosicoli* also colonizes humans: in developing countries, including Oman (Barrett, 1990) and Papua New Guinea (Trott *et al.*, 1997a), *B. pilosicoli* has been shown to colonize around 30 % of general population in developed countries (Tompkins *et al.*, 1986; Lee & Hampson, 1992; Brooke *et al.*, 2001). In humans, the colonization has been linked to a number of symptoms including chronic diarrhoea, rectal bleeding, pseudo-appendicitis and lower abdominal discomfort (Gad *et al.*, 1977; Douglas & Cruciolli, 1981; Rodgers *et al.*, 1986; Heine *et al.*, 2001). More severe invasive cases have also been described in both immunocompromised and immunocompetent individuals, with intestinal spirochaetes being observed in enterocytes, goblet cells, macrophages and Schwann cells, and associated in some cases with epithelial ulceration and necrosis, and crypt abscessation (Antonakopoulos *et al.*, 1982; Guccion *et al.*, 1995; Padmanabhan *et al.*, 1996). Intestinal spirochaetes resembling *B. pilosicoli* have been observed invading the colon and liver of a homosexual man with HIV, who was suffering from cholestatic hepatitis (Kostman *et al.*, 1993). Isolates of *B. pilosicoli* have also been recovered from the bloodstream of immunocompromised individuals in Europe and the USA, some of whom have had bloody diarrhoea (Lambert & Goursot, 1982; Fourmi-Amazouz *et al.*, 1995; Trott *et al.*, 1997b; Kanavaki *et al.*, 2002).