

Genetic Characterization of *Campylobacter jejuni* O:41 Isolates in Relation with Guillain-Barré Syndrome

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***Campylobacter jejuni* O:41 strains are found in association with Guillain-Barré syndrome in South Africa. Strains of this serotype collected over 17 years were characterized by amplified fragment length polymorphism and flagellin typing to determine their clonal nature. Despite minor variation in GM1 expression, all of the strains were genetically indistinguishable, indicating that they are representative of a genetically stable clone.**

Campylobacter jejuni is a common cause of human gastroenteritis. A correlation between (i) *C. jejuni* infection and (ii) Guillain-Barré syndrome (GBS) and Miller-Fisher syndrome (MFS) has been described; 30% of GBS or MFS patients have a *C. jejuni* infection prior to, or concomitant with, the onset of neurological symptoms (5, 9). Infections with certain *C. jejuni* serotypes pose an increased risk of GBS, especially serotype O:19 (5, 9, 10). In the Cape Town area of South Africa, *C. jejuni* strains of serotype O:41, but not O:19, have been found to be associated with GBS, despite the fact that O:19 strains are detected in stool samples at a frequency three times higher than that of O:41 (6, 7).

The genetic characterization of serotype O:41 isolates from the Western Cape area isolated over a period of 17 years was the aim of this investigation. The isolates (Table 1) were genetically characterized to determine clonality using amplified fragment length polymorphism (AFLP) (2) corroborated with flagellin typing (1). The serotype O:41 strains were analyzed in combination with the reference strains of serotypes O:1 to O:10, O:19, and O:41 of the serotyping scheme (12) and with four clinical isolates of serotype O:19 (Table 1).

The results (Fig. 1) indicate that all 11 isolates of serotype O:41 are genetically indistinguishable by AFLP. Apparently, all of the O:41 strains examined represent a clonal population, despite phenotypic variation detected in GM1 expression (Table 1, data kindly provided by D. Sack [13]). The clonality of serotype O:41 isolates was corroborated by flagellin typing (Fig. 2). Interestingly, serotype O:41 and O:19 strains have the same *fla* profile. Most other serostrains produced different *fla* profiles (Fig. 2; results for *DdeI* digestions not shown); however, the profile of O:19 and O:41 is not unique to these two serotypes (T. Wassenaar, unpublished data).

Recently, an O:19-specific PCR was developed which differentiates O:19 strains from those of other serotypes (8). We applied this test to O:41 strains. With adaptation of the method (a primer concentration of 60 nM had to be used to obtain specific PCR products), O:41 strains were classified as non-O:19 by this PCR (results not shown).

The methods of flagellin typing and the O:19-specific PCR could be applied to type *Campylobacter* isolates for *Campy-*

lobacter-induced GBS risk assessment. However, such genotyping results should be interpreted with caution since our results indicate that the O:19-specific PCR would not detect O:41 and the flagellin genotype of O:19 and O:41 is not unique to these two serogroups.

A clonal relationship of isolates of the same serotype is not a general feature of *Campylobacter*, as serogroups O:1, O:2, and O:4 are genetically heterogeneous (3, 11); however, some serogroups, e.g., O:19, appear to be clonal (4, 10). Our results indicate that serogroup O:41 isolates from South Africa are also clonal and that this serotype has been genetically stable for a long time.

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TABLE 1. Strains used in this study

No.	Serotype	<i>C. jejuni</i> biotype	Source ^a	Yr of isolation	Expression of GM1 epitope
546.81	O:41	2	Non-GBS	1981	+
137.83	O:41	2	Non-GBS	1983	+
260.94	O:41	2	GBS	1994	+
28134.94	O:41	2	GBS	1994	–
367.95	O:41	2	GBS	1995	+
233.95	O:41	2	GBS	1995	+
386.96	O:41	2	Non-GBS	1996	+
287.96	O:41	2	Non-GBS	1996	–
242.98	O:41	2	MFS	1998	+
290.98	O:41	2	Non-GBS	1998	–
331.82	O:19	1	Non-GBS	1982	+
94.84	O:19	1	Non-GBS	1984	+
1050.98	O:19	1	Ostrich	1998	+
HB93-13	O:19	1	GBS ^b	NA ^c	NA

^a Strains 546.81 to 94.84 were isolated at the Red Cross Children's Hospital in Cape Town, South Africa, from patients suffering from GBS, MFS, or gastroenteritis (non-GBS). Strain 1050.98 was isolated from an ostrich suffering fatal enteritis. *C. jejuni* serotype reference strains O:1 to O:10, O:19, and O:41, which were also used in this study, were from the National Collection of Type Cultures strain collection.

^b Strain HB93-13 was isolated from a GBS patient in the People's Republic of China. (14).

^c NA, data not available.

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