

Re-emergence of O103:H2 Shiga toxin-producing *Escherichia coli* infections in São Paulo, Brazil

Shiga toxin-producing *Escherichia coli* (STEC) is an important cause of gastroenteritis in developed countries, and symptoms include mild to severe diarrhoea and haemorrhagic colitis (HC) that may be complicated with haemolytic uraemic syndrome (HUS). STEC O157:H7 is a prominent pathogen worldwide, but the occurrence of non-O157 STEC infections is increasing in several regions, and particular non-O157 serogroups associated with pathogenicity include O26, O91, O103 and O111 (Paton & Paton, 1998).

In Brazil, infections due to STEC have been mainly reported as associated with sporadic cases of non-bloody diarrhoea, particularly in young children (Giraldi *et al.*, 1990; Cantarelli *et al.*, 2000; Guth *et al.*, 2000). Despite the lack of a nationwide surveillance system for HC and HUS, isolation of O157:H7 strains from bloody diarrhoea (Irino *et al.*, 2002) and of O26:H11 from one HUS case (Guth *et al.*, 2002) have been recently described in Brazil. Moreover, non-O157 STEC have been circulating as agents of infantile diarrhoea in São Paulo State since the late 1970s, with serotypes O111:NM, O111:H8 and O26:H11 accounting for most of the cases (Vaz *et al.*, 2004), indicating the occurrence of important enterohaemorrhagic *E. coli* (EHEC) strains in our settings, which is certainly a public health concern.

It is known that the predominance of non-O157 STEC strains may vary depending on the region analysed, and O103:H2 STEC strains have been reported as an important cause of gastroenteritis and HUS in several European countries (Eklund *et al.*, 2001; Prager *et al.*, 2002) and in the USA (Tarr *et al.*, 1996). To our knowledge the only mention of an infection by O103:H2 STEC in Brazil dates from 1986, when it was isolated from a 3-month-old child with non-bloody diarrhoea (Guth *et al.*, 2000). In this report the re-emergence of O103:H2 STEC strains as recent causes of infantile diarrhoea and haemolytic anaemia in São Paulo State is addressed.

Three cases of O103:H2 STEC infection were identified in Brazil during the period 2000–2002. One of the strains was isolated from the stools of a 24-month-old child with haemolytic anaemia and the two others were isolated from faecal specimens of 18- and 24-month-old children with non-bloody diarrhoea. *E. coli* strains were isolated from the stools of these patients by standard procedures, identified as STEC by detection of Shiga toxin (*stx*), intimin (*eae*) and enterohaemolysin (*ehx*) gene sequences, and serotyped as previously described (Vaz *et al.*, 2004). All the strains carried *stx*₁, *eae* and *ehx*, and one of them harboured additionally the *stx*₂ and *stx*_{2vha} sequences, which were determined by RFLP-PCR (Guth *et al.*, 2003). Intimin type *ε* was identified in all of them (Oswald *et al.*, 2000). The *stx*₁ *eae* *ehx* virulence profile is commonly observed among strains of this serotype isolated in other regions (Eklund *et al.*, 2001; Prager *et al.*, 2002; Tarr *et al.*, 1996), and was also harboured by the STEC strain isolated in São Paulo in 1986 (Table 1).

Cattle represent the main reservoir of STEC, and thus most of the outbreaks and sporadic cases of human infections have been associated with the consumption of contaminated food, the major vehicles of infection being undercooked ground beef and unpasteurized milk. As non-O157 STEC strains are more prevalent in animals and as contaminants of foods than O157 STEC strains, humans are probably more exposed to these organisms. The occurrence of O103:H2 STEC strains in cattle had been

described in some studies (Zweifel *et al.*, 2005). However, in Brazil these strains have not been isolated from animals or foods (Cerqueira *et al.*, 1997; Irino *et al.*, 2005), making any analysis of probable infection sources difficult.

The real incidence of O157 and non-O157:H7 STEC infections in Brazil is not easy to establish since only a few laboratories adhered to diagnostic methods for O157 identification and the search for non-O157 STEC strains is only performed in some reference laboratories. Nevertheless, O103:H2 STEC has re-emerged in São Paulo State as a cause of disease, and although still in low numbers the search for this particular EHEC serotype should be implemented. The molecular analysis of human STEC strains isolated in Brazil, including those of serogroup O103, is being undertaken in our laboratory.

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Table 1. Characteristics of O103:H2 STEC strains isolated in São Paulo, Brazil

Strain	Date of isolation (mm/yy)	Age of patient (months)	Patient's condition*	Virulence markers
651-1	07/86	3	D	<i>stx</i> ₁ <i>eae</i> <i>ehx</i>
495/12	12/00	18	D	<i>stx</i> ₁ <i>eae</i> <i>ehx</i>
437/01	10/01	24	HA	<i>stx</i> ₁ <i>eae</i> <i>ehx</i>
91	09/02	24	D	<i>stx</i> ₁ <i>stx</i> ₂ <i>stx</i> _{2vha} <i>eae</i> <i>ehx</i>

*D, diarrhoea; HA, haemolytic anaemia.

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