

THE HETEROGENEITY OF VERO TOXIN OF
ESCHERICHIA COLI

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Vero toxigenic *Escherichia coli* (VTEC) have been reported from diarrhoeal disease of calves in Sri Lanka¹; has been implicated in outbreaks of haemorrhagic colitis and haemolytic uraemic syndrome in man²; and has been isolated from diarrhoeal and oedema diseases of pigs³. The Vero toxin (VT) produced by human VTEC has been shown to be related to the Shiga toxin of *Shigella dysenteriae* 1⁴.

The present study was carried out to investigate the antigenic relationship of VT produced by strains of *E.coli* isolated from different vertebrates to Shiga toxin. Forty VTEC strains isolated from calves¹, three goat VTEC, and two pig VTEC (SLM7 and SLM30), all isolated in Sri Lanka were included in this study. In addition, porcine (O141) (provided by William Smith, UK) and human (H30) (obtained from Dr. O'Brien, USA) VTEC strains were also studied. Antigenic relationship of the toxins produced by these strains to Shiga toxin was studied using antiserum to purified Shiga toxin (provided by Dr. O'Brien, USA) in a toxin neutralization assay on Vero cells. Four units of toxin (culture supernatant) was mixed with dilutions of the Shiga toxin and tested for residual toxin activity on Vero cells⁵.

The VT of 35 of 40 calf strains, 3 goat strains and the human (H30) strain was neutralized by the Shiga antitoxin (Shiga related VT-SRVT). The porcine strains and five of forty calf *E.coli* strains produced VT which was not neutralized by antiserum to Shiga toxin (Shiga unrelated VT-SUVT).

When these toxins were tested on a panel of continuous cell lines, it was found that all VTs produced a similar cytopathic effect (CPE) on Vero cells. Whereas the calf (both SRVT And SUVT), goat and the human VT produced CPE on both HeLa and Hep-2 cells, the porcine strains did not (Table 1).

When the heat stability of VT from different strains of *E.coli* was studied, the VT of pig *E.coli* was inactivated at 66° C for 30 minutes, whereas the VT of all the other strains was heat stable at this temperature.

Table 1. Activity of VT of different
E.coli strains on a panel of cell lines

Cell line	VTEC strain tested						
	H30*	56**	256***	304***	8G+	SLM7++	0141++
Vero	+	+	+	+	+	+	+
Hela	+	+	+	+	+	-	-
Hep-2	+	+	+	+	+	-	-
Y1-adrenal	-	-	-	-	-	-	-
PS	-	-	-	-	-	-	-
P388	-	-	-	-	-	-	-

* Human VTEC; ** calf VTEC(SRVF); *** calf VTEC(SUVF)

+ Goat VTEC; ++ pig VTEC

We conclude that there is antigenic and biologic heterogeneity amongst "Vero toxins" of *E.coli*. Pig VT appears to be biologically (activity on cell lines; heat stability) distinct from all other VTs. Within the cattle VTEC, there appears to be strains which produce SRVF and SUVF when assessed antigenically.

References

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