

Type III secretion system 1 of *Vibrio parahaemolyticus* induces oncosis in both epithelial and monocytic cell lines

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The *Vibrio parahaemolyticus* type III secretion system 1 (T3SS1) induces cytotoxicity in infected epithelial cells. In this study we characterized the cell death phenotype in both infected epithelial (HeLa) and monocytic (U937) cell lines. Using a combination of wild-type and gene knockouts, we showed that *V. parahaemolyticus* strain NY-4 was able to induce cell death in both cell lines via a T3SS1-dependent mechanism. The mechanism of cell death appears to involve formation of a pore structure in the surface of infected HeLa and U937 cells as demonstrated by cellular swelling, uptake of cell membrane-impermeable dye, and protection of cytotoxicity by osmoprotectant (PEG3350). Electron microscopy of infected HeLa and U937 cells showed cell membrane disruption and cytoplasmic vacuolation. Western blot analysis showed that poly ADP ribose polymerase (PARP) was not cleaved and remained in its full-length active form and *V. parahaemolyticus*-induced cytotoxicity was not inhibited by addition of the pan-caspase inhibitor zVAD; thus caspases were not involved in cytotoxicity caused by T3SS1. We conclude that T3SS1 of *V. parahaemolyticus* strain NY-4 induced a mode of cell death consistent with oncosis. This description of both epithelial and macrophage death induced by *V. parahaemolyticus* sheds new light on the pathogenesis of vibriosis