INTRODUCTION. Type IV secretion systems (T4SSs) are multiprotein complexes that transport effector proteins and protein-DNA complexes through bacterial membranes to the extracellular milieu or directly into the cytoplasm of other cells. They are essential for host colonization by many medically important microbes as well as for horizontal transfer of genetic material between bacteria and from bacteria to plants. Many bacteria of the family Xanthomonadaceae, that occupy diverse environmental niches, carry a T4SS with unknown function but with several characteristics that distinguish it from other T4SSs. OBJECTIVES. The aim of this study is to determine the function of the Xanthomonadaceae T4SS. MATERIALS AND METHODS. We have used bioinformatics analysis, structural biology, spectroscopy, enzymology and novel bacterial competition and secretion experiments to address this question. RESULTS AND DISCUSSION. The Xanthomonas citri (Xac) T4SS provides these cells the capacity to kill other Gram-negative bacterial species in a contact-dependent manner. The secretion of one Type IV bacterial effector protein is shown to require a conserved C-terminal domain and its bacteriolytic activity is neutralized by a cognate immunity protein whose 3D structure is similar to peptidoglycan hydrolase inhibitors. CONCLUSIONS. This is the first demonstration of the involvement of a T4SS in bacterial killing and points to this special class of T4SS as a mediator of both antagonistic and cooperative interbacterial interactions and therefore an important driving force in the evolution of bacterial species.