Ecology and *in situ* gene expression of the two *V. vulnificus* genotypes

James D. Oliver*, Brett Froelich, Kristi Doyle, and Tiffany Williams  
University of North Carolina at Charlotte, NC, USA

*Vibrio vulnificus* is responsible for 95% of all seafood-related deaths in the USA, primarily from raw oyster consumption. Between 2000 and 2008, 298 cases were documented (average of 34/year) with 99 deaths (52% fatality rate). However, the CDC estimates that 12 and 30 million persons have one or more predisposing conditions for *V. vulnificus* infection, and more cases would thus be expected. We now know, however, that two genotypes of this pathogen exist, with the “C” (clinical) genotype apparently being the more virulent of the two.

Interestingly, while the two genotypes occur in estuarine waters in approximately equal number, the “E” (environmental) genotype predominates (ca. 87% of total *V. vulnificus*) in oysters. It would seem that such a difference in oysters compared to the surrounding waters would be due to either differential rates of oyster uptake or depuration, or differential survival within oysters following uptake of the bacteria from water. However, our studies suggest the predominance in oysters is not due to differential bacterial uptake by either larval or adult oysters, through depuration, or survival in oyster hemolymph.

We have considered, however, that because oysters preferentially take up larger (e.g. 10µm) particles than bacterial-sized particles (ca. 1 µm), a preferential association of the E-genotype with plankton or other particulates might result in greater uptake of this relatively avirulent form. We have now determined that E-genotype cells associate with marine aggregates to a statistically greater extent than the C-genotype. This may result from the greater rate of capsule loss we have found occurs with the E-genotype; lack of capsular polysaccharide has been shown to result in greater attachment.

Further, *in situ* studies have indicated that, while a variety of genes remain on for many hours when cells are present in the estuarine environment, genes responsible for capsule synthesis turn off under these in situ conditions.

In summary, our studies offer a possible explanation for why the E-genotype of *V. vulnificus* predominates in oysters in comparison to the waters surrounding these animals. These, and other recent findings from our lab, will be discussed during this presentation.

**Literature Cited**


