FSHN09-01

UF UNIVERSITY of FLORIDA
IFAS Extension

Preventing Foodborne and Non-foodborne Illness: *Vibrio parahaemolyticus*[1]

Anita C. Wright, Renée Goodrich Schneider, Michael A. Hubbard, and Keith R. Schneider[2]

What is *Vibrio parahaemolyticus?*

Vibrio parahaemolyticus is a naturally occurring bacterium that inhabits coastal brackish marine waters throughout the world and is commonly found in the United States and Canada. This organism requires salt to survive and appears in higher concentrations during the warmer summer months. If ingested in sufficient numbers, this bacterium can cause illness such as gastroenteritis (stomach and intestinal inflammation which results in symptoms such as cramps, vomiting, nausea, etc.). Illnesses linked with this organism have been associated with the consumption of raw or improperly cooked seafood.

What type of illness is caused by *Vibrio parahaemolyticus?*

Watery diarrhea, nausea, vomiting, abdominal cramping, headache, fever and chills are the most common symptoms after consuming this organism. On average symptoms usually occur after 15 hours, but can begin as early as 4 hours and as late as 36 hours after exposure and continue for up to 3 days. It is categorized as a short illness, and after recovery there are no prolonged effects. However, in rare instances those who are either immunocompromised or particularly sensitive to its toxin may experience more severe effects. An open wound or abrasion on the skin that is exposed to seawater, fish, or shellfish can also harbor *V. parahaemolyticus,* causing skin or soft tissue infections.

Who is at risk for a *Vibrio parahaemolyticus* infection?

Every person is at some risk for *V. parahaemolyticus* infection that comes in contact with it; however, those that are immunocompromised are especially at risk for illness. This includes those with HIV, cancer, liver disease, insulin-dependent diabetes, hemochromatosis (iron overload), stomach troubles, as well as prolonged steroid use; those with chronic liver disease in particular are actually eighty times more likely to fall ill from *V. parahaemolyticus.* If an individual is in a high-risk group, cooking food properly and avoiding consumption of raw seafood, minimizes the risk of infection.

1. This document is FSHN09-01, one of a series of the Food Science and Human Nutrition Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date: July 2009. Visit the EDIS Web site at http://edis.ifas.ufl.edu.

2. Anita C. Wright, associate professor; Renée Goodrich Schneider, associate professor; Michael A. Hubbard, lab technician; Keith R. Schneider, associate professor; Department of Food Science and Human Nutrition; Institute of Food and Agricultural Sciences; University of Florida; Gainesville 32611.

How common are infections involving *Vibrio parahaemolyticus?*

Foodborne infections caused by *V. parahaemolyticus* are fairly common in Asia, but until recently few cases were reported annually in the United States. An estimated 4,500 cases of *V. parahaemolyticus* infection occur each year in the United States. However, since the infection is categorized as a short-term illness with no long-term complications, many cases are not reported, and/or many of those infected simply assume it was the flu or a short bout of food poisoning. When patients actually do go to the doctor, many laboratories do not have the proper selective media or equipment to screen for *V. parahaemolyticus.* The Gulf States (Florida, Louisiana, Alabama, and Texas) have traditionally participated in monitoring efforts with the Centers for Disease Control and Prevention (CDC), collectively reporting an average of 30-40 diagnosed cases each year. However, many other states do not participate in reporting these foodborne illnesses to the CDC or to their respective state health departments, and the number of reported cases greatly underestimates the true number of cases.

Recently, a *V. parahaemolyticus* outbreak was traced to a cruise ship in Alaska and attributed to consumption of locally harvested raw oysters. An extremely large outbreak was also documented in Chile and involved more than 10,000 persons. Thus, travelers should be aware of these risks and avoid potentially contaminated raw seafood. Vibrio parahaemolyticus has also begun to appear in areas of the world that were previously unaffected—in 2006, for example, a total of 177 cases were reported in New York, Washington, and Oregon (http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5531a5.htm). This outbreak was attributed to contaminated oysters and contaminated clams traced to harvest areas in Washington and British Columbia. As researchers investigate whether an increase in seawater temperature may be contributing to what appears to be the global expansion of this pathogen, increased proficiency in detection and reporting of *V. parahaemolyticus* may also account for the rising number of infections.

How does infection with *V. parahaemolyticus* occur?

Vibrio parahaemolyticus is a naturally occurring estuarine organism that can be taken up and concentrated by mollusks, such as clams and oysters, as they feed. Outbreaks of illness related to *V. parahaemolyticus* typically occur by ingesting raw or undercooked seafood and shellfish (especially oysters), or through cross-contamination of cookware or utensils. The bacteria proliferate rapidly when contact surfaces are not cleaned properly or the seafood is not kept out of the temperature "danger zone" (see specifics below).

Receiving and storage of seafood and shellfish

There are specific recommendations in the FDA's 2005 Food Code for handling seafood and shellfish in a retail or food service operation (http://www.cfsan.fda.gov/~dms/fc05-toc.html). Seafood and shellfish are considered Potentially Hazardous Foods because foodborne pathogens increase in number if temperature abuse occurs. In other words, most foods in this category should be kept at either above 135°F (after cooking) or below 41°F (storage), with temperatures in the middle being considered part of the "danger zone." As a rule of thumb, foods should spend no more than 4 hours in the "danger zone" temperature range. Shellfish are an exception and may be transported and received at 45°F.

Once a product is frozen, it is important to maintain a proper freezer temperature to avoid product thawing. Labeling properly stored foods is also helpful to ensure that others handling the food in the future will know exactly how long a food product has been stored.

Seafood in interstate commerce must be produced under the Seafood HACCP regulation. Detailed information can be found on the FDA Web site at http://www.cfsan.fda.gov. For Florida-specific requirements, please see the Florida Department of Agriculture and Consumer Services Web pages at http://doacs.state.fl.us.

Methods to help prevent infection by *Vibrio parahaemolyticus* in individuals who are in high-risk groups

These suggestions should always be followed to help prevent infection, especially for persons with underlying diseases that place them in high-risk groups:

- Do not eat raw shellfish, especially oysters if you are immunocompromised.
- Cook shellfish thoroughly.

For shellfish still in the shell

1. Steam until the shell opens and continue to cook for at least 9 more minutes. Do not eat if shell does not open during steaming.
2. Boil until the shell opens and continue to cook for 5 minutes.

For shucked oysters

1. Boil for at least 3 minutes.
2. Fry in oil at 375°F for at least 10 minutes.

- Avoid cross-contamination of other cooked foods with raw seafood or juices from raw seafood. Disinfect all surfaces and utensils properly.
- When in coastal areas, avoid exposing skin abrasions or wounds to seawater/brackish water or raw seafood.

References

Centers for Disease and Control and Prevention, Division of Bacterial and Mycotic Diseases. n.d. *Vibrio parahaemolyticus*. Retrieved March 31, 2009 from http://www.cdc.gov/nczved/dfbmd/disease_listing/vibriop_gi.html.

US Department of Health and Human Services, Public Health Service, Food and Drug Administration. *2005 FDA Food Code*. Retrieved March 31, 2009 from http://www.cfsan.fda.gov/~dms/fc05-toc.html . Full text available at http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodCode/FoodCode2005/default.htm.

Murano, Peter S. 2003 *Understanding Food Science and Technology,* 305–314. Belmont, CA: Thomson Wadsworth.

Mariott, Norman G. 1999. *Principles of Food Sanitation,* 22–37. Gaithersburg, MD: Aspen.

Schneider, K.R., Parrish, M.E., Goodrich-Schneider, R.M., & Cookingham, *T. Preventing Foodborne Illness: Clostridium botulinum*. FSHN0406. November 2004. Gainesville: University of Florida Institute of Food and Agricultural Sciences. Retrieved March 31, 2009 from http://edis.ifas.ufl.edu/FS104.

Minnesota Department of Agriculture. *Employee Personal Hygiene.* Retrieved March 31, 2009 from http://www.mda.state.mn.us/food/business/factsheets/hygiene.htm

Minnesota Department of Agriculture. *Potentially Hazardous Foods.* Retrieved March 31, 2009 from http://www.mda.state.mn.us/food/business/factsheets/hazrds.htm.

DHS Oregon. Oregon Department of Human Services. Retrieved March 31, 2009 from http://www.dhs.state.or.us/publichealth/acd/vibrio/facts.cfm . Now available at http://www.oregon.gov/DHS/ph/acd/diseases/vibrio/facts.shtml.