

Quelling *Campylobacter*: It Takes a Planet

Campylobacter.

It's a funny sounding name for bacteria. But there's nothing funny about a *Campylobacter* infection.

Symptoms include blood in the stool, fever, and abdominal pain, which may be mistaken for appendicitis or ulcerative Crohn's disease.

Though infection usually lasts only a few days, that may be long enough to cause meningitis in newborns or temporary arthritis in children.

Older individuals are also among the most vulnerable to infection, especially if they have a chronic illness or weak immune system. In some cases, the bacteria may get into their bloodstream and affect a variety of organs or tissues, causing an unusual form of arthritis or a nervous system disease called Guillain-Barré syndrome.

Campylobacters are found everywhere in nature, even in house pets, who may carry the bacteria without harm to themselves. *Campylobacter* can also be found in farm animals, especially poultry. (See article on page 4.)

Illness from *Campylobacter* is a serious human health problem worldwide. It is also a critical problem for U.S. Department of Agriculture agencies concerned with food safety, animal health, and international trade.

Consequently, this microbe is a key target of the USDA Agricultural Research Service's Food Safety Program. ARS experts at several laboratories from coast to coast are studying various aspects of the bacteria. Their work is uncovering answers to many key questions about this pathogen, such as: Where does it live? How does it survive and grow in animals and in foods? What genes and what proteins (the products of those genes) enable it to succeed as a pathogen? Why are some *Campylobacters* more pathogenic than others?

Until recently, we thought there were only a few species of *Campylobacter* that were important to investigate, monitor, and control. It now appears we might have been wrong. Scientists and public health officials worldwide are discovering that there are other, little-known species that warrant our close attention. Even though these species have only recently attracted our attention, we do not—at this time—think they are of recent origin.

So far, no laboratory has yet developed a best method or "gold standard" to isolate and identify *Campylobacters*. A reliable, rapid, affordable procedure would help coordinate the efforts of scientists everywhere.

Also missing is a multiple-species, single-pass test that would provide a fast, inexpensive way to identify all species of *Campylobacter* in a given sample from a patient, for example. Such a test would greatly help public health agencies responsible for monitoring *Campylobacter* infections in humans and for tracking the infections to their source, whether it is a farm or a food-processing plant.

To address and correct the limitations of today's methods for isolating and identifying the array of *Campylobacters*, ARS scientists are working with researchers here and abroad to develop a gold-standard test. Such technology is a goal of Campy-check, a novel collaboration of several European nations, South Africa, and the United States. We are also collaborating with the national public health agencies of Canada and Iceland to speed the process of discovery about this microbe.

There's more. We are determining the prevalence of *Campylobacter* species and strains in food and water. In corporate efforts with the Institute for Genomics Research and with Agencourt Bioscience Corporation, we are determining the structure of all the genes in certain *Campylobacters*. We are preparing these findings for publication; some genomic details are already posted on the World Wide Web for use by researchers everywhere.

Our collaborations are timely and appropriate. Food safety is, unavoidably, a global issue. Food produced today in another country can be on your table tomorrow. ARS research on *Campylobacters* is an example of the agency's efforts to make America's already safe food even safer. At the same time, our discoveries are helping people in other countries, just as the discoveries at labs beyond our borders are helping us. To quell *Campylobacter* does, indeed, take a planet.

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