Immunologist Peter Holt (foreground) and veterinarian Lara Vaughn collect and label eggs that will be tested for *Salmonella enteritidis.*

STEPHEN AUSMUS (K10353-1)

A Possible New Vaccine To KO *Salmonella* in Chicken Eggs

Food poisoning is a misnomer. One is not poisoned by the food, but rather by the microbes growing in or on the food. Hens lay eggs that can harbor microbes (microscopic organisms) called *Salmonella enteritidis*, which can lead to salmonellosis, a disease characterized by nausea, vomiting, and severe diarrhea, symptoms we would all rather avoid.

Agricultural Research Service immunologist Peter Holt, veterinarian Henry Stone (retired), and immunochemist Cam Greene, in Athens, Georgia, have been working on vaccination strategies in poultry to reduce the possibility of *S. enteritidis* getting into the egg in the first place. *Salmonella* infection is a major problem for the egg industry and consumers, since unbroken table eggs from infected flocks can be contaminated. "Reducing the prevalence of *S. enteritidis* in poultry would likely cause a reduction in human infection from poultry and egg consumption," says Holt.

Under Holt's direction, the group from the Southeast Poultry Research Laboratory developed an oil emulsion vaccine of inactivated *S. enteritidis* that provided substantial protection to hens exposed to the bacteria.

Birds were given the vaccine subcutaneously in two doses 4 to 6 weeks apart. The hens were then exposed to *S. enteritidis*.

To ensure that no other pathogens are present in the hens before and during the vaccination and study phases, testing was conducted under very stringent conditions.

The experimental oil emulsion vaccine differs from the commercial preparations in that it was formulated to increase levels of specific antibodies that get into the intestinal tract, thereby reducing the amount of *S. enteritidis* present. This decreases the chance of the bacterium invading internal organs and being shed in feces.

"We found that the new vaccine reduced *S. enteritidis* shedding 10 to 40 percent more effectively than the three commercial vaccines used by the U.S. poultry industry," says Holt. A patent for the vaccine has been filed (March 21, 2002, SN 10/101,943), and it is available for licensing.

A vaccine that reduces *Salmonella* shedding would be helpful to the poultry industry, since this is the primary method by which *Salmonella* infection spreads through a flock. A vaccine that can eliminate shedding would be a boon for poultry exporters since poultry breeding stock sold to overseas markets is required to be *Salmonella* free.

Vaccinating poultry flocks is an important method to reduce *S. enteritidis* problems in flocks in today's marketplace. About 25 million doses of *S. enteritidis* vaccine are used annually in U.S. poultry, while 50 to 75 million doses are used worldwide.—By **Sharon Durham,** ARS.

This research is part of Food Safety (Animal and Plant Products), an ARS National Program (#108) described on the World Wide Web at www.nps.ars.usda.gov

Peter Holt is in the USDA-ARS Poultry Disease Research Unit, Southeast Poultry Research Laboratory, 934 College Station Road, Athens, GA; phone (706) 546-3442, fax (706) 546-3035, e-mail pholt@seprl.usda.gov. ★