



*An ornithosis bacterin (an inactivated bacterial product used for immunization purposes) is administered to turkeys by intratracheal inoculation (actual angle of inoculation is differ-*

*ent than demonstrated here). The effect of the bacterin is to immunize the turkeys against lethal chlamydial infection (0378X210-6).*

## IMMUNIZATION OF PET BIRDS AGAINST CHLAMYDIOSIS (PSITTACOSIS)

by Dr. L.A. Page, Phd  
Ames, Iowa

*The following article and illustration from Agricultural Research, June, 1978, is being reprinted with their permission by A.F.A. Watchbird because of its relevant importance to aviculture, especially to psittacine breeders.*

Vaccines whose purpose is stimulating production of specific antibodies to the invading disease agent have been only moderately successful in protecting birds and mammals against chlamydiosis, a bacterium-caused respiratory disease. Now we know why.

SEA microbiologist Leslie A. Page and others had evidence that antibody stimulation is not the dominant mechanism of chlamydil immunity. His earlier studies (AGR. RES., Nov. 1975, p. 12) suggested cell-mediated immunity as the chief mechanism. This form of immune response causes sensitization of white blood cells, or leucocytes.

Dr. Page therefore initiated studies

oriented toward stimulating cell-mediated immunity in turkeys, in which chlamydial disease is known as ornithosis. His investigations at the National Animal Disease Center, Ames, Iowa, produced these significant results:

— An immunization procedure that gives 100 percent protection against death from ornithosis and 90 percent protection against development of lesions that would cause condemnation of organs or carcasses at a USDA-inspected poultry processing plant.

— A diagnostic test that predicts the ability of birds to resist ornithosis infections.

— And convincing evidence that the cell-mediated immune mechanism indeed has the dominant role in resistance to ornithosis.

The immunization procedure effective for turkeys should also protect ducks, pigeons, and parrots, Dr. Page says, and his findings should be applicable in studies of chlamydial pneumonia in lambs,

calves, horses, goats, cats, and dogs. Chlamydiosis is caused by the bacterium *Chlamydia psittaci*.

In turkeys, prompt antibiotic treatment can restrict losses if ornithosis is diagnosed early. Routine use of effective vaccines may have a place in high-risk flocks, such as those in epidemic areas.

Dr. Page found that turkeys can be immunized against severe challenge infection with a lethal strain of *C. psittaci* if given two doses of a potent bacterin, if the interval between doses is 8 weeks, and if inoculation is via the trachea. Less effective protection resulted from two doses 2, 4, or 6 weeks apart, from only one inoculation, or from two intra-muscular inoculations.

The immunization procedure giving the most effective protection was clearly related to stimulation of cell-mediated mechanisms, Dr. Page found. Chlamydia-specific sensitization of white blood cells was evident only after the second bacterin inoculation, and only if bacterins were

administered at least 8 weeks apart.

A lymphocyte mitogenesis test using white blood cells from freshly drawn blood of vaccinated turkeys indicates stimulation of cell-mediated immunity. White blood cells undergo nuclear DNA synthesis when cultured in the presence of purified suspensions of chlamydiae. Synthesis of new DNA is detected by adding radioactive thymidine to the white cell culture and assaying the culture later for radioactive DNA.

Dr. Page's studies produced additional evidence that cell-mediated immune mechanisms play a dominant role in resistance to ornithosis.

The immunization procedure inducing high levels of immunity to challenge infection produced only low levels of antibodies detectable by the complement fixation test — and none by the agar gel precipitin test. Effective protection is therefore not dependent upon a high level of antibodies.

Finally, Dr. Page showed that surgical removal of the bursa from newly-hatched poult did not impair development of bacterin-induced immunity when they were vaccinated at 10 weeks of age and later challenge-exposed. The bursa is required for antibody synthesis in birds.

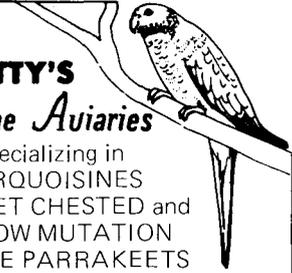
But surgical removal of the thymus — essential in the cell-mediated immune mechanism — prevented development of immunity in 83 percent of a second group of turkeys similarly vaccinated and exposed.

Dr. Leslie A. Page is at the National Animal Disease Center, P.O. Box 70, Ames, IA. 50010.

*In a personal communication with the president of the American Federation of Aviculture, Dr. Page appraised the application of bacterin immunization as an effective protection for parrots and other pet birds (pigeons, ducks, etc.) against psittacosis (Chlamydiosis).*

*The development of an immunization for pet birds that is effectual against psittacosis is not only of importance to aviculture but has great significance from a public health standpoint.*

*For a more technical and detailed report of Dr. Page's findings, the reader is referred to his paper "Stimulation of Cell-Mediated Immunity to Chlamydiosis in Turkeys by Inoculation of Chlamydial Bacterin", published in the American Journal of Veterinary Research, Vol. 39, No. 3, (purchased and reprinted U.S.D.A. for official use).*



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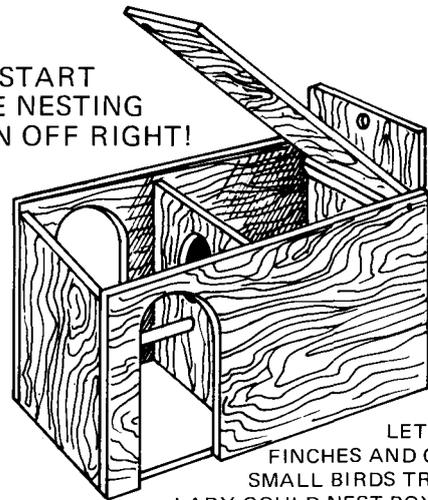
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