Vaccinate chickens before they hatch

The adage the earlier the better applies to vaccination against the disease that is the leading cause of poultry losses. The vaccine currently in use in the poultry industry to prevent Marek's disease is given to chicks just hours after hatching. But in many cases that does not seem to be soon enough. Chicks are exposed to the disease immediately after receiving the vaccine when they are placed in brooder houses. Often they have not had the time to develop full immunity. So some vaccinated chicks continue to succumb to Marek's disease.

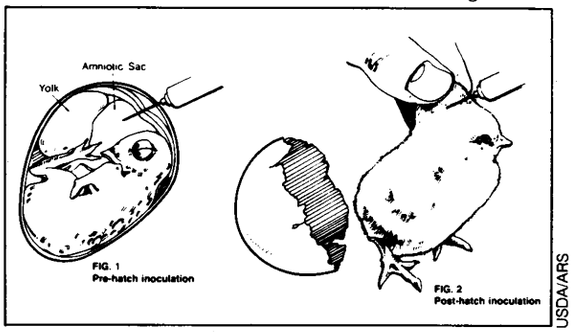
Vaccinating chicks before they hatch may solve the problem of early disease exposure. Veterinary scientists report they have successfully injected the Marek's disease vaccine, made of turkey herpes virus, into chicken eggs three days before they hatch. The injection usually delivered vaccine to the amniotic sac, rather than directly into the embryo.

The vaccine had no adverse effect on the proportion of eggs that hatch or on the growth rate of the resultant chicks. But it did improve disease resistance. When exposed to Marek's disease three days after hatching, chicks vaccinated hours after hatching were eight times more likely to develop the disease than were chicks inoculated within their shells three days before they hatched.

The new technique was developed by Jagdev M. Sharma and Ben R. Burmester of the Department of Agriculture. Sharma cautions, "Whether our methods, under laboratory conditions, would be a practical alternative [to current commercial practice] remains to be determined. It also remains to be seen whether this method of vaccination is feasible for other diseases. We found optimum protection was achieved if vaccination was done at about the eighteenth day of embryonation, the same time embryonated eggs routinely are transferred to hatching trays. It may be possible for commercial producers to vaccinate and transfer eggs at the same time." Sharma and Burmester are at the Agricultural Research Service's Regional Poultry Laboratory in East Lansing, Mich.

Terry B. Kinnery, acting administrator of the research service, says, "These research results demonstrate for the first time that resistance can be established in chick embryos through vaccination. Use of the new technique will help the poultry industry save billions of dollars in the future. The savings will result from reduced deaths and condemnations of poultry, improved feed utilization and increased egg production."

The pre-hatching vaccine may make it more reasonable for the poultry industry to count their chickens before they hatch. □



Vaccinating an egg confers resistance to poultry disease. The chick embryo takes up vaccine from the amniotic sac fluid. Chicks vaccinated in the shell are much better protected against early exposure to Marek's disease than are chicks inoculated a few hours after hatching.

USDA/ARS

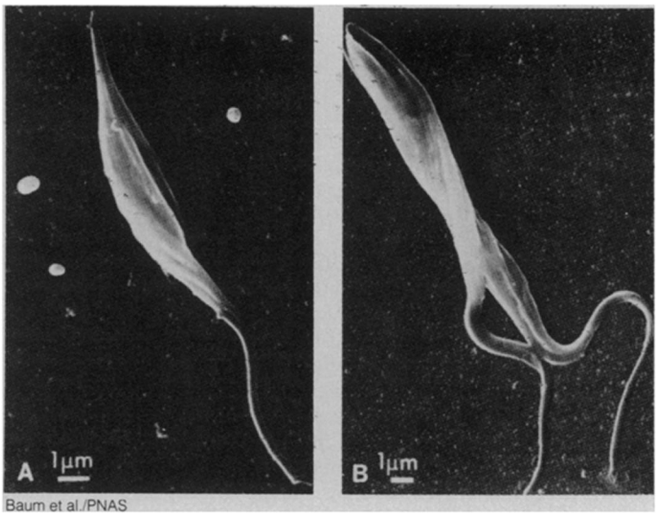
Stability is the key to Chagas drug

Chagas disease, caused by tiny one-celled animals called *Trypanosoma cruzi*, is the South American counterpart of African sleeping sickness, attacking the nervous system or heart lining and sometimes killing its victims. Unlike sleeping sickness, however, Chagas disease has no effective treatment. Soon, though, one may become available, according to a report in the July PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES by Stephen G. Baum and colleagues at the Albert Einstein College of Medicine in New York City.

Because many drugs already had been tested against Chagas disease and found ineffective, Baum and his team figured that novel approaches would be necessary to identify an effective drug. For instance, there are many microtubules on the skeleton of *T. cruzi* that must come apart and later reassemble if the organisms are to divide (replicate) into new *T. cruzi*. An experimental anti-tumor drug called taxol is known to stabilize microtubules. So Baum and his colleagues decided to test the hypothesis that taxol could prevent the replication of *T. cruzi* by keeping the microtubules from coming apart at the time of cell division.

They cultured *T. cruzi* in flasks, added taxol to some of the cultures daily for a week and kept other cultures drug-free in order to serve as controls. They counted the number of *T. cruzi* in each culture daily during the week of drug exposure and also examined organisms from each of the cultures periodically during this time period to see whether taxol had changed the anatomy of the organisms in any way.

As they hoped, taxol markedly inhibited the replication of *T. cruzi* in a dose-related fashion, suggesting that taxol, or a less-toxic derivative, may turn out to be a highly effective and safe treatment for Chagas disease. What's more, this inhibition was accompanied by abnormal anatomical changes in the organisms. Multiplication of the nucleus, flagellum, mitochondria and other cell organelles took place in each organism, yet the organism divided only partially, from the top part way down through the bottom. Although these abnormal changes do not prove that taxol inhibited *T. cruzi* by stabilizing the microtubules, the changes do suggest that this is the case because cell division always stopped at a region in the organisms where microtubules are thought to arise. □



Baum et al./PNAS

An untreated, healthy T. cruzi *(left) versus one treated with taxol (right), which has two flagella but cell division arrested midway down the organism.*