



Medical Education and Research Grant Outcome Report

Name: Creation of a Bovine *Cryptosporidium* Vaccine to Reduce Outbreaks in Human Populations

Principal Investigator: Laura J. Knoll, PhD, Associate Professor

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Department: Medical Microbiology & Immunology

Program: New Investigator Program

Grant Duration: 03-01-07 to 07-30-08 (16 months)

Expenditures: \$100,000 (100% expended)

Use of Funds (Taxonomy): Basic research

Research Keywords: Parasite, vaccine, antigens, *Cryptosporidium*, *Toxoplasma*

► **Description:** Illness and mortality stemming from the *Cryptosporidium* parasite are problems in Wisconsin (where the country's largest outbreak occurred in Milwaukee in 1993) and nationwide. Limited treatment options for *Cryptosporidium* point to the need for a vaccine. Since cattle are a known source for *Cryptosporidium* outbreaks in humans, a bovine vaccine—with commercial applications in the dairy industry—would reduce bovine-to-human transmission. This development would have a tremendous health impact on the state's population.

The aim was to: (1) express *Cryptosporidium* surface antigens in non-disease-causing strains of a closely related parasite, *Toxoplasma gondii*, and (2) test whether the vaccine strain was protective in mice.

► **Results:** Aim 1: The antigen Cpgp40/15 was expressed on the surface of the *T. gondii* strain. Aim 2: Preliminary results show that the strain was protective against lethal doses of *Cryptosporidium*.

These experiments will be repeated with larger numbers of mice, and with sub-lethal doses of *Cryptosporidium*. The intention is to quantify the protective immune response and ultimately the effectiveness of the vaccine.

► **Met Objectives:** Project completed

► **Timeline for Application of Results:** 5-7 years

► **New Partnerships or Collaborations:** Collaborations with researchers at Tufts University, and with the UW School of Veterinary Medicine.

► **Matched Dollars (cash or in-kind):** \$0

► **Dissemination:** Work continues with Wisconsin Alumni Research Foundation on licensing issues related to vaccine development.

► **Additional Funding:** Dr. Roberta O'Connor in Dr. Ward's lab (Tufts University) received a National Institutes of Health R21 grant, part of it involving further research on the *Toxoplasma/Cryptosporidium* vaccine. Dr. Knoll is a collaborator on this grant.