

***Neospora caninum*-induced inflammation causes abortion which is prevented by vaccination with parasite-derived immune modulators**

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Statement of the Problem: *Neospora caninum* is a protozoan parasite causing bovine neosporosis. Although seroprevalence of *N. caninum* is high in many of its intermediate hosts, the clinical disease associated with livestock production is manifested primarily in cattle. Neosporosis as an emerging disease is considered a major cause of abortion in cattle worldwide, which has been estimated to account for 20% of all cattle abortions. Currently, there is no drug or vaccine available to treat or prevent neosporosis. *N. caninum* infection does elicit a strong inflammatory immune response in the hosts; however, the resulting immunity does not appear to be protective.

Methodology & Theoretical Orientation: It has been believed that the unusual inflammation induced by *N. caninum* results in pregnancy loss by causing detrimental immunopathology at the fetal-maternal interface. We hypothesize that immunization against the parasitic molecules responsible for stimulating high host inflammation may confer protection.

Findings: Our studies identified a group of parasite-derived immunomodulators, including *Neospora* cyclophilin (NcCyP) and profilin (NcPro), which mediate *N. caninum*-elicited host immune responses and inflammation. In the mouse and ruminant models, immunization with both NcCyP and NcPro


resulted in high levels of antibody production and protected against *Neospora* challenge infection and neosporosis-associated abortion following challenge infection.

Conclusion & Significance: These results indicate that the approach to prevent and control neosporosis in ruminants by a vaccine is feasible and in particular, a bacterial expression system produced recombinant vaccine has the advantages of being highly efficacious and cost-effective. Our studies provided the first evidence that neosporosis or neosporosis-associated abortion is preventable by immune modulator-based vaccines and the application of this vaccine will increase cattle productivity by significantly reducing reproductive losses associated with *N. caninum* infection.

Speaker Biography

Wenbin Tuo has expertise in protozoan and nematode parasite infectious diseases in livestock species. He has devoted his professional career to understanding host-parasite interactions and development of immunologic control measures for parasitic infections in large ruminants. Vaccine candidates identified by antigen-specific CD4 T cells and parasitic immune modulators that are able to cross-downregulate host protective immunity have been tested in numerous vaccine trials and some of the vaccines have been demonstrated to have significant protective efficacies. His ongoing research involves continued investigation of interplays between the parasites and hosts and identification and testing of protective candidate vaccines in ruminants.

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