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## Nanoparticle-based vaccine platforms against apicomplexan

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Vaccines based on live attenuated parasites are associated with safety concerns related to reversion to pathogenic form or recombination with wild strains, are expensive, require a cold storage for delivery, are difficult to manufacture and have a short shelf life. Subunit vaccines are more stable and safer but they have lower efficiency. Optimal progress towards novel vaccines against intracellular apicomplexan parasites will depend on several factors such as selection of appropriate parasite antigens and optimal presentation of these antigens to the immune system, including identification of the best adjuvant formulation and route of vaccine administration. Due to the complexity of apicomplexan parasites, vaccine strategies must associate large panel of antigens and adjuvant able to better stimulate innate and adaptive immune responses than in natural infection. Toll-like receptors are expressed on numerous cells of the immune system and TLR agonists are promising adjuvants also in farm animals. Mucosal administration of vaccines, by mimicking natural route of infection, is an important approach to induce appropriate protective immune responses to microbial antigens in systemic sites and peripheral blood as well as in most mucosal environments. Our team has demonstrated that maltodextrin/phospholipid nanoparticles sustain release of all soluble components of *Toxoplasma gondii* after nasal administration. This formulation led to protection against congenital toxoplasmosis in mice (70% reduction in parasite load) and chronic toxoplasmosis in ewes (no parasite detected) correlated with strong and long-lasting humoral and Th1/Th17 cellular responses. We now apply this vaccine strategy against an emerging cause of abortion and infertility problems in cattle, neosporosis due to *Neospora caninum*. TLR ligands are added as adjuvant to reach sterilizing vaccine.

### Biography

Françoise Debierre-Grockiego is a Teacher at University of Tours (France) in the field of Parasitology and Vaccine. She has more than 15 years of experience in the study of biological effects of glycosylphosphatidylinositols from protozoan parasites (*Toxoplasma gondii*, *Plasmodium falciparum*, *Trypanosoma cruzi*). Her knowledge is built on vaccine strategy developed by the team antiparasitic biopharmaceuticals experienced in vaccinating animals via nasal route and challenging animals with *Toxoplasma* or *Neospora* to evaluate vaccine efficacy against chronic and congenital infection, based on study of humoral and cellular immune responses.

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