Prevention of zoonotic tissue cyst formation in sheep using live attenuated and parapoxvirus vector based vaccines against Toxoplasma gondii

Result in Brief

Project information

TOXPOX
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Vaccine against Toxoplasmosis

Toxoplasmosis is a leading cause of death attributed to foodborne illness. As one of the neglected parasitic infections, it has recently been targeted for public health action.

Toxoplasmosis is caused by the protozoan Toxoplasma gondii (TG). Up to a third of the world's human population carries a Toxoplasma infection. In the EU, most human infections are due to consumption of meat containing TG tissue cysts. Vaccination of food animals to prevent Toxoplasma cyst formation would be highly effective in reducing the disease burden in humans.

The EU-funded TOXPOX project aimed to develop a vaccine using selected TG antigens and explore the efficacy of delivering the vaccine using viral vectors. The project focused on testing recombinant virus vectors to deliver TG antigens in vivo to stimulate specific protective immune responses.
The project achieved the successful construction and preparation of recombinant viral constructs using both pox viruses and lentiviruses expressing selected TG antigens. Immunisation of mice with the recombinant vectors resulted in induction of specific antibody responses. These results proved that the approach is efficient and is worth pursuing to produce a new vaccine against TG tissue cysts in food animals.

The only commercially available vaccine against toxoplasmosis, Toxovax, prevents congenital disease in lambs. Toxovax uses live attenuated strain of TG and carries the risk of reversion back to wild-type that can affect both animals and humans. TOXPOX developed a safer vaccine strategy based on a recombinant virus expressing Toxoplasma antigens.

**Keywords**

Toxoplasmosis, foodborne, parasitic, Toxoplasma gondii, tissue cysts, vaccine, antigen, viral vector, recombinant, pox virus, lentivirus, antibody

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