

ZONA PELLUCIDA VACCINES FOR FERTILITY CONTROL OF BRUSHTAIL POSSUMS IN NEW ZEALAND

J. A. Duckworth¹, X. Cui¹, F. C. Molina¹, W. Lubitz³, P. E. Cowan²

¹Possum Biocontrol Research, Landcare Research, Lincoln, New Zealand; ²Landcare Research, Palmerston North, New Zealand; ³University of Vienna, Austria

Introduced marsupial brushtail possums (*Trichosurus vulpecula*) are a major pest in New Zealand because of their impacts on conservation values and agricultural production. Immunologically-based fertility control (immunocontraception) offers an effective and humane alternative approach to possum management. The zona pellucida (ZP) is an extracellular coat around all mammalian eggs and an attractive target for the development of immunocontraceptive vaccines. Antibodies against ZP are ovary-specific and act by preventing sperm from binding and penetrating the ova and/or by disrupting the development of follicles or early embryo. The aim of these studies was to test the efficacy of possum-derived ZP antigens for their ability to elicit sustained immune responses and cause infertility, and to assess a range of options for development of a bait-delivered contraceptive vaccine. Alloimmunisation with possum ZP2 and ZP3 proteins showed that self-ZP antigens elicited strong humoral immune responses and reduced the fertility of female possums by 72-80%. Several potentially possum-specific immunocontraceptive peptides have been identified by linear epitope mapping and amino acid alignment and are being tested for their ability to reduce fertility. Recent trials have demonstrated that possums mount immune responses against ZP antigens delivered in transgenic plants and bacterial ghosts. Research on antigen and specific peptide identification, non-target effects and delivery systems is ongoing. *Research supported by NZ Foundation for Research Science & Technology, Marsupial CRC and NZ Animal Health Board.*