

Advancing Recombinant Antibody Technology: The Immunological Toolbox initiative to drive Veterinary Immunology research

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The Immunological Toolbox continues to play a global role in supporting immunology research in veterinary species. As part of this jointly funded UKRI-BBSRC project, Roslin and Pirbright are strategically leading various initiatives to address capability and knowledge gaps in veterinary immunology.

The Pirbright antibody sequencing initiative has made significant progress to secure globally important and unique antibody collections by creating a digital antibody bank. Over 800 hybridomas producing antibodies against livestock viruses and important immune markers in cattle, pig and chicken from different repositories across the USA, Europe and Africa are now secured (detailed on immunologicaltoolbox.co.uk). In combination with our recombinant capability, that now includes 56 antibody subclass expression cassettes, we have supported the generation of 491 anti-pathogen recombinant antibodies from multiple veterinary species, contributing to numerous vaccine discovery campaigns globally. This is a unique resource enabling targeted antibody engineering to meet specific research needs, and when combined with Pirbright's extensive hybridoma collections, resulted in multiple optimized multicolor immunofluorescence panels. These novel tools and assays are allowing the study complex immune responses at unprecedented resolution to support vaccine development and quality control processes. The project is also contributing to broader impacts by advancing One Health approaches, methanogen vaccination studies and promoting the 3Rs.

The UK Immunological Toolbox website underpins these efforts, offering a centralised resource for access to veterinary reagents and toolbox services and facilitating information exchange with community. The website had great success in driving global collaborations, with 3996 unique visitors from 81 different countries in last 5 years. We have supported multiple requests, shared 103 hybridoma derived and recombinant antibodies (predominantly non-commercially available) to 23 organisations on a non-profit basis. Building on this progress, we are currently focusing on enhancing community engagement, the website will soon undergo modifications as part of a planned revamp to address user's feedback.