



Veterinary Immunology Committee Toolkit Workshop 2010: Progress and plans

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ABSTRACT

The 3rd Veterinary Immunology Committee (VIC) Toolkit Workshop took place at the 9th International Veterinary Immunology Symposium (IVIS) in Tokyo, Japan on 18th August 2010. The Workshop built on previous Toolkit Workshops and covered various aspects of reagent development, commercialization and provision to the veterinary immunology research community. The emphasis was on open communication about current progress and future plans to avoid duplication of effort and to update priorities for reagent development. There were presentations on the major reagent development and networking projects such as the BBSRC/RERAD Immunological Toolbox (2004–2009), US Veterinary Immune Reagent Network (VIRN 2006–2010) that has just received renewal funding for 2010–2014, and EU Network for Animal Diseases Infectiology Research Facilities project (NADIR 2009–2013). There were also presentations and discussions on the use of reagents for assay development, particularly multiplexing, and how these new technologies will underpin basic research developments. Mechanisms for improved information exchange, especially through websites with VIC playing a central role, were identified.

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1. Introduction

The Veterinary Immunology Committee (VIC) is one of six Committees that operate under the auspices of the International Union of Immunological Societies (IUIS; <http://www.iuisonline.org/pages/committ.htm>). The current Chair of VIC is Wayne Hein, who oversees a number of Subcommittees and Working Groups that address different areas of veterinary immunology, one of these subgroups being VIC Toolkit Committee. The VIC Toolkit Committee aims to provide a global network for information exchange to accelerate reagent development, facilitate reagent exchange and find means of protecting valuable and irreplaceable reagents that are in danger of becoming 'orphaned'. This is achieved in a number of ways, pri-

marily through electronic communication given the global distribution of the members. However, once every three years the International Veterinary Immunology Symposium (IVIS) brings together the veterinary immunology community at one meeting and provides an excellent opportunity for interaction and discussion. The seeds for the VIC Toolkit were sown at a Workshop to discuss veterinary immunological reagents held during the 6th IVIS in Uppsala, Sweden in 2001 (Entrican, 2002). The inaugural VIC Toolkit Workshop took place at the 7th IVIS in Quebec City, Canada in 2004 and the second at the 8th IVIS in Ouro Preto in 2007. The full details of the structure of VIC Toolkit Committee and its objectives can be found in the report on the meeting in Ouro Preto (Entrican et al., 2009). Here we report on the third VIC Toolkit Workshop held at the 9th IVIS in Tokyo, Japan in August 2010. The Workshop was structured to provide updates on the major reagent development initiatives globally as well as covering more specific aspects of reagent applications and evaluations.

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2. The BBSRC/RERAD Immunological Toolbox

Gary Entrican (Moredun, UK) began the session by presenting a final report and describing the outputs of the BBSRC/RERAD Immunological Toolbox (2004–2009). The Immunological Toolbox was a three-centre Consortium project awarded to the Institute for Animal Health (IAH), the Animal Health Trust (AHT) and the Moredun Research Institute (MRI) to develop immunological reagents for five veterinary species (cattle, sheep, pigs, horses and chickens). The targets for each species were identified according to gaps in existing capability and, whenever known, taking into account what was being done in those species at other organizations (most notably by the United States Veterinary Immune Reagent Network [US VIRN], see below). In addition to developing reagents and assays, the objectives of the Immunological Toolbox also included reagent provision and knowledge exchange through publications, presentations and the development of a dedicated website and database. The project was initially coordinated by Jim Kaufman at IAH (2004–2007) then latterly by Gary Entrican at MRI (2007–2009). Among the achievements of the Toolbox were the cloning and expression of pig β 2-microglobulin and MHC class I molecules, expression of more than 20 cytokines and chemokines of cattle, sheep, horse and chicken origin, development of quantitative PCR assays for over 70 cytokines, development of PCR detection of equine MHC Class I and production of polyclonal antisera and monoclonal antibodies (mAb) to cytokines, chemokines and cell-surface proteins. Details can be found on the Immunological Toolbox website (<http://www.immunologicaltoolbox.co.uk/>) and wherever possible these reagents have been commercialized through AbD Serotec (<http://www.abdserotec.com/>). The Toolbox outputs also included 22 peer-reviewed publications in scientific journals and 3 book chapters describing reagent development and/or reagent characterisation.

Several lessons were learned during the course of the Toolbox project, such as the added value of working within a Consortium sharing skills, knowledge and resources. Reagent development did not always go to plan, even when approaches that had successfully worked for other targets, or the same target in other species, were taken. The failure of the Immunological Toolbox to produce mAb to bovine IL-2 despite multiple attempts and several approaches was a good example of how unpredictable and frustrating reagent development can be. Even when new mAb are produced, the characterisation and validation process, particularly when ELISA development is involved, is very time consuming. The mAb produced to ovine CXCL8 by the Toolbox are a case in point and an ELISA will be available once it is fully optimized and specificity is confirmed.

One of the things that distinguished the Toolbox from US VIRN was the coordinated reagent development for cattle and sheep. These two species are very closely related phylogenetically, hence the likelihood of reagent cross-reactivity is very high. Examples are the mAb-based sandwich ELISAs that detect both cattle and sheep IL-4, IL-10, IL-12 and IFN- γ (Hope et al., 2002, 2005; Wattegedera et al., 2004, 2008). However, this is not always the case and cross-reactivity cannot be assumed. Previous work had shown that a sand-

wich ELISA based on mAb produced against ovine GM-CSF did not detect bovine GM-CSF. Similarly, during the course of the Toolbox project a sandwich ELISA based on mAb produced against bovine TNF- α did not detect ovine TNF- α . By cross-checking the mAbs against recombinant proteins of each species and conducting intracellular cytokine staining and flow cytometry on transfected cells it was discovered in each of these cases that one mAb of the ELISA pair did not recognize the orthologous cytokine (Entrican et al., 1996; Kwong et al., 2010). Further funding for the Immunological Toolbox was sought towards the end of 2009 but this was unsuccessful. The future for UK veterinary reagent development may be via smaller projects, possibly supported in part by industry.

3. NADIR

Although the Immunological Toolbox has come to an end, there is a Consortium-based research and networking project that was recently established within the European Union (EU), the Network for Animal Diseases Infectiology Research Facilities project (NADIR), funded by the EU Seventh Framework Programme. The strategic aim of NADIR is to realize the EU potential in animal infectiology by bringing together experimental laboratories to optimize their studies, improve tools, share reagents and achieve economies of scale (http://www.nadir-project.eu/nadir_project/). There are 15 organizations across Europe that participate in NADIR, all with facilities to conduct research into infectious diseases of farmed livestock. The project was launched in France in May 2009 and is funded until 2012. NADIR has a number of networking and research activities that can be found at http://www.nadir-project.eu/nadir_project/layout/set/print/the_project. Of interest to veterinary immunologists within the EU may be the NADIR Transnational Access Programme that provides funds for those not within the NADIR Consortium to support short-term visits to laboratories within NADIR. Details on how to apply for these visits can be found at http://www.nadir-project.eu/nadir_project/call_for_access.

4. US VIRN

Joan Lunney (USDA ARS BARC, Beltsville, USA) provided an update on US VIRN before describing progress on the Swine Toolkit component of the network. US VIRN is a multi-centre Consortium project funded by USDA to develop immunological reagents for cattle, pigs, horses, chickens and fish (trout and catfish). The dedicated website can be found at <http://www.vetimm.org>. US VIRN and the Immunological Toolbox have worked closely together and complement each other as been described previously (Entrican et al., 2009). US VIRN was funded for four years from 2006; the four year renewal application was recently approved. One major difference between the research funding in the US and UK is the mechanism for involving a commercial partner within a government-funded project. For the Research Councils within the UK the industrial partner would be expected to contribute financially

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