



International Veterinary Vaccinology Network Annual Report 2018



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Introduction

Welcome to the International Veterinary Vaccinology Network (IVVN) Annual Report 2018.

It has been a busy first year for all of the IVVN team who have been working hard to get the Network established and complete the large number of tasks required to have achieved so many exciting activities. Highlights of the first year include the fantastic first annual conference held in Nairobi in March 2018 which was more successful than we could have hoped for and was enjoyed by the many delegates that joined us.

Having now awarded pump-priming grants and laboratory exchange awards, we are looking forward in the coming year as we begin to see the results from our catalyst funded activities. With female LMIC fellowship awards, a vaccinology course in Bangkok, the second annual conference in London in January 2019, IVVN funded workshops, scholarships for attending external conferences and workshops and upcoming calls for more pump-priming grants and laboratory exchanges, the opportunities for our members to benefit from the IVVN continue to come. With new industrial relationships being forged, discussions with other groups with interests in the veterinary vaccinology sphere and productive interactions with our sister networks, the IVVN team continue to explore additional avenues for opening up new collaborations and bringing more opportunities to our members.

As ever the IVVN aims to be responsive to our members needs and we welcome any feedback, positive or negative, on your experience of the Network in its first year – let us know what we have done well, what improvements you would make, and any other activities we should be considering.

It is an exciting time to be involved with the IVVN and I look forward to the opportunities (and challenges) of the coming year.

Dr. Timothy Connelley, Director of the IVVN

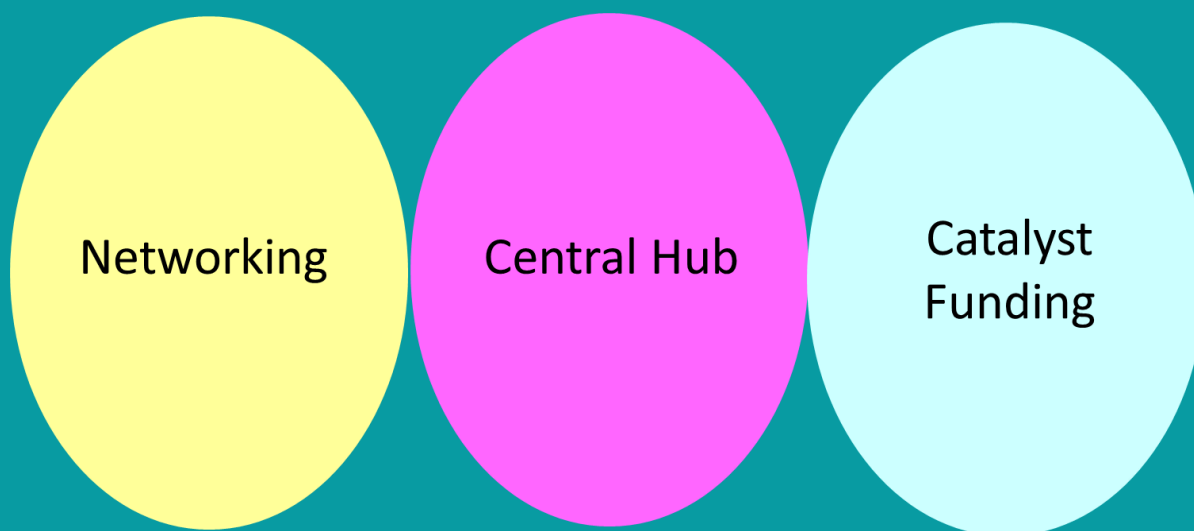
Background

Animal diseases have significant impacts on societies in low-and-middle income countries (LMICs), through reduced animal health, impaired welfare, reduced livestock productivity and public health. Vaccines offer the most sustainable route to control and prevent many of the most devastating diseases of livestock. The IVVN provides the opportunity to establish multi-partnered, international collaborations that bring together the diverse skills that can accelerate the development of vaccines.

The IVVN offers a unique opportunity to establish a forum for specialists to focus on establishing new collaborations between partners with complementary expertise to address critical 'bottle-necks' in the development of veterinary vaccines for LMIC priority diseases. Many of these obstacles are relevant to human vaccinology and so much of the science conducted by the Network will have applications under the 'one-health' remit.

The IVVN launched in August 2017 after receiving £2.2M from the MRC and BBSRC through the GCRF. The activities of the Network will be achieved through:

- 1) Hosting Networking Events.
- 2) Providing Catalyst Funding.
- 3) Being a central 'hub' for information dissemination.



Organisational Structure

The IVVN is directed by Dr. Timothy Connelley (The Roslin Institute, UK) and Prof. Bryan Charleston (The Pirbright Institute, UK), and advised by a Network Management Board and External Advisory Group consisting of international experts from across the fields of human and veterinary vaccinology (Figure 1).

The IVVN is coordinated and managed by Dr. Carly Hamilton (The Roslin Institute, UK) – please do not hesitate to contact Carly at IVVN@roslin.ed.ac.uk with any questions or comments.



Figure 1: IVVN Organisational Structure

Membership

Since launching in August 2017 the IVVN has welcomed over 750 members from across 57 different countries (Figure 2). 28% of IVVN members are from the UK, 60% are from LMICs and 12% are from other countries. Membership is free and registration is available [here](#). Join us today!



Figure 2: IVVN member countries and distribution of members

Benefits of being an IVVN member include:

- Being part of an international community of researchers working to develop improved vaccines for major livestock and zoonotic diseases.
- Access to potential collaborators from across the fields of veterinary and human vaccinology.
- Networking opportunities through attendance at our annual scientific meetings.
- Members are eligible to apply for scholarships to attend our annual scientific meetings.
- Members are eligible to apply for pump-priming grants of up to £100,000 and laboratory exchange awards of up to £10,000 to accelerate their vaccine research.
- Opportunities to host workshops on specific vaccine related topics.
- Notification of news, events, training, funding and publications of interest via our website, social media, and monthly newsletters.

Networking Events

To facilitate the formation of novel collaborations, the IVVN hosts annual scientific meetings, which focus on vaccine-related themes, and provide a platform for networking and knowledge exchange.

International Veterinary Vaccinology Network Meeting 2018



Delegates at the inaugural IVVN meeting, Nairobi, March 2018

Meeting Report

The inaugural meeting of the International Veterinary Vaccinology Network took place on the 26th and 27th March 2018 in the beautiful setting of the Ole Sereni Hotel which overlooks Nairobi National Park in Kenya. With 115 delegates from across 23 of countries in attendance, this was a fantastic opportunity for IVVN members to meet, and form new collaborations in

order to improve vaccine research and development for livestock and zoonotic diseases in LMICs.

Day 1: 26th March 2018

The meeting began with IVVN director Dr. Tim Connelley (The Roslin Institute), IVVN co-director Dr. Bryan Charleston (The Pirbright Institute) and IVVN board member, Dr. Vish Nene (ILRI) welcoming attendees to Nairobi, and wishing delegates an enjoyable and productive meeting. IVVN Network Manager, Dr. Carly Hamilton (The Roslin Institute) provided attendees with an update **presentation** on the activities of the IVVN since launching in August 2017, including **membership** and current IVVN **funding opportunities**.

‘Vaccines for Zoonotic Diseases’ was the theme of the first session of the meeting which was chaired by Prof Fiona Tomley from the Royal Veterinary College. **Prof Paul Kaye** (University of York) began this session by presenting his research on visceral leishmaniasis, and highlighting IVVN sister network VALIDATE, which aims to promote vaccine research and development for complex intracellular pathogens that cause significant disease burden in LMICs. Rift Valley Fever was the focus of the next presentation from **Dr. John Gachohi** (WSU Global Health Program), who is utilising mathematic modelling to identify vaccination strategies that can be used for Rift Valley Fever in East Africa. Brucellosis and IVVN sister network BactiVac (a bacterial vaccine network that aims to accelerate the development of vaccines against bacterial infections relevant to LMICs), was the focus of the next presentation from **Dr. John McGiven** (Animal and Plant Health Agency). Read more about the four IVVN sister networks **here**. The next presentation by Dr. Patrick Munyoki (KEMRI-Wellcome Trust) presented human epidemiological research on respiratory viruses in households in coastal Kenya. The session concluded with a talk from **Dr. Baptiste Dungu** (MCI Sante Animale) on vaccine needs for neglected zoonotic diseases.

Attendees had the opportunity to network over lunch, and during coffee breaks outside in the sunshine. ‘I would like to meet boards’ were set up around the room which allowed delegates to write their name and research interests on the board, or identify a particular person that they would like to meet. The organizers then matched attendees working in the same field, in order to initiate discussion on their mutual areas of interest.

Prof Brian Perry (Universities of Oxford and Edinburgh) chaired the second session of the meeting which was on veterinary vaccine production in Africa. The first presentation was from Dr. Lian Thomas (University of Liverpool) who discussed ‘How do we improve socio-economic analysis of veterinary vaccines?’ The next few talks highlighted various African vaccine-manufacturing companies including AU-PANVAC, Afrigen Biologics and Vaccines, KEVEVAPI and Botswana Vaccine Institute. **Dr. Nick Nwankpa** (AU-PANVAC) emphasised the importance of establishing global partnerships and networks, such as the IVVN, to overcome the challenges faced in the production of vaccines in Africa. The work of South African start-up company, Afrigen Biologics and Vaccines, was highlighted by **Dr. Caryn Fenner**, who discussed the use of next generation adjuvants to improve the efficacy of veterinary vaccines. **Dr. Jane Wachira** from Kenya Veterinary Vaccines Production Institute (KEVEVAPI) outlined the role of KEVEVAPI in controlling disease in Africa via the production of safe,

efficacious and affordable veterinary vaccines. Lastly, **Dr. George Matlho** (Botswana Vaccine Institute) discussed the control of FMD using FMDV-SAT vaccinology. The session concluded with two presentations – firstly, **Dr. Jeremy Salt** (GALVmed) presented the veterinary vaccines and diagnostic tests delivered by GALVmed, and secondly **Dr. Keith Sumption** (UN FAO) discussed global vaccine security, and an initiative set up by EuFMD to address the lack of supply of FMD vaccines for emergencies.

Following the presentations, 44 posters were presented during the poster session, which was well attended and had a fantastic atmosphere. It was an excellent platform to allow delegates to present their research, and discuss potential opportunities for collaboration. All poster abstracts can be found **here**, and to find out who won the Early Career Researcher Poster Prizes, please click **here**. The first day of the meeting concluded with a delicious three-course buffet dinner, and lots of conversation about how we can work together to improve vaccines for diseases affecting agriculture in LMICs.

Day 2: 27th March 2018

The second day of the meeting began with a session on ‘Synthetic Biology in Vaccine Development’, which was chaired by Dr. Pip Beard (The Pirbright Institute). **Dr. Lauren Oldfield** from the J.Craig Vetter Institute discussed her research on vaccine development using synthetic genomics and plans to expand current techniques to viruses of livestock, for example African swine fever virus. **Professor Susan Rosser** from the University of Edinburgh presented ways in which synthetic biology could be harnessed to enable veterinary vaccine development, and introduced delegates to the Edinburgh Genome Foundry (EGF), which is a £5.3M RCUK national synthetic biology facility focusing on automating DNA design, assembly and characterisation. The development of malaria vaccines via the Plug and Display’ VLP platform using Spycatcher/Spytag technology was the focus of the next presentation by Professor Sumi Biswas from the University of Oxford. Dr. Anna Lacasta from ILRI then presented new vaccinology approaches to control East Coast Fever in cattle. This session concluded with a presentation from Professor Eleanor Riley from The Roslin Institute and Dr. Martin Broadstock from the MRC on the **Vaccine Development Process Map** which has been developed by the UK Vaccine Network to speed up future vaccine development.

‘Livestock Vaccines Here & Now’ was the theme of the final session of the IVVN meeting, and Professor Sandra Adams (University of Stirling) chaired this session. **Dr. Sadhana Sharma** from the BBSRC introduced delegates to STAR-IDAZ International Research Consortium on Animal Health (IRC) who are bringing together working groups of global experts to develop research roadmaps for livestock diseases. Dr. Jeremiah Karuga from Zoetis, then provided an overview on the African Livestock Productivity & Health Advancement (A.L.P.H.A) initiative, funded by Zoetis and the Gates Foundation, that aims to advance sustainable livestock production in Ethiopia, Nigeria & Uganda. **Prof. Brian Perry** (Universities of Oxford and Edinburgh) provided delegates with an update on the Brucellosis Vaccine Prize. The competition aims to develop a suitable vaccine that is efficacious, safe and viable for use against *Brucella melitensis* in small ruminants across the developing world. The next talk was from **Dr. Brian Bigirwa** from Brentec Vaccines who presented his journey from vaccine concept, to the development and production of a successful, thermostable vaccine (Kukustar) for Newcastle Disease. **Dr. Victor**

Mbao (Livestock Vaccine Innovation Fund) presented an overview of the Livestock Vaccine Innovation Fund who aim to make quality vaccines available and more affordable to small-scale livestock farmers. FAO and OIE have established the PPR Global Eradication Programme, and **Dr. Bouna Diop** from FAO, provided IVVN meeting delegates with an update on the programme. The meeting concluded with an excellent keynote presentation from **Prof. Guy Palmer** on 'Livestock vaccination as a driver to achieve the Sustainability Development Goals'.

Thank you to the speakers, session chairs, poster presenters, and delegates for participating in the meeting, and ensuring that it was a great success.

Early Career Researcher Poster Competition



L to R: Sue Dennis, Marie-Christine Bartens, Andressa Fisch

During the IVVN meeting poster session, 44 posters were presented on a range of vaccine-related topics, and the posters were judged by an expert panel consisting of Dr. Keith Sumption (FAO), Dr. Martin Broadstock (MRC), Dr. Bill Golde (Moredun Research Institute), Dr. Danny Wright (The Jenner Institute) and Dr. Mustapha Oumouna (University of Médéa).

The judges commented on the excellence of all of the presentations made by the poster presenters, and awarded the following prizes:

1st: Marie-Christine Bartens, Royal Veterinary College, UK (poster 43)

‘Cattle breed TLR2 polymorphisms impact on immune and potential subsequent vaccine response’

2nd: Andressa Fisch, University of Sao Paulo, Brazil (poster 24)

‘A multicomponent vaccine composed by recombinant tick secreted proteins protect cattle against *R. microplus* infestation’

3rd: Sue Dennis, University of Cape Town, South Africa (poster 15)

‘Development of a Plant-Made Recombinant Virus-like Particle (VLP) Vaccine Against African Horse Sickness’

Many congratulations to Marie, Andressa and Sue, and thank you to all the poster presenters for presenting their exciting research.

To view all of the speaker and poster abstracts from the meeting, please click [here](#).

Scholarships

The IVVN awarded 36 scholarships for Masters Students, PhD Students, Post Docs, and Senior Researchers from 16 countries to attend the first meeting of the IVVN in Nairobi, Kenya on the 26th & 27th March 2018. Scholar reports can be found [here](#).

Scholars

Anna Stedman, The Pirbright Institute, UK

Christine Maritz Oliver, University of Pretoria, South Africa

Coral Dominguez-Medina, Animal Heath Trust, UK

Cornelius Gunter, University of Cape Town, South Africa

Darren Gray, Queen's University Belfast, UK

David Lazarus, University of Cape Town, South Africa

Eriko Padron-Regalado, University of Oxford, UK

Esther Kanduma, University of Nairobi, Kenya

Florencia Gonzalez, Universidad de Buenos Aires, Argentina

Funmilayo I.D. Afolayan, University of Ibadan, Nigeria

Geoffrey Mainda, Ministry of Fisheries and Livestock, Zambia

Hoang Nguyen, VNUHCM-University of Science, Vietnam

Irene Kiio, International Livestock Research Institute, Kenya

Jasbir Bedi, Guru Angad Dev Veterinary and Animal Sciences University, India

Jerome Dinga, University of Buea, Cameroon

Jones Akinbobola, University of Abuja, Nigeria

Kizito Mugimba, Makerere University, Uganda

Lindert Benedictus, The Roslin Institute, UK

Lucia Biffar, Animal and Plant Health Agency, UK

Mamo Gezahegne, Addis Ababa University, Ethiopia

Marie-Christine Bartens, Royal Veterinary College, UK

Milcah Kigoni, University of Nairobi, Kenya

Mustapha Oumouna, University of Médéa, Algeria

Olayinka Asala, National Veterinary Research Institute, Nigeria

Paul Gwakisa, Sokoine University of Agriculture, Tanzania

Pengxiang Chang, The Pirbright Institute, UK

Peter Muthama, KEMRI-Wellcome Trust, Kenya

Phat Dinh, Nong Lam University, Vietnam

Raheela Akhtar, University of Veterinary and Animal Sciences, Lahore, Pakistan

Riccardo Tassi, Moredun Research Institute, UK

Rowena Hoare, University of Stirling, UK

Silvanus Anika, University of Nigeria, Nigeria

Solomon Ramabu, Botswana University of Agriculture and Natural Resources, Botswana

Sue Dennis, University of Cape Town, South Africa

Tesfaye Kassa, Jimma University, Ethiopia

Yakhya Dieye, Université Cheikh Anta Diop, Senegal

Presentations

Theme 1: Vaccines for Zoonotic Diseases

[‘VALIDATE Network’ Prof Paul Kaye \(The University of York\)](#)

[‘More effective vaccination strategies for Rift Valley fever in livestock in East Africa’ Dr. John Gachohi \(Washington State University Global Health Program – Kenya\)](#)

[‘Brucellosis and the BactiVac Network’ Dr. John McGiven \(APHA\)](#)

[‘Vaccine needs for zoonotic diseases in humans and animals’ Dr. Baptiste Dungu \(MCI Sante Animale\)](#)

Theme 2: Veterinary Vaccine Production in Africa

[‘The Production of Good Quality Veterinary Vaccines In Africa: Challenges And Prospects’ Dr. Nick Nwankpa \(AU PANVAC\)](#)

[‘The use of next generation adjuvants in animal health’ Dr. Caryn Fenner \(Afrigen Biologics and Vaccines\)](#)

[‘Strategic Role of KEVEVAPI in disease control in Kenya and neighbouring countries’ Dr. Jane Wachira \(KEVEVAPI\)](#)

[‘Control of Foot-and-Mouth Disease in Southern Africa: Current and future prospects in FMDV- SAT vaccinology’ Dr. George Matlho \(Botswana Vaccine Institute\)](#)

[‘GALVmed’ Dr. Jeremy Salt \(GALVmed\)](#)

[‘Global Vaccine Security - why it matters – with specific reference to FMD and re-thinking on vaccine supply for emergencies and to meet surge in demands’ Dr. Keith Sumption \(EuFMD Secretariat, Food-and Agriculture\)](#)

Theme 3: Synthetic Biology in Vaccine Development

[‘Think Globally: Vaccine development using synthetic genomics’ Dr. Lauren Oldfield \(J. Craig Venter Institute\)](#)

[‘How could the power of the emerging area of Synthetic Biology be harnessed to enable veterinary vaccine development?’ Prof Susan Rosser \(University of Edinburgh\)](#)

Theme 4: Livestock Vaccines Here & Now

[‘STAR IDAZ IRC - Global Coordination of Animal Health’ Dr. Sadhana Sharma \(BBSRC\)](#)

[‘Vaccine Production: Experiences of a Start-up’ Dr. Brian Bigirwa \(Brentec Vaccines\)](#)

[‘The Livestock Vaccine Innovation Fund at IDRC’ Dr. Victor Mbao \(Livestock Vaccine Innovation Fund\)](#)

[‘PPR Global Eradication Programme: contributing to food security, poverty alleviation and resilience’ Dr. Bouna Diop \(FAO\)](#)

'The Brucellosis Vaccine Prize: an incentive for innovation in Animal Health' Prof Brian Perry (Afrigue One Aspire)

'Livestock vaccination as a driver to achieve the Sustainability Development Goals' Prof Guy Palmer (Washington State University)

UK & International Veterinary Vaccinology Network Conference 2019

Register to attend by visiting VVN or IVVN websites

UK & International Veterinary Vaccinology Network Conference 2019

Themes:

- Vaccines for Ectoparasites
- Vaccine Commercialisation
- Antigen Discovery
- Controlling AMR with Vaccination

JANUARY 9+10

The Tower Hotel
London UK

ROSLIN | VETERINARY VACCINOLOGY NETWORK | MRC | GCRF | BBSRC | International Veterinary Vaccinology Network | Pirbright

UK & International Veterinary Vaccinology Network Conference 2019, The Tower Hotel, London, UK, 9th & 10th January 2019.

Following on from the success of the IVVN's inaugural meeting in Kenya, the IVVN are delighted to host the UK & International Veterinary Vaccinology Network Conference 2019 in The Tower Hotel, London, UK on the 9th & 10th January 2019. This conference will be a joint event with the [UK Veterinary Vaccinology Network \(VVN\)](#), and will bring together individuals from across the world with the aim of improving vaccines for livestock and zoonotic diseases both in the UK and internationally.

The UK & International Veterinary Vaccinology Network Conference 2019 will be composed of four themes:

- Vaccines for Ectoparasites
- Vaccine Commercialisation
- Antigen Discovery
- Controlling Antimicrobial Resistance (AMR) with Vaccination

Each session will consist of presentations from invited speakers and selected abstracts. There will also be a poster session to allow delegates to highlight their vaccine research, and plenty of opportunities to network and form novel collaborations. In addition, the IVVN will provide scholarships for researchers from the UK and LMICs to attend the conference.

Further information can be found [here](#).

Workshops

The second form of networking activity hosted by the IVVN are workshops that aim to provide a platform for smaller groups to discuss specific topics of their choice.

IVVN Training Workshops

IVVN Grant Writing Workshop, Nairobi, 25th March 2018

On Sunday 25th March 2018, the IVVN hosted a grant-writing workshop for 40 researchers (MSc students, PhD students, Post Docs, and Senior Researchers) from the United Kingdom (UK) and low-and-middle income countries (LMICs).

The workshop began with a presentation entitled ‘How to win funds and influence panels’ from Dr. Martin Broadstock, Programme Manager for Immunology and Vaccines, at the Medical Research Council (MRC). Martin discussed how to get a good idea for a grant application, how to find the right funder, the key elements of successful grant proposals, and how to make an application successful.

Following Martin’s presentation, Professor Fiona Tomley, from the Royal Veterinary College (RVC), summarised the main reasons why grant applications do not get funding:

1. High level of competition (there is a one in five chance of your grant being funded)
2. Lack of focus – researchers must have a clear research question
3. Lack of clarity
4. Grant applications can sometimes be over ambitious

Fiona then led workshop attendees through the IVVN pump-priming application form, and guidance notes, highlighting which specific aspects of these forms are important when applying for IVVN pump-priming funding.

Following the presentations from Martin and Fiona, it was time for an interactive, practical session. Attendees were divided into breakout groups, with each group containing a representative from the IVVN Network Management Board (NMB). The groups discussed two IVVN pump-priming grants (written by IVVN Director, Dr. Tim Connelley) which were either an example of a ‘good’ or a ‘bad’ grant application, and identified which aspects of the grants made them potentially successful, or not. Once the groups had identified differences between the two grants, they were given annotated versions of the ‘good’ and ‘bad’ applications that illustrated the key strengths or weaknesses in each grant proposal.

The practical exercise was followed by a Q&A session with the IVVN Network Management Team which allowed the workshop attendees to ask specific questions on all aspects of the IVVN pump-priming grant application process.

Thank you to Dr. Martin Broadstock, Professor Fiona Tomley, Dr. Tim Connelley, the IVVN NMB, and most importantly, the workshop attendees for making this workshop such a success!

Useful Resources

- [Presentation from Dr. Martin Broadstock: 'How to win funds and influence panels'](#)
- [IVVN pump-priming grant application – which aspects are key to writing a good grant application](#)
- [IVVN pump-priming grant guidance – which parts of the guidance notes are most important before beginning your grant application](#)

IVVN Funded Workshops

The IVVN provide workshop funding for IVVN members to host workshops on a particular topic. Workshop calls will be announced intermittently and members will receive a notification via email.

Workshop on 'Field evaluation of novel livestock vaccines', Borgo Egnazia, Italy, 1st November 2018. Hosted by Dr. Nick Lyons (EuFMD, FAO, Italy), Dr. Keith Sumption (EuFMD, FAO, Italy) and Dr. Eyal Klement (Hebrew University, Israel).

Livestock vaccines are used extensively for the control of infections and diseases in livestock, including those with zoonotic potential, and represent a huge cost to both the livestock industry and governments. The highest impact infectious diseases are particularly prevalent in low and middle income countries where vaccines have the potential to lead to dramatic increases in production, and improvements to livelihoods, food security and human health. Evaluation of livestock vaccines is widely done through challenge and seroconversion studies. This is in contrast to human vaccines that are assessed by their ability to prevent an outcome under natural challenge conditions. Although challenge studies offer a standardised approach they do not account for the range of exposure conditions in the field where vaccines are actually used. Moreover, correlates or surrogates of protection should similarly be derived in conditions where vaccines will be used, to give an accurate indication of likely field efficacy. As new vaccines are being developed, specific challenges arise when pre-existing vaccines exist and it is important to demonstrate the relative efficacy under these conditions. The aim of this one day workshop is to give the opportunity to researchers in vaccines to share experiences on conducting field studies to estimate the efficacy of veterinary vaccines. It will be open to all researchers with an interest in vaccine evaluation. The focus will be from taking novel vaccines from the laboratory to the field. Two eminent researchers in the field of human vaccine evaluation will be invited to give presentations. Attendees will be asked to submit an abstract which will all be made available in a booklet with a selection asked to deliver presentations. The event will also provide opportunity for networking and potential collaborations between different aspects of veterinary vaccinology.

Support for LMIC researchers to attend external workshops

The IVVN provide funding for researchers from LMICs to attend external workshops or meetings.

Scholarships awarded:

- 1) 19th Fish Immunology Workshop, Wageningen University & Research, April 29 - May 3 2018 (2 researchers).
- 2) 6th European Veterinary Immunology Workshop, Utrecht, 5-7th September 2018 (3 researchers).
- 3) BSI Comparative and Veterinary Immunology Group: Frontiers in human and veterinary antibody discovery, The Pirbright Institute, 26th & 27th November 2018 (3 researchers).

Catalyst Funding

Pump-priming grants

Grants of up to £100,000 are available for collaborative teams of IVVN members to address key bottlenecks preventing the development of a particular vaccine. The IVVN will announce pump-priming grant calls intermittently and members will receive a notification via email.

Awarded pump-priming grants (Round 1 - January 2018)

1) Development of immunological tools for monitoring the immune response of Nile tilapia

Professor Kim Thompson (Moredun Research Institute, UK), Professor Sachdev S. Sidhu (University of Toronto, Canada), Professor Alexandra Adams (University of Stirling, UK), Dr. Alasdair Nisbet (Moredun Research Institute, UK), Dr. Hoang Nguyen (Vietnam National University, Vietnam), Dr. Nguyen Ngoc Phuoc (Hue University of Agriculture and Forestry, Vietnam) & Professor Ruth Zadoks (University of Glasgow, UK)

Aquaculture is the fastest growing animal food production sector globally. Fish are an important source of protein and as such aquaculture has great potential to play a key role in future food security programmes. Because of their rapid growth and high protein content, tilapia is an attractive species for aquaculture, reaching harvest size after only 6-7 months; tilapia are now in fact the second most farmed species after carp. They are farmed in many low and middle-income countries (LMIC) and provide an important source of revenue for many low income families. Disease in tilapia culture is associated with intensification of the farming system, and both bacterial and viral diseases are severely impacting on the expansion of tilapia farming; in particular *Streptococcus* spp. There is increasing concern about the use of antibiotics to control disease outbreaks and attention is focusing on the use of vaccination for disease control. Vaccination exposes fish to a non-infectious dose of the pathogen, so when they come into contact with the pathogen at a later date, memory cells of their immune system stimulate a response to combat the disease. We need a better understanding of how tilapia respond to infection and vaccination to be able to develop and formulate effective vaccine products for tilapia. We currently have few reagents available for investigating the immune response of tilapia. Through a collaboration of scientists in Vietnam, Canada and the UK, we plan to develop and apply novel tools (synthetic antibodies) for studying the immune response of this important aquaculture species, using *Streptococcus agalactiae* as our infection model. Synthetic antibodies are made in the laboratory, unlike conventional antibodies which are produced in animals, thus eliminating the need to use animals to make these reagents. This work will ultimately lead to the development of more effective strategies for managing disease in tilapia aquaculture systems.

2) Low-cost thermostabilisation of a Rift Valley Fever vaccine for veterinary use

Dr. George Warimwe (KEMRI-Wellcome Trust Research Programme, Kenya), Dr. Alexander D. Douglas (Jenner Institute, UK) & Dr. Michael J. Francis (BioVacc Consulting Ltd, UK)

Vaccines are among the most cost-effective public health interventions ever developed. However, many of the currently available products require refrigeration in order to maintain

their viability and ability to elicit a protective immune response in humans or animals. This requirement for a 'cold chain' has major cost implications, and remains a major challenge in the deployment of vaccines in resource-poor settings where uninterrupted supply of electricity to maintain a cold chain in fridges is unavailable. In this project we aim to develop and optimise a low-cost method of formulating vaccines to obviate the need for refrigeration. We will exploit the known properties of certain sugars, trehalose and sucrose, to thermostabilise live viruses when slowly desiccated on to fibrous membranes with minimal loss in viability. We will adapt an existing method to make it suitable for stabilisation of very low cost veterinary vaccine formulations, which are not purified to the same extent as human formulations. To demonstrate the utility of this new method, we will thermostabilise an advanced candidate vaccine in development for Rift Valley Fever (ChAdOx1 RVF) in humans and animals, and evaluate its viability and ability to elicit an immune response in mice following storage at low (4°C), medium (20°C) and high (45°C) temperatures for 6 months. If successful, the thermostable ChAdOx1 RVF will be further developed for commercialisation, both for the human and veterinary indications. The data generated in this project will also be useful in informing thermostabilisation protocols for other veterinary (and human) vaccines.

3) A single dose vectored *Taenia solium* vaccine

Professor Adrian Hill (Jenner Institute, UK), Professor Marshall Lightowlers (University of Melbourne, Australia) & Dr. Bryan Charleston (The Pirbright Institute, UK)

Taenia solium is the aetiological agent of neurocysticercosis in humans and is associated with a high frequency of epilepsy in endemic areas. Pigs are the almost exclusive natural animal intermediate host for *T. solium* and immunisation of pigs offers the opportunity for disease prevention. Despite the general difficulty of effective immunisation against complex parasites Lightowlers in Melbourne has developed a highly effective protein in adjuvant vaccine based on the TSOL18 antigen. Two doses of this vaccine lead to very high level protection of >98% in pigs in a variety of rural disease settings where the vaccine is most needed. However, deployment of two doses of vaccine in pigs in such settings is proving highly logistically problematic and a single dose of this vaccine has been found to be insufficiently protective. We propose here to assess for the first time the potential of a viral vectored adenovirus vaccine encoding the same TSOL18 antigen. Adenoviral vectors are known to provide excellent antibody responses with a single dose in a range of animal species, including pigs, and in humans, as illustrated by their use as a single dose vaccine in the Ebola rapid response vaccine programme in 2014. We propose to make adenoviral vectors for this *Taenia* antigen, test immune responses in mice initially and then critically in pigs. By comparing the immune response generated in pigs by a single dose of the new adenoviral vaccine to that generated by two doses of the existing protein in adjuvant vaccine, we will be able to determine whether a single dose adenoviral vaccine is a viable option for further development as a single dose vaccine for prevention of *Taenia solium* disease.

Laboratory Exchange Awards

Laboratory exchange awards of up to £10,000 are available to facilitate transfer of expertise between laboratories in the Network. Calls for laboratory exchange award proposals will be announced intermittently and members will receive a notification via email.

Awarded Laboratory Exchange Awards (Round 1 – July 2018)

1) Investigation of novel AB5 toxin from the fish pathogen *Yersenia ruckeri*, a potential mucosal vaccine adjuvant

Dr. Travis Beddoe (La Trobe University, Australia) and Prof Chris Secombes (University of Aberdeen, UK)

2) Genomic analysis of antigenic diversity in Brazilian *Trypanosoma vivax* strains

Dr. Guilherme da Costa Martins (University of Sao Paulo, Brazil) and Dr. Andrew Jackson (University of Liverpool, UK)

3) Isolation and molecular characterisation of mycobacterium strains responsible for endemic bovine tuberculosis in Medea, Algeria

Dr. Mammam Khames (University of Medea, Algeria) and Dr. Sharon Kendall (Royal Veterinary College, UK)

4) Understanding the role of humoral immunity in vaccine development for *Streptococcus agalactiae* infection in tilapia

Dr. Mugimba Kahoza Kizito (Makerere University, Uganda) and Prof Kim Thompson (Moredun Research Institute, UK)

5) Advancing the analysis of bovine class II MHC restricted T cell responses to vaccination

Dr. Isaac Kombe Silwamba (University of Zambia, Zambia) and Dr. Bill Golde (Moredun Research Institute, UK)

Information Dissemination

The IVVN is a central area for dissemination of relevant information to the veterinary vaccinology community via the website, twitter, blog and monthly newsletters.

Website

www.intvetvaccnet.co.uk

Twitter

Follow the IVVN on Twitter [@IntVetVaccNet](https://twitter.com/IntVetVaccNet) for daily updates from the Network and the veterinary vaccinology community.

Newsletters

IVVN monthly newsletters provide updates on the activities of the Network and notification of news, events, publications, funding opportunities and training opportunities from the veterinary vaccinology community.

Newsletter Archive:

[September 2017](#)

[October 2017](#)

[November 2017](#)

[December 2017](#)

[January 2018](#)

[February 2018](#)

[March 2018](#)

[April 2018](#)

[May 2018](#)

[June 2018](#)

[July 2018](#)

[August 2018](#)

[September 2018](#)

Blog

The aim of the IVVN blog is to highlight IVVN member's research. If you would like to take part, please email Carly at IVVN@roslin.ed.ac.uk – we would love to hear from you!

Blog Archive:

[Dr. Brian Bigirwa, Brentec Vaccines](#)

[Afrigen Biologics and Vaccines & Afrivet](#)

[Professor Jacqui Matthews, Moredun Research Institute](#)

[TRANSVAC & VAC2VAC](#)

[Inaugural meeting of the PPR – Global Research and Expertise Network](#)

[Madeleine Clark, The Pirbright Institute](#)

[Professor Gary Entrican, Moredun Research Institute](#)

[Dr. Rebecca McLean, The Pirbright Institute](#)

Concluding Comments

We hope you will all agree it has been a fantastic first year for the IVVN and we would like to say a huge thank you to all of our members for their continued support. We have successfully established an international network consisting of academics, industry members, and others from 57 different countries. Membership continues to grow, and importantly, new members are very welcome!

By hosting networking events, providing catalyst funding and being a central area for dissemination of information to the veterinary vaccinology community, we hope to work together to improve vaccine development for livestock and zoonotic diseases in LMICs.

Thank you to the MRC, BBSRC and GCRF for funding the Network.