

WOAH Reference Laboratory Reports Activities 2023

Activities in 2023

This report has been submitted : 10 juin 2024 12:16

Laboratory Information

Name of disease (or topic) for which you are a designated WOA Reference Laboratory:	Marek's disease
Address of laboratory:	Ash Road, Pirbright, Woking, Surrey, GU24 0NF UNITED KINGDOM
Tel.:	+441483231493
E-mail address:	yongxiu.yao@pirbright.ac.uk
Website:	https://www.pirbright.ac.uk/diagnostics-surveillance/mareks-disease-virus-referencelaboratory
Name (including Title) of Head of Laboratory (Responsible Official):	Dr. Yongxiu Yao
Name (including Title and Position) of WOA Reference Expert:	Dr. Yongxiu Yao, Head of viral Oncogenesis group
Which of the following defines your laboratory? Check all that apply:	Academic institution

TOR1: DIAGNOSTIC METHODS

1. Did your laboratory perform diagnostic tests for the specified disease/topic for purposes such as disease diagnosis, screening of animals for export, surveillance, etc.?

(Not for quality control, proficiency testing or staff training)

Yes

Diagnostic Test	Indicated in WOA Manual (Yes/No)	Total number of test performed last year	
		Nationally	Internationally
Indirect diagnostic tests			
None		0	0
Direct diagnostic tests			
Real-time PCR for virulent MDV-1, MDV-2, HVT vaccine, CVI988 vaccine, and Prevxion vaccine		3662	193
Vaccine virus titration by virus isolation		3	0
Field virus isolation		8	0

TOR2: REFERENCE MATERIAL

2. Did your laboratory produce or supply imported standard reference reagents officially recognised by WOA?

No

3. Did your laboratory supply standard reference reagents (nonWOAH-approved) and/or other diagnostic reagents to WOA Members?

No

4. Did your laboratory produce vaccines?

Not applicable

5. Did your laboratory supply vaccines to WOAHA Members?

Not applicable

TOR3: NEW PROCEDURES

6. Did your laboratory develop new diagnostic methods for the designated pathogen or disease?

Yes

NAME OF THE NEW TEST OR DIAGNOSTIC METHOD DEVELOPED	DESCRIPTION AND REFERENCES (PUBLICATION, WEBSITE, ETC.)
Real-time PCR for specific detection of the new Marek's disease vaccine 'Prevxion-RN®'	Validation of this test as an ISO/IEC 17025-accredited test is in progress; the report (when completed) could be requested from: Marek's Disease Virus Reference Laboratory, The Pirbright Institute, Ash Road, Woking, Surrey, GU24 0NF, UK (https://www.pirbright.ac.uk/diagnostics-surveillance/mareks-disease-virus-reference-laboratory)

7. Did your laboratory validate diagnostic methods according to WOAHA Standards for the designated pathogen or disease?

No

8. Did your laboratory develop new vaccines for the designated pathogen or disease?

No

9. Did your laboratory validate vaccines according to WOAHA Standards for the designated pathogen or disease?

No

TOR4: DIAGNOSTIC TESTING FACILITIES

10. Did your laboratory carry out diagnostic testing for other WOAHA Members?

Yes

NAME OF WOAHA MEMBER COUNTRY SEEKING ASSISTANCE	DATE	WHICH DIAGNOSTIC TEST USED	NO. SAMPLES RECEIVED FOR PROVISION OF DIAGNOSTIC SUPPORT	NO. SAMPLES RECEIVED FOR PROVISION OF CONFIRMATORY DIAGNOSES
BELGIUM	2023-11-01	Real-time PCR for CVI988 vaccine	30	0
IRELAND	2023-01-02	Real-time PCR for CVI988 vaccine and HVT vaccine	20	0
IRELAND	2023-02-01	Real-time PCR for CVI988 vaccine and HVT vaccine	20	0
IRELAND	2023-03-01	Real-time PCR for CVI988 vaccine and HVT vaccine	20	0
LIBYA	2023-11-01	Real-time PCR for vMDV and MDV-2	0	7
RUSSIA	2023-08-01	Real-time PCR for vMDV and MDV-2, and for CVI988 vaccine	33	33

11. Did your laboratory provide expert advice in technical consultancies on the request of an WOAHA Member?

Yes

NAME OF THE WOAHA MEMBER COUNTRY RECEIVING A TECHNICAL CONSULTANCY	PURPOSE	HOW THE ADVICE WAS PROVIDED
SAUDI ARABIA	To provide advice on collection of field samples, sample processing, and real-time PCR set-up for detecting vMDV and vaccine strains	In-person meeting with Khaled Hussein (Almarai Co.); electronic copies of guidance documents provided

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

12. Did your laboratory participate in international scientific studies in collaboration with WOAHA Members other than the own?

Yes

Title of the study	Duration	PURPOSE OF THE STUDY	PARTNERS (INSTITUTIONS)	WOAHA MEMBER COUNTRIES INVOLVED OTHER THAN YOUR COUNTRY
The consequences of transmissible vaccines on disease ecology and pathogen evolution:	5 years	To use a Marek's disease virus vaccine-challenge model to	Pennsylvania State University	UNITED STATES OF AMERICA

Marek's disease virus as a case study		quantify the consequences of transmissible vaccine use		
Examining the molecular diversity of MDV field isolates	5 years	Epidemiological investigation, pathogenicity analysis, and evaluation of vaccine protection against the MDV isolates from MD-vaccinated poultry farms	Henan academy of Agricultural Science	CHINA (PEOPLE'S REP. OF)
Exploring the potential of MDV-2 as a vaccine vector	4 years	To test if MDV-2 is a good candidate for vectored vaccines against MD and other avian viral diseases	MSD Animal Health	THE NETHERLANDS

13. In exercising your activities, have you identified any regulatory research needs* relevant for WOA?H?

No

TOR6: EPIZOOLOGICAL DATA

14. Did your Laboratory collect epidemiological data relevant to international disease control?

Yes

IF THE ANSWER IS YES, PLEASE PROVIDE DETAILS OF THE DATA COLLECTED:

We have an ongoing project to sequence the meq gene (closely linked to virulence of Marek's disease virus) of MDV isolated from samples submitted from UK backyard chicken flocks, to investigate the phylogeny, pathology, and distribution of these viruses, and the potential threat to commercial poultry.

15. Did your laboratory disseminate epidemiological data that had been processed and analysed?

No

16. What method of dissemination of information is most often used by your laboratory? (Indicate in the appropriate box the number by category and list the details in the box)

a) Articles published in peer-reviewed journals:

4

1. Fiddaman SR, Dimopoulos EA, Lebrasseur O, du Plessis L, Vrancken B, Charlton S, Haruda AF, Tabbada K, Flammer PG, Dascalu S, Marković N, Li H, Franklin G, Symmons R, Baron H, Daróczy-Szabó L, Shaymurotova DN, Askeyev IV, Putelat O, Sana M, Davoudi H, Fathi H, Mucheshi AS, Vahdati AA, Zhang L, Foster A, Sykes N, Baumberg GC, Bulatović J, Askeyev AO, Askeyev OV, Mashkour M, Pybus OG, Nair V, Larson G, Smith AL, Frantz LAF (2023). Ancient chicken remains reveal the origins of virulence in Marek's disease virus. *Science*, 382(6676):1276-1281.

2. Teng M, Zhu ZJ, Yao Y, Nair V, Zhang GP, Luo J. (2023). Critical roles of non-coding RNAs in lifecycle and biology of Marek's disease herpesvirus. *Science China Life Sciences*, 66(2):251-268.

3. Liu JL, Teng M, Zheng LP, Zhu FX, Ma SX, Li LY, Zhang ZH, Chai SJ, Yao Y, Luo J. (2023). Emerging hypervirulent Marek's disease virus variants significantly overcome protection conferred by commercial vaccines. *Viruses*, 15(7):1434.

4. Teng M, Liu J, Luo Q, Zheng L, Yao Y, Nair V, Zhang G, Luo J. Efficient Screening and Characterization of Monoclonal Antibodies against MDV-1 Specific Oncoprotein Meq Using the CRISPR/Cas9 Gene Edited Viruses. *Viruses*, 2023, 15(4), 817; <https://doi.org/10.3390/v15040817>

b) International conferences:

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Professor Venugopal Nair has given the following talks:

1. Invited to talk on 'Avian Oncogenic viral diseases: A major concern for livestock farming & welfare' at the 15th Kerala Veterinary Science Congress at Kerala Veterinary & Animal Sciences University Pookode, Kerala, India on 18th November 2023.

2. Invited speaker to talk on 'Marek's Disease: A major challenge for Poultry Health & an excellent model for viral oncogenesis on 2nd Nov 2023 at the 12th Asia Pacific Poultry Conference (APPC2023) Nanjing.

3. V Nair invited to speak on 'Avian Oncogenic Viruses, Human Cancers & One Health' at the International Symposium on Important Animal Diseases and Zoonoses at Yangzhou University on 31 Oct 2023.

4. V Nair talked on 'Innovations in Avian Disease Control- Breakthroughs in Vaccinology & Control' at the Sino-European Modern Livestock & Poultry Industry Technology Innovation Seminar & the Launch of the Joint Laboratory of China & European Countries on 4-6 November 2023.

5. V Nair talked on 'Innovations in control strategies of Avian diseases' at the College of Veterinary Medicine, South China Agricultural University, Guangzhou, China on 8

Nov 2023 at the inauguration of the CERAD Guangzhou Unit.

6. V Nair talked on 'Recent advances in the pathogenesis and control of avian oncogenic viral diseases' at the College of Veterinary Medicine, Nanjing Agricultural University on 1st November 2023.

7. V Nair invited to talk on 'Avian Oncogenic Viruses, Human Cancers and One Health' at the GARAD Conference Guildford 22-24 May 2023.

Dr. Yongxiu Yao has given the following talks:

1. Talk at the inauguration of the UK-China CERAD Guangzhou Unit in South China Agricultural University, China, 8th November 2023. Title: Genome editing of avian herpesviruses for recombinant vaccine development.

2. Talk at "Sino-European Modern Livestock & Poultry Industry Technology Innovation Seminar & the Launch of the Joint Laboratory of China & European Countries" in Binzhou, China, 4-6th November 2023. Title: Genome editing of avian herpesviruses for recombinant vaccine development.

3. Talk at the "12th Asia Pacific Poultry Conference (APPC2023)" Nanjing, China, 1st Nov 2023. Title: Genome editing of avian herpesviruses for recombinant vaccine development.

4. Talk at the college of Veterinary Medicine, Nanjing Agricultural University, China, 1st November 2023. Title: Genome editing of avian herpesviruses for recombinant vaccine development.

5. Talk at "International Symposium on Important Animal Diseases and Zoonoses" in Yangzhou University, China, 31st October 2023. Title: Genome editing of avian herpesviruses for recombinant vaccine development.

6. Talk at the GARAD Conference Guildford 22-24 May 2023. Title: Genome editing of avian herpesviruses for recombinant vaccine development.

7. Invited virtual talk at "The 2nd international academic forum on animal farming health" in Shenyang Agricultural University, China, 14th October 2023. Title: CRISPR/Cas9: Powerful tool to study virus-host interaction and vaccine development.

c) National conferences:

0

Haven't attended any national conferences in 2023.

d) Other (Provide website address or link to appropriate information):

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

17. Did your laboratory provide scientific and technical training to laboratory personnel from other WOAHA Members?

Yes

a) Technical visit : 0

b) Seminars : 2

c) Hands-on training courses: 0

d) Internships (>1 month) 0

Type of technical training provided (a, b, c or d)	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
B	THE NETHERLANDS	10

TOR8: QUALITY ASSURANCE

18. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)	
ISO/IEC 17025:2017	Certificate issued by UK accreditation service	Pirbright UKAS Certificate.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Real-time PCR testing of chicken organs, feathers, and poultry dust to detect Marek's disease virus (vMDV), MDV-2, and vaccine strains CV1988 and HVT)	United Kingdom Accreditation Service (UKAS) 17025

20. Does your laboratory maintain a "biorisk management system" for the pathogen and the disease concerned?

Yes

MDV (including MDV serotypes 1, 2 and HVT) causes diseases in poultry species such as chickens, turkey and quails. The viruses are exclusive pathogens of avian species

and hence are unlikely to infect and cause any harm to the human. Also, no known risks to the environment have been associated with these viruses. However, sample preparation for qPCR and when the culture of the virus is involved, strictly all of the work will be performed with the appropriate PPE (nitrile gloves and lab coat); and in containment level 2 environment solely for sample protection, and for sterility of cultures in line with group practices for culture of avian herpesviruses.

TOR9: SCIENTIFIC MEETINGS

21. Did your laboratory organise scientific meetings related to the pathogen in question on behalf of WOA?H?

No

22. Did your laboratory participate in scientific meetings related to the pathogen in question on behalf of WOA?H?

No

TOR10: NETWORK WITH WOA?H REFERENCE LABORATORIES

23. Did your laboratory exchange information with other WOA?H Reference Laboratories designated for the same pathogen or disease?

Not applicable (only WOA?H Reference Laboratory designated for the disease)

24. Do you network (collaborate or share information) with other WOA?H Reference Laboratories designated for the same pathogen?

Not applicable (Only WOA?H Reference Laboratory designated for the disease)

25. Did you organise or participate in inter-laboratory proficiency tests with WOA?H Reference Laboratories designated for the same pathogen?

Not applicable (Only WOA?H Reference Laboratory designated for the disease)

26. Did your laboratory collaborate with other WOA?H Reference Laboratories for the same disease on scientific research projects for the diagnosis or control of the pathogen of interest?

Not applicable (Only WOA?H Reference Laboratory designated for the disease)

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOA?H Reference Laboratories for the same pathogen?

No

TOR12: EXPERT CONSULTANTS

28. Did your laboratory place expert consultants at the disposal of WOA?H?

No

29. Additional comments regarding your report:

Yes

Unlike high consequential animal diseases with epidemic/pandemic potential, Marek's disease is endemic in most member countries. As it is not a notifiable disease in these countries, testing the samples for diagnosis may be seen as less of a priority and hence large numbers of samples are not submitted to the MDVRL from many countries. However, MDVRL activities increased significantly during 2023, specifically sample submissions as evidenced by 932 samples in 2022 to 3855 samples in 2023, as well as vaccine titration and field virus isolation. In addition, we worked on developing and validating a real-time PCR specific for Prevexxion vaccine as an ISO/IEC 17025 accredited test. We continue to provide technical advice to queries, diagnostic support and confirmation diagnoses from other member countries, and supply standard reference reagents upon request. Other activities include collecting epidemiological data relevant to international disease control, participation of international scientific studies in collaboration with WOA?H members, and dissemination of information by publishing in peer-reviewed journals and presenting at international meetings. Most of the activities are carried out using the funding from the Pirbright Institute MDVRL or from charges for the tests, as we do not receive any funding support from the WOA?H or local government.

MDVRL is open to receive requests to deliver hands-on training to other members but has not yet been successful on this. We planned to provide the training to Zoetis representatives from Saudi Arabia in 2023, but the planned training had to be cancelled twice because the attendees were unable to get visas. Additionally, we have been working with Pirbright Training Team to prepare training modules which can be used to achieve this goal, funding permitted. Furthermore, although there has been no successful in-person training conducted, we have been actively providing technical advice to queries from many member countries on MD testing and disease control by emails, video calls and during our visits to other countries.

MDVRL at Pirbright is the only accredited MDV reference laboratory, there is no other MDV ref lab to network with for inter-laboratory proficiency testing. Currently, there are no other laboratories that routinely use the same real-time PCR tests for diagnostic testing of MDV. As part of the ongoing discussion on this topic with our accreditation body, we test samples for a previous collaborator of known provenance. We have offered support to another laboratory which, after completing the due diligences, could be considered to partake in interlaboratory comparison testing. This other laboratory is not yet fully implemented and their methodology not fully validated.