

OIE Reference Laboratory Reports Activities

Activities in 2019

This report has been submitted : 2020-01-11 15:33:38

Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Highly and low pathogenic avian influenza
Address of laboratory:	Harbin Veterinary Research Institute, CAAS 1. 427 Maduan Street, Harbin, 150001, CHINA (PEOPLES REP. OF) 2. 678 Haping Road, Harbin, 150069, CHINA (PEOPLES REP. OF)
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E-mail address:	hlchen1@yahoo.com
Website:	www.hvri.ac.cn
Name (including Title) of Head of Laboratory (Responsible Official):	Hualan Chen, Professor, Director
Name (including Title and Position) of OIE Reference Expert:	Hualan Chen, Professor, Director,
Which of the following defines your laboratory? Check all that apply:	Academic

ToR 1: To use, promote and disseminate diagnostic methods validated according to OIE Standards

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 OIE Manual (Yes/No)	Total number of test performed last year	
		Nationally	Internationally
Indirect diagnostic tests		Nationally	Internationally
Hemagglutinin inhibition(H5)	yes	6071	0
Hemagglutinin inhibition(H7)	yes	6071	0
Hemagglutinin inhibition(H9)	yes	6071	0
Hemagglutinin inhibition(H1)	yes	2134	0
Hemagglutinin inhibition(H3)	yes	2134	0
Direct diagnostic tests		Nationally	Internationally
Chicken embros	yes	60485	0
RT-PCR	yes	5100	0

ToR 2: To develop reference material in accordance with OIE requirements, and implement and promote the application of OIE Standards. To store and distribute to national laboratories biological reference products and any other reagents used in the diagnosis and control of the designated pathogens or disease.

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

No

3. Did your laboratory supply standard reference reagents (non OIE-approved) and/or other diagnostic reagents to OIE Member Countries?

Yes

Type of reagent available	Related diagnostic test	Produced/ provide	Amount supplied nationally (ml, mg)	Amount supplied internationally (ml, mg)	No. of recipient OIE Member Countries	Region of recipients
AI type antigens(H5)	HI serological test	produced	22494	322	2	<input checked="" type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
AI type antigens(H7)	HI serological test	produced	13408	0	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
AI type antigens(H9)	HI serological test	produced	5786	0	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
AI type antiserum(H5)	HI serological test	produced	6214	68	2	<input checked="" type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
AI type antiserum(H7)	HI serological test	produced	4400	0	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East
AI type antiserum(H9)	HI serological test	produced	1590	0	1	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East

4. Did your laboratory produce vaccines?

Yes

5. Did your laboratory supply vaccines to OIE Member Countries?

Yes

Vaccine name	Amount supplied nationally (ml, mg) (including for own use)	Amount supplied to other countries (ml, mg)	Name of recipient OIE Member Countries
Avian influenza virus trivalent inactivated vaccine(H5+H7)	664610250	0	CHINA (PEOPLE'S REP. OF)
Avian influenza virus bivalent inactivated vaccine(H5+H7)	26898000	0	CHINA (PEOPLE'S REP. OF)
Avian influenza virus NDV vector live vaccine(H5)	3477356	0	CHINA (PEOPLE'S REP. OF)
Avian influenza virus inactivated vaccine(H5)	0	33625000	EGYPT
Avian influenza virus inactivated vaccine(H5+H9)	0	4737500	EGYPT

ToR 3: To develop, standardise and validate, according to OIE Standards, new procedures for diagnosis and control of the designated pathogens or diseases

6. Did your laboratory develop new diagnostic methods validated according to OIE Standards for the designated pathogen or disease?

Yes

7. Did your laboratory develop new vaccines according to OIE Standards for the designated pathogen or disease?

Yes

Name of the new test or diagnostic method or vaccine developed	Description and References (Publication, website, etc.)
A duplex TaqMan real-time RT-PCR assay	Liu L, Zhang Y, Cui P, Wang C, Zeng X, Deng G, et al. Development of a duplex TaqMan real-time RT-PCR assay for simultaneous detection of newly emerged H5N6 influenza viruses. <i>Virology journal</i> . 2019;16(1):119. doi: 10.1186/s12985-019-1229-2. PubMed PMID: 31640801; PubMed Central PMCID: PMC6805314.
A reverse-transcription loop-mediated isothermal amplification assay	Shi L, Yu X, Yao W, Yu B, He L, Gao Y, Zhang Y, Tian G, Ping J, Wang X. Development of a reverse-transcription loop-mediated isothermal amplification assay to detect avian influenza viruses in clinical specimens. <i>Journal of Integrative Agriculture</i> 2019, 18(7): 1428-1435.
Recombinant duck enteritis viruses expressing the Newcastle disease virus (NDV) F gene	Ding L, Chen P, Bao X, Li A, Jiang Y, Hu Y, et al. Recombinant duck enteritis viruses expressing the Newcastle disease virus (NDV) F gene protects chickens from lethal NDV challenge. <i>Veterinary microbiology</i> . 2019;232:146-50. doi: 10.1016/j.vetmic.2019.04.022.

ToR 4: To provide diagnostic testing facilities, and, where appropriate, scientific and technical advice on disease control measures to OIE Member Countries

8. Did your laboratory carry out diagnostic testing for other OIE Member Countries?

No

9. Did your laboratory provide expert advice in technical consultancies on the request of an OIE Member Country?

Yes

Name of the OIE Member Country receiving a technical consultancy	Purpose	How the advice was provided
EGYPT	To provide scientific information on avian influenza vaccine for the control the H5 and H9 avian influenza in Egypt	Participate the meeting held in Egypt and share the information about the evolution of H5 and H9 avian influenza viruses in Egypt and the proposed vaccine

ToR 5: To carry out and/or coordinate scientific and technical studies in collaboration with other laboratories, centres or organisations

10. Did your laboratory participate in international scientific studies in collaboration with OIE Member Countries other than the own?

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	OIE Member Countries involved other than your country
Research of Emerging infectious diseases	2015-2019	The genetic basis of the host range and virulence of influenza viruses	Division of Virology, Department of Microbiology and Immunology; Institute of Medical Science, University ofTokyo, Japan	JAPAN
Animal influenza surveillance in China	2019-2023	Surveillance campaign of avian influenza from China	Emory University,Atlanta, Georgia 30322 USA	UNITED STATES OF AMERICA

ToR 6: To collect, process, analyse, publish and disseminate epizootiological data

relevant to the designated pathogens or diseases

11. Did your Laboratory collect epizootiological data relevant to international disease control?

Yes

If the answer is yes, please provide details of the data collected:

1.D. E. Stallknecht et al., Limited Detection of Antibodies to Clade 2.3.4.4 a/Goose/Guangdong/1/1996 Lineage Highly Pathogenic H5 Avian Influenza Virus in North American Waterfowl. *Journal of wildlife diseases* 56, 47-57 (2020). 2.S. H. Mahmoud et al., Evolution of H5-Type Avian Influenza A Virus Towards Mammalian Tropism in Egypt, 2014 to 2015. *Pathogens* 8, (2019). 3.J. Henning et al., Risk factors for H5 avian influenza virus prevalence on urban live bird markets in Jakarta, Indonesia-Evaluation of long-term environmental surveillance data. *PLoS one* 14, e0216984 (2019). 4.W. Cheng et al., Comparison of Avian Influenza Virus Contamination in the Environment Before and After Massive Poultry H5/H7 Vaccination in Zhejiang Province, China. *Open Forum Infect Dis* 6, ofz197 (2019). 5.M. M. Naguib et al., Global patterns of avian influenza A(H7): virus evolution and zoonotic threats. *FEMS Microbiol Rev*, (2019). 6.J. L. Medina et al., Ecuadorian mainland industrial poultry production is free of H5/H7 Avian influenza virus: National surveillance program in 2016. *J Vet Med Sci* 81, 1597-1600 (2019).

12. Did your laboratory disseminate epizootiological data that had been processed and analysed?

Yes

If the answer is yes, please provide details of the data collected:

(1). Li X, Cui P, Zeng X, Jiang Y, Li Y, Yang J, et al. Characterization of avian influenza H5N3 reassortants isolated from migratory waterfowl and domestic ducks in China from 2015 to 2018. *Transboundary and emerging diseases*. 2019;66(6):2605-10. doi: 10.1111/tbed.13324. PubMed PMID: 31402584. (2). Li M, Yin X, Guan L, Zhang X, Deng G, Li T, et al. Insights from avian influenza surveillance of chickens and ducks before and after exposure to live poultry markets. *Sci China Life Sci*. 2019;62(6):854-7. doi: 10.1007/s11427-019-9522-7. PubMed PMID: 30977013. (3). Guan L, Shi J, Kong X, Ma S, Zhang Y, Yin X, et al. H3N2 avian influenza viruses detected in live poultry markets in China bind to human-type receptors and transmit in guinea pigs and ferrets. *Emerging microbes & infections*. 2019;8(1):1280-90. doi: 10.1080/22221751.2019.1660590. PubMed PMID: 31495283; PubMed Central PMCID: PMC6746299. (4). Ge Y, Yao Q, Wang X, Chai H, Deng G, Chen H, et al. Detection of reassortant avian influenza A (H11N9) virus in wild birds in China. *Transboundary and emerging diseases*. 2019;66(3):1142-57. doi: 10.1111/tbed.13044. PubMed PMID: 30338936.

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

a) Articles published in peer-reviewed journals: 13

- (1). Wang G, Jiang L, Wang J, Zhang J, Kong F, Li Q, et al. The G Protein-Coupled Receptor FFAR2 Promotes Internalization during Influenza A Virus Entry. *Journal of virology*. 2020;94(2). doi: 10.1128/JVI.01707-19. PubMed PMID: 31694949.
- (2). Ma S, Zhang B, Shi J, Yin X, Wang G, Cui P, et al. Amino Acid Mutations A286V and T437M in the Nucleoprotein Attenuate H7N9 Viruses in Mice. *Journal of virology*. 2020;94(2). doi: 10.1128/JVI.01530-19. PubMed PMID: 31666373.
- (3). Liu L, Zhang Y, Cui P, Wang C, Zeng X, Deng G, et al. Development of a duplex TaqMan real-time RT-PCR assay for simultaneous detection of newly emerged H5N6 influenza viruses. *Virology journal*. 2019;16(1):119. doi: 10.1186/s12985-019-1229-2. PubMed PMID: 31640801; PubMed Central PMCID: PMC6805314.
- (4). Liang L, Jiang L, Li J, Zhao Q, Wang J, He X, et al. Low Polymerase Activity Attributed to PA Drives the Acquisition of the PB2 E627K Mutation of H7N9 Avian Influenza Virus in Mammals. *mBio*. 2019;10(3). doi: 10.1128/mBio.01162-19. PubMed PMID: 31213560; PubMed Central PMCID: PMC6581862.
- (5). Li X, Cui P, Zeng X, Jiang Y, Li Y, Yang J, et al. Characterization of avian influenza H5N3 reassortants isolated

- from migratory waterfowl and domestic ducks in China from 2015 to 2018. *Transboundary and emerging diseases*. 2019;66(6):2605-10. doi: 10.1111/tbed.13324. PubMed PMID: 31402584.
- (6). Li M, Yin X, Guan L, Zhang X, Deng G, Li T, et al. Insights from avian influenza surveillance of chickens and ducks before and after exposure to live poultry markets. *Sci China Life Sci*. 2019;62(6):854-7. doi: 10.1007/s11427-019-9522-7. PubMed PMID: 30977013.
- (7). Kong H, Ma S, Wang J, Gu C, Wang Z, Shi J, et al. Identification of Key Amino Acids in the PB2 and M1 Proteins of H7N9 Influenza Virus That Affect Its Transmission in Guinea Pigs. *Journal of virology*. 2019;94(1). doi: 10.1128/JVI.01180-19. PubMed PMID: 31597771; PubMed Central PMCID: PMC6912098.
- (8). Guan L, Shi J, Kong X, Ma S, Zhang Y, Yin X, et al. H3N2 avian influenza viruses detected in live poultry markets in China bind to human-type receptors and transmit in guinea pigs and ferrets. *Emerging microbes & infections*. 2019;8(1):1280-90. doi: 10.1080/22221751.2019.1660590. PubMed PMID: 31495283; PubMed Central PMCID: PMC6746299.
- (9). Gu C, Zeng X, Song Y, Li Y, Liu L, Kawaoka Y, et al. Glycosylation and an amino acid insertion in the head of hemagglutinin independently affect the antigenic properties of H5N1 avian influenza viruses. *Sci China Life Sci*. 2019;62(1):76-83. doi: 10.1007/s11427-018-9439-0. PubMed PMID: 30515728.
- (10). Ge Y, Yao Q, Wang X, Chai H, Deng G, Chen H, et al. Detection of reassortant avian influenza A (H11N9) virus in wild birds in China. *Transboundary and emerging diseases*. 2019;66(3):1142-57. doi: 10.1111/tbed.13044. PubMed PMID: 30338936.
- (11). Ding L, Chen P, Bao X, Li A, Jiang Y, Hu Y, et al. Recombinant duck enteritis viruses expressing the Newcastle disease virus (NDV) F gene protects chickens from lethal NDV challenge. *Veterinary microbiology*. 2019;232:146-50. doi: 10.1016/j.vetmic.2019.04.022. PubMed PMID: 31030839.
- (12). Chen P, Ding L, Jiang Y, Zeng X, Deng G, Shi J, et al. Protective efficacy in farmed ducks of a duck enteritis virus-vectored vaccine against H5N1, H5N6, and H5N8 avian influenza viruses. *Vaccine*. 2019;37(40):5925-9. doi: 10.1016/j.vaccine.2019.08.026. PubMed PMID: 31471151.
- (13). Shi L, Yu X, Yao W, Yu B, He L, Gao Y, Zhang Y, Tian G, Ping J, Wang X. Development of a reverse-transcription loop-mediated isothermal amplification assay to detect avian influenza viruses in clinical specimens. *Journal of Integrative Agriculture* 2019, 18(7): 1428-1435.

b) International conferences: 8

- (1) Hualan Chen and Chenjun Li organized the meeting of the Interactions between Influenza Viral RNP Complex Proteins and Host Cellular Factors' at U.S. China Dialogue and Workshop on the Challenges of Emerging Infections, Laboratory Safety, Global Health Security and Responsible Conduct in the Use of Gene Editing in Viral Infectious Disease Research from April 8 to 10, 2019 in Harbin, China.
- (2) Hualan Chen participated the meeting of Influenza and other infections held from February 19 to 20, 2019 in Tokyo, Japan.
- (3) Huanliang Yang participated the Summary of the OFFLU Swine Influenza Virus (SwIAV) group technical meeting held from February 26 to 27, 2019, in Paris, France.
- (4) Chenjun Li participated the 25th annual meeting of the NRLs for AI/ND of EU member states held from June 19 to 21, Italy.
- (5) Yanbing Li participated the 2nd Avian Influenza Symposium held during July 7-11, 2019, in Korea.
- (6). Chenjun Li and Libin Liang participated the meeting of OPTIONS for the Control of Influenza X Conference held from August 28 to September 1, 2019, in Singapore.
- (7). Xianying Zeng participated the OIE Regional Expert Group Meeting for diseases of poultry in Asia and the Pacific Region held during October 1-5, 2019 in Sapporo, Japan.
- (8) Hualan Chen participated the International Symposium on Animal Health and Food Safety during December 4-6, 2019 in Nanjing, China.

c) National conferences: 3

- (1) Yanbing Li participated the conference on the cooperation and collaboration on prevention and control of animal diseases held from May 21 to 23, 2019, in Hangzhou, China.
- (2) Chenjun Li participated the Avian Influenza Cross-border Transmission Summit held from November from 5 to 7 in Wuxi city of China
- (3) Hualan Chen participated the National Post-Doctors Academic Forum on Animal Contiguous Disease and Human Health held on December 23, 2019 in Harbin, China.

d) Other:

(Provide website address or link to appropriate information) 0

ToR 7: To provide scientific and technical training for personnel from OIE Member Countries**To recommend the prescribed and alternative tests or vaccines as OIE Standards**

14. Did your laboratory provide scientific and technical training to laboratory personnel from other OIE Member Countries?

Yes

- a) Technical visits: 0
- b) Seminars: 0
- c) Hands-on training courses: 7
- 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
c	Pakistan	7

ToR 8: To maintain a system of quality assurance, biosafety and biosecurity relevant for the pathogen and the disease concerned

15. Does your laboratory have a Quality Management System?

Yes

Quality management system adopted	Certificate scan (PDF, JPG, PNG format)
CNAS L6928	CNAS-Certificate.jpg
CNAS BL0085	CNAS-certification in new place.jpg

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Haemagglutination inhibition test(HI)	ILAC
RT-PCR	ILAC
Isolation of influenza virus	ILAC
Neutralization assay	ILAC

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

Yes

(See Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, Chapter 1.1.4)

ToR 9: To organise and participate in scientific meetings on behalf of the OIE

18. Did your laboratory organise scientific meetings on behalf of the OIE?

No

19. Did your laboratory participate in scientific meetings on behalf of the OIE?

Yes

Title of event	Date (mm/yy)	Location	Role (speaker, presenting poster, short communications)	Title of the work presented
U.S. China Dialogue and Workshop on the Challenges of Emerging Infections, Laboratory Safety, Global Health Security and Responsible Conduct in the Use of Gene Editing in Viral Infectious Disease Research	01/2019	Harbin, China	Speaker	Influenza Vaccine Research in China and Globally
Influenza and other infections	02/2019	Tokyo, Japan	Speaker	vaccination on poultry successfully eliminated human infections with H7N9 virus in China
Summary of the OFFLU Swine Influenza Virus (SwIAV) group technical meeting	02/2019	Paris, France	Speaker	Swine influenza surveillance in China
The conference on the cooperation and collaboration on prevention and control of animal diseases	05/2019	Hangzhou, China	Speaker	Epidemiology of avian influenza in China
25th annual meeting of the NRLs for AI/ND of EU member states	06/2019	Italy	Speaker	Vaccination of poultry successfully eliminated human infection
The 2nd Avian Influenza Symposium	07/2019	Korea	Speaker	Control of avian influenza in China
OPTIONS for the Control of Influenza X Conference	08/2019	Sigapore	Speaker	The Avian Influenza Control in China
OIE Regional Expert Group Meeting for diseases of poultry in Asia and the Pacific Region	10/2019	Sapporo, Japan	Speaker	The update information on the control of H5N1 and H7N9 avian influenza in China
Avian Influenza Cross-border Transmission Summit	11/2019	Wuxi, China	Speaker	The Avian Influenza Control in China
the International Symposium on Animal Health and Food Safety	12/2019	Nanjing, China	Speaker	Control of H7N9 avian influenza in China
National Post-Doctors Academic Forum on Animal Contiguous Disease and Human Health	12/2019	Harbin, China	Speaker	Control of H5N1 and H7N9 avian influenza in China

ToR 10: To establish and maintain a network with other OIE Reference Laboratories designated for the same pathogen or disease and organise regular inter-laboratory proficiency testing to ensure comparability of results

20. Did your laboratory exchange information with other OIE Reference Laboratories designated for the same pathogen or disease?

Yes

21. Was your laboratory involved in maintaining a network with OIE Reference Laboratories designated for the same pathogen or disease by organising or participating in proficiency tests?

No

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

No

ToR 11: To organise inter-laboratory proficiency testing with laboratories other than OIE Reference Laboratories for the same pathogens and diseases to ensure equivalence of results

23. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than OIE Reference Laboratories for the same disease?

No

Note: See Interlaboratory test comparisons in: Laboratory Proficiency Testing at: <http://www.oie.int/en/our-scientific-expertise/reference-laboratories/proficiency-testing> see point 1.3

ToR 12: To place expert consultants at the disposal of the OIE

24. Did your laboratory place expert consultants at the disposal of the OIE?

No

25. Additional comments regarding your report:

The National Prize for Natural Sciences of China (2019) was awarded to the project “Transmission potential of different animal influenza viruses in humans: insights from animal studies” led by Hualan Chen

