

OIE Reference Laboratory Reports Activities

Activities in 2021

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Name of disease (or topic) for which you are a designated OIE Reference Laboratory:	Avian influenza
Address of laboratory:	Animal and Plant Quarantine Agency Ministry of Agriculture, Forest and Rural Affairs 177, Hyeoksin 8-ro Gimcheon-si Gyeongsangbuk-do 39660 KOREA (REP. OF)
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Name (including Title) of Head of Laboratory (Responsible Official):	Bong Kyun Park(Commissioner, APQA)
Name (including Title and Position) of OIE Reference Expert:	Youn-Jeong Lee
Which of the following defines your laboratory? Check all that apply:	Governmental

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
c-ELISA(AI type A)	Yes	89	0
HI	Yes	4050	0
Direct diagnostic tests		Nationally	Internationally
Virus isolation	Yes	957	63
RT-PCR	Yes	27,486	14
H5/H7 pathotyping by Sanger sequencing	Yes	190	0
Next Generation sequencing for AIV gene	Yes	156	77

**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?

No

4. Did your laboratory produce vaccines?

No

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

No

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.)
H9N2 LPAI vaccine	Kim DY, Kang YM, Cho HK, Park SJ, Lee MH, Lee YJ and Kang HM.(2021) Development of a recombinant H9N2 influenza vaccine candidate against the Y280 lineage field virus and its protective efficacy. Vaccine. 39(42):6213-6220
rRT-PCR kit detecting M, H5 and H7 gene	patent application No. in Korea : 10-2007951(2019.6.28.)

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?

Yes

Name of OIE Member Country seeking assistance	Date (month)	No. samples received for provision of diagnostic support	No. samples received for provision of confirmatory diagnoses
MONGOLIA	October	14	14

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

No

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
The monitoring and characteristic studies for avian influenza and foot and mouth disease viruses in Vietnam	10 years	Monitoring of highly pathogenic avian influenza in Vietnam	National center for veterinary Diagnosis	VIETNAM
studies on genetic characterization of foot and mouth disease viruses and avian influenza virus in FMD and AI endemic countries(Cambodia and LAO PDR)	5 years	Monitoring of highly pathogenic avian influenza in Cambodia and LAO PDR	National animal Health and production Research Institue(Cambodia) National Animal Health Laboratory(Lao PDR)	LAOS
The monitoring and characteristic studies for avian influenza viruses in migratory habitats of Mongolia	5 years	Monitoring of highly pathogenic avian influenza in Mongolia	Mongolian University of Life Sciences(MULS)	MONGOLIA

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:
- (HPAI outbreaks) The informaion on the isolated viruses of avian influenza, e.g. origin, subtype, pathotype or nucleotide sequences, for the molecular epidemiological stuides on the outbreaks of HPAI Vietnam, Cambodia, LAO PDR and Mongolia. - (Migratory birds) The information on the avian influenza viruses isolated from the migratory birds from active surveillance in Mongolia e.g. origin, subtype, pathotype or nucleotide sequences, for the molecular epidemiological studies and providing early warning for the disease control in poultry.

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:
The publication of the studies about molecular epidemiological characterization of avian influenza viruses isolated from wild birds or poultry in South Korea and other countries.

**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: 10

1. Heo GB, Kye SJ, Sagong MG, Lee EK, Lee KN, Lee YN, Choi KS, Lee MH, Lee YJ. Genetic characterization of H9N2 avian influenza virus previously unrecognized in Korea. *J Vet Sci*, 2021, 22, e21

2. Baek YG, Lee YN, Lee DH, Shin JI, Lee JH, Chung DH, Lee EK, Heo GB, Sangong MG, Kye SJ, Lee KN, Lee MH, Lee YJ. Multiple Reassortants of H5N8 Clade 2.3.4.4b Highly Pathogenic Avian Influenza Viruses Detected in South Korea during the Winter of 2020-2021. *Viruses*. 2021. 13(3), 490

3. Kye SJ, Park MJ, Kim NY, Lee YN, Heo GB, Baek YK, Shin JI, Lee MH, Lee YJ. Pathogenicity of H9N2 low pathogenic avian influenza viruses of different lineages isolated from live bird markets in three animal models: SPF chickens, Korean native chickens and ducks. *Poultry Science* 2021 Sep; 100(9):101318

4. Kang YM, Cho HK, Kim JH, Lee SJ, Park SJ, Kim DY, Kim SY, Lee MH, Kim MC, Kang HM. Single dose of multi-clade virus-like particle vaccine protects chickens against clade 2.3.2.1 and clade 2.3.4.4 HPAIv. *Sci. Rep.* 2021, 11:13786.

5. Lee YN, Lee DH, Shin JI, Si YJ, Lee JH, Baek YG, Hong SY, Bunnary S, Tum S, Park MJ, Kye SJ, Lee MH, Lee YJ. Pathogenesis and genetic characteristics of a novel reassortant low pathogenic avian influenza A(H7N6) virus isolated in Cambodia in 2019. *Transboundary Emerging Disease*, 2021. 1-7.

6. Park MJ, Cha RM, Kye SJ, Lee YN, Kim NY, Baek YG, Heo GB, Sagong MG, Lee KN, Lee YJ, Lee EK. Pathogenicity of H5N8 High Pathogenicity Avian Influenza Virus in Chickens and Ducks from South Korea in 2020-2021. *Viruses* 2021 Sep 23; 13(10): 1903

7. Kim DY, Kang YM, Cho HK, Park SJ, Lee MH, Lee YJ, Kang HM. Development of a recombinant H9N2 influenza vaccine candidate against the Y280 lineage field virus and its protective efficacy. *Vaccine*. 2021, 39(42):6201-6205.

8. Park SJ, Kang YM, Cho HK, Kim DY, Kim SY, Bae YC, Kim JH, Kim GY, Lee YJ, Kang HM. Cross-protective efficacy of inactivated whole influenza vaccines against Korean Y280 and Y439 lineage H9N2 viruses in mice. *Vaccine*. 2021. 39(42):6213-6220.

9. Lee YN, Lee DH, Kwon JH, Shin JI, Hong SY, Cha RM, Baek YG, Lee EK, Sagong MG, Heo GB, Lee KN, Lee YJ. Genetic characterization of novel H7Nx low pathogenic avian influenza viruses from wild birds in South Korea during the winter of 2020-2021. *Viruses*, 2021. 13(11), 2274

10. Si YJ, Park YR, Baek YG, Park MJ, Lee EK, Lee KN, Kim HR, Lee YJ, Lee YN. Pathogenesis and genetic characteristics of low pathogenic avian influenza H10 viruses isolated from migratory birds in South Korea during 2010-2019. *Transbound Emerg. Dis.* 2021;1-12

b) International conferences: 1

1. Lee EK. HPAI outbreak situation and response during '20/21 winter season in Korea. NARO International Symposium(on-line), Japan (2021.11.5.)

c) National conferences: 2

1. Lee KN. H5N8 HPAI outbreaks and virus characterization in Korea, 2019-20. 2021 Avian influenza on-line Symposium at APQA, ROK(2021.9.15.)

2. Kang HM. Current status of vaccine development. 2021 Avian influenza on-line Symposium at APQA,

ROK(2021.9.15.)

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: 1

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	6	35

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)
ISO 17025	2020.10.20 certicate of accreditation(APQA).jpg

16. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
Identification of the agent(molecular techniques)	KOLAS
Serological test(HA and HI)	KOLAS

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
The 3rd OIE regional meeting of OIE reference centres in Asia and Pacific(OIE)	02/21	Zoom meeting	speaker(Dr.Kwang Nyeong Lee)	Introduction of OIE reference laboratory for HPAI and LPAI(APQA, Korea)
AIV-REG Working Group 1 Diagnostic protocols(OIE)	08/21	Zoom meeting	participant	participant
3rd Regional expert network meeting and workshop for avian disease in Asia and the Pacific(OIE)	09/21	Zoom meeting	speaker(Dr.Kwang Nyeong Lee)	AI surveillance activities for AI in Korea
Toward mitigating pandemic influenza risk : A regional consultation on avian influenza surveillance in Asia(FAO)	12/21	speaker(Dr.Kwang Nyeong Lee)	participant	participant
Regional expert network for avian disease in Asia-Pacific(OEI)	12/21	Zoom meeting	speaker(Dr.Youn-Jeong Lee)	Recent HPAI situation in the Republic of Korea

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?

Yes

Purpose of the proficiency tests: ¹	Role of your Reference Laboratory (organiser/participant)	No. participants	Participating OIE Ref. Labs/ organising OIE Ref. Lab.
Conventioanl proficiency Ring trial(AI/ND PCR and classical HI typing)	participant	information available from organiser APHA(UK)	APHA, UK (Organiser)

¹ validation of a diagnostic protocol: specify the test; quality control of vaccines: specify the vaccine type, etc.

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?

Yes

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

Purpose for inter-laboratory test comparisons ¹	No. participating laboratories	Region(s) of participating OIE Member Countries
National Proficiency test for avian influenza(organiser)	38 provincial laboratories	<input type="checkbox"/> Africa <input type="checkbox"/> Americas <input checked="" type="checkbox"/> Asia and Pacific <input type="checkbox"/> Europe <input type="checkbox"/> Middle East

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?

Yes

Kind of consultancy	Location	Subject (facultative)
AI surveillance	e-mail	AI surveillance for early detection of introduction and monitoring of endemic viruses

25. Additional comments regarding your report: