OIE Collaborating Centres Reports Activities

Activities in 2018

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Title of collaborating centre:	Zoonoses of Asia-Pacific
Address of Collaborating Centre:	Chinese Academy of Agricultural Sciences No 427 Maduan Street Nangang District Harbin, Heilongjiang, 150001 CHINA (PEOPLES REP. OF)
Tel.:	+86-189.46.06.62.20
Fax:	+86-5199-7166
E-mail address:	zhangjing02@caas.cn
Website:	www.hvri.ac.cn
Name of Director of Institute (Responsible Official):	Zhigao BU
Name (including Title and Position) of Head of the Collaborating Centre (formally OIE Contact Point):	Zhigao Bu
Name of writer:	Jing Zhang

ToR: To provide services to the OIE, in particular within the region, in the designated specialty, in support of the implementation of OIE policies and, where required, seek for collaboration with OIE Reference Laboratories

ToR: To identify and maintain existing expertise, in particular within its region

1. Activities as a centre of research, expertise, standardisation and dissemination of techniques within the remit of the mandate given by the OIE

Epidemiology, surveillance, risk assessment, modelling	
Title of activity	**Scope**
Equine Influenza	In March 2017, an influenza outbreak occurred in donkeys in Shandong province, China. The causative virus, A/donkey/Shandong/1/2017(H3N8), was isolated from a dead donkey. Genetic analysis indicated that the virus originated from influenza A (H3N8) clade 2 of the Florida sub-lineage that has been circulating in Asian equine populations. Comparison of the deduced amino acid sequence of the HA gene of this causative virus with that of the A/equine/Richmond/1/2007 vaccine strain showed that substitutions had occurred in the antigenic regions A, B, and C
Escherichia coli	Between June 2015 and April 2016, 370 E. coli isolates were collected from pigs, chickens, and dairy cows in Northeast China. Among these, 111 were florfenicol resistant, including 109 isolates carrying the floR gene and 6 positives for cfr. The prevalence of cfr in E. coli isolates from the four northeast provinces in China was 1.6% (6/370), which was higher than that previously reported (0.08% and 0.5%).
Zoonoses	
Title of activity	**Scope**
Avian Influenza	To monitor virus evolution and vaccine efficacy, we collected 53,884 poultry samples across China from February 2017 to January 2018. We isolated 252 H7N9 low pathogenic viruses, 69 H7N9 highly pathogenic viruses, and one H7N2 highly pathogenic virus, of which two low pathogenic and 14 highly pathogenic strains were collected after vaccine introduction. Genetic analysis of highly path□ogenic strains revealed nine genotypes, one of which is predominant and widespread and contains strains exhibiting high virulence in mice.

Mycobacterium tuberculosis	we report a new M. tuberculosis extracellular factor, bifunctional enzyme Rv0888, with both nuclease and sphingomyelinase activities. Rv0888 sphingomyelinase activity can induce NETs' formation in vitro and in the lung of the mice and enhance the colonization ability of Mycobacterium smegmatis in the lungs of mice.
Avian Influenza	H7N9 and H7N2 Viruses Bearing Genes from Duck Influenza Viruses Replicate Efficiently and Are Lethal in Ducks
Rabies virus (RABV)	we identified a novel receptor of RABV, which RABV uses to infect neurons. We found that metabotropic glutamate receptor subtype 2 (mGluR2), a member of the G protein-coupled receptor family that is abundant in the central nervous system, directly interacts with RABV glycoprotein to mediate virus entry
Japanese encephalitis virus(JEV)	We confirmed that Japanese encephalitis virus (JEV) Signal peptidase complex subunit 1（SPCS1） participates in the posttranslational protein processing and viral assembly stages of the JEV life cycle but not in the cell entry, genome RNA replication, or translation stages. Furthermore, we found that SPCS1 interacts with two independent transmembrane domains of the flavi□virus NS2B protein.
Brucellosis	A novel small regulatory RNA, Bmsr1 (Brucella melitensis M28 small RNA 1), was identified in a virulent Brucella melitensis M28 strain based on bioinformatic analysis, reverse transcription PCR (RT-PCR), and Northern blot. The Bmsr1 expression level was highly induced after infection of macrophage cells RAW264.7 at 48 h, suggesting a role for Bmsr1 during in vitro infection. Indeed, bmsr1 deletion mutant of M28 attenuated its intracellular survival in RAW264.7 at 24 h and 48 h post-infection. In a mouse model of chronic infection, bmsr1 deletion strain displayed decreased colonization in the spleen while Bmsr1-overexpressed strain showed higher colonization levels than wild type pathogen.
Diagnosis, biotechnology and laboratory	
Title of activity	**Scope**
Avian Influenza□H7□	We have developed a rapid diagnostic kit specific for the H7 subtype that is accessible, easy to use. Although the detection limit of this H7 kit is one-tenth lower than that of a commercially available rapid influenza A and B diagnostic kit of similar design, except for the specificity of the monoclonal antibodies used, this kit is highly specific, detecting only H7-subtype influenza viruses, including the recent highly pathogenic H7N9 viruses from humans, and does not show any non-specific reactions with other HA subtypes.This H7 kit will be of value for the early detection of H7N9-infected patients.
Vaccines	
Title of activity	**Scope**

Avian Influenza	To monitor virus evolution and vac□cine efficacy, we collected 53,884 poultry samples across China from February 2017 to January 2018. We isolated 252 H7N9 low pathogenic viruses, 69 H7N9 highly pathogenic viruses, and one H7N2 highly pathogenic virus, of which two low pathogenic and 14 highly pathogenic strains were collected after vaccine introduction. Genetic analysis of highly path□ogenic strains revealed nine genotypes, one of which is predominant and widespread and contains strains exhibiting high virulence in mice.
Avian Influenza□H7N9□	In September 2017, an H5/H7 bivalent inactivated vaccine for chickens was introduced, and the H7N9 virus isolation rate in poultry dropped by 93.3% after vaccination. More importantly, only three H7N9 human cases were reported between October 1, 2017 and September 30, 2018, indicating that vaccination of poultry successfully eliminated human infection with H7N9 virus.
Avian Influenza□H7N9□	We evaluated the protective efficacy of a cold-adapted, live attenuated H7N9 vaccine (H7N9/AAca) against two heterologous H7N9 highly pathogenic viruses in mice and guinea pigs. Our results showed that one dose of the H7N9/AAca vaccine prevented disease and death in mice challenged with two different H7N9 highly pathogenic viruses, but did not prevent replication of the challenge viruses; after two doses of H7N9/AAca, the mice were completely protected from challenge with A/chicken/Hunan/S1220/2017(H7N9) virus, and very low viral titers were detected in mice challenged with H7N9 virus CK/SD008-PB2/627 K.
Goatpox virus (GTPV)	We found that the 135 protein of GTPV plays an important role in inhibition of innate immunity and apoptosis in host cells. Use of the 135 gene as the insertion site to generate a vectored vaccine resulted in stron□ger adaptive immune responses than those obtained using the tk locus as the inser□tion site.

ToR : To propose or develop methods and procedures that facilitate harmonisation of international standards and guidelines applicable to the designated specialty

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the surveillance and control of animal diseases, food safety or animal welfare

Proposal title	Scope/Content	Applicable area

Diagnostic Standard	Diagnostic techniques for equine influza was developed and expended in China.	☒Surveillance and control of animal diseases ☐Food safety ☐Animal welfare
Diagnostic Standard	Animal influenza detection-Protocal of duplex realtime RT-PCR for influenza virus subtypes H7 and N9 was de	☒Surveillance and control of animal diseases ☐Food safety ☐Animal welfare
Vaccine	Reassortant Avian Influenza Virus H5/H9/H7 Subtype Vaccine	☒Surveillance and control of animal diseases ☐Food safety ☐Animal welfare
Vaccine	Recombinant NDV vector vaccine (H5)	☒Surveillance and control of animal diseases ☐Food safety ☐Animal welfare
Diagnostic reagens	A total of 76,220 ml Avian influenza antigens□H5, H7, H9□were produced and appled to control the diseases.	☒Surveillance and control of animal diseases ☐Food safety ☐Animal welfare
Diagnostic reagents	A total of 250 samples/kits against avian influenza (universal, H5,H7,H5+H7, H9) were produced and applyed to control the diseases.	☒Surveillance and control of animal diseases ☐Food safety ☐Animal welfare

ToR: To establish and maintain a network with other OIE Collaborating Centres designated for the same specialty, and should the need arise, with Collaborating Centres in other disciplines

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

3. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres (CC), Reference Laboratories (RL), or organisations designated for the same specialty, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
OIE Collaborating Centre for Zoonoses in Europe	Friedrich-Loeffler-Institut, Gemamy	☐Africa ☐Americas ☐Asia and Pacific ☒Europe ☐Middle East	Group of High-To a Containment Lab Directors □GOHLD□ Annual Meeting

Surveillance and Control of animal protozoan Diseases	Japan	☐Africa ☐Americas ☒Asia and Pacific ☐Europe ☐Middle East	acedemic exchange of protozoan diseases

4. Did your Collaborating Centre maintain a network with other OIE Collaborating Centres, Reference laboratories, or organisations in other disciplines, to coordinate scientific and technical studies?

Yes

Name of OIE CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
the OIE cc- of Biotechnology-based Diagnosis of Infectious Diseases in Veterinary Medicine National Veterinary Institute, Sweden	Sweden	☐Africa ☐Americas ☐Asia and Pacific ☒Europe ☐Middle East	To have cooperation on the research of swine fever

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

5. Did your Collaborating Centre place expert consultants at the disposal of the OIE?

Yes

Name of expert	Kind of consultancy	Subject
Dr Hualan Chen	Conselor	To update the Teresrial Manual
Dr Zhe Hu	Conselor	To update the Teresrial Manual in China
Dr Honglin Jia	Conselor	To update the Teresrial Manual in China
Dr Xiaojun Wang	Conselor	To contruct a biosafety laboratory in Kazakhstan
Dr Wei Guo	Conselor	To contruct a biosafety laboratory in Kazakhstan
Dr Jianzhong Shi	Conselor	To attend the Two OIE Laboratory Twinning Projects between Japan and Mongolia, namely, the National Institute of Animal Health (NIAH) of Japan (on FMD),

ToR: To provide, within the designated specialty, scientific and technical training to personnel from OIE Member Countries

6. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by the OIE, to personnel from OIE Member Countries?

Yes
a) Technical visits: 22
b) Seminars: 3
c) Hands-on training courses: 8
d) Internships (>1 month): 4

Type of technical training provided (a, b, c or d)	Content	Country of origin of the expert(s) provided with training	No. participants from the corresponding country
c	Training of development of vaccine and diagnositic and laboratory technique aganist animal infectious diseases	Pakistan	4
c	Training of experimental operation in high level biosafety laboratory	Kazakhstan	4
d	Training of development of vaccine and diagnositic and laboratory technique aganist animal infectious diseases	Pakistan	4
b	the Group of High Containment Laboratory Directors (GOHLD) Meeting	USA, Germany, UK, China	5
b	Symposium on Animal Infectious Diseases and Human Health	USA, France, Germany, UK,Singapore	15
b	Training Course fortechnology on the poultry diseases prevention and control	Indonesia, Nepal , Egypt, Ethiopia, et al	50

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

7. Did your Collaborating Centre organise or participate in the organisation of scientific meetings on behalf of the OIE?

Yes

National/International	Title of event	Co-organiser	Date (mm/yy)	Location	No. Participants
Inernational	To attend the meeting of the Biological Srandards Commision	OIE	02/09	France	1

Inernational	To attend the regional workshop for transboundary animal diseases(TADs) Control	OIE	08/21	Mongolia	1
International	Host the Group of High Containment Laboratory Directors (GOHLD) Meeting	OIE	09/06	China	13
International	Host Symposium on Animal Infectious Diseases and Human Health	OIE	08/08	China	200

ToR: To collect, process, analyse, publish and disseminate data and information relevant to the designated specialty

8. Publication and dissemination of any information within the remit of the mandate given by the OIE that may be useful to Member Countries of the OIE

a) Articles published in peer-reviewed journals: 23

1.Shi J, Deng G, Ma S, Zeng X, Yin X, Li M, Zhang B, Cui P, Chen Y, Yang H, Wan X, Liu L, Chen P, Jiang Y, Guan Y, Liu J, Gu W, Han S, Song Y, Liang L, Qu Z, Hou Y, Wang X, Bao H, Tian G, Li Y, Jiang L, Li C, Chen H. Rapid Evolution of H7N9 Highly Pathogenic Viruses that Emerged in China in 2017. Cell Host Microbe, 2018(4):558-568

2.Weiyu Luo, Jie Zhang, Libin Liang, Guangwen Wang, Qibing Li, Pengyang Zhu, Yuan Zhou, Junping Li, Yuhui Zhao, Nan Sun, Shanyu Huang, Chenchen Zhou, Yu Chang, Pengfei Cui, Pucheng Chen, Yongping Jiang, Guohua Deng, Zhigao Bu, Chengjun Li, Li Jiang, Hualan Chen. Phospholipid scramblase 1 interacts with influenza A virus NP, impairing its nuclear import and thereby suppressing virus replication. PLOS Pathogens, 2018(1):e1006851

3.Guangwen Wang, Jie Zhang, Fandi Kong, Qibing Li, Jinliang Wang, Shujie Ma, Yuhui Zhao, Libin Liang, Junping Li, Nan Sun, Lizheng Guan, Yuan Zhou, Chenchen Zhou, Shanyu Huang, Zhigao Bu, Li Jiang, Hualan Chen, Chengjun Li. Generation and application of replication-competent Venus-expressing H5N1, H7N9, and H9N2 influenza A viruses. Science Bulletin, 2018(63):176-186

4.Xianying Zeng, Guobin Tian, Jianzhong Shi, Guohua Deng, Chengjun Li, Hualan Chen. Vaccination of poultry successfully eliminated human infection with H7N9 virus in China. SCIENCE CHINA Life Sciences, 2018:1674-7305

5.Chunyang Gu, Xianying Zeng, Yangming Song, Yanbing Li, Liling Liu, Yoshihiro Kawaoka, Dongming Zhao, Hualan Chen. Glycosylation and an amino acid insertion in the head of hemagglutinin independently affect the antigenic properties of H5N1 avian influenza viruses. SCIENCE CHINA Life Sciences, 2018:1674-7305

6.Huanliang Yang, Yihong Xiao, Fei Meng, Fachao Sun, Meng Chen, Zilong Chengb, Yan Chen, Sidang Liu, Hualan Chen, Huanliang Yang, Yihong Xiao, Fei Meng, Fachao Sun, Meng Chen, Zilong Cheng, Yan Chen, Sidang Liu, Hualan Chen. Emergence of H3N8 equine influenza virus in donkeys in China in 2017. Veterinary Microbiology, 2018(214):1-6

7.Wenyu Yang, Xin Yin, Lizheng Guan, Mei Li, Shujie Ma, Jianzhong Shi, Guohua Deng, Yasuo Suzuki andHualan Chen. A live attenuated vaccine prevents replication and transmission of H7N9 highly pathogenic influenza viruses in mammals. Emerging Microbes & Infections, 2018(7):10.1038/s41426-018-0154-6

8.Enguang Rong, Xiaoxue Wang, Hualan Chen, Chenghuai Yang, Jiaxiang Hu, Wenjie Liu, Zeng Wang, Xiaoyun Chen, Haixue Zheng, Juan Pu, Honglei Sun, Jacqueline Smith, David W, Burt, Jinhua Liu, Ning Li and Yinhua Huang. Molecular Mechanisms for the adaptive switching Between the Oas/rnase l and Oasl/rig-i Pathways in Birds and Mammals. Frontiers in Immunology, 2018(9):10.3389/fmicb.2018.01346

9.Kiyoko Iwatsuki-Horimoto, Jianzhong Shi, Xiurong Wang, Yuko Sakai-Tagawa, Mutsumi Ito, Kazushi Murakami, Tiago J da Silva Lopes, Kazunari Nakaishi, Seiya Yamayoshi, Satoshi Watabe, Hualan Chen and Yoshihiro Kawaoka. Development of an Influenza Rapid Diagnostic Kit Specific for the H7 subtype. Frontiers in Microbiology, 2018(9):10.3389/fmicb.2018.01346

10.Ye Ge, Qiucheng Yao, Hongliang Chai, Yuping Hua, Guohua Deng, Hualan Chen. A 627K variant in the PB2 protein of H9 subtype influenza virus in wild birds. Influenza Other Respi Viruses, 2018(12):728-741

11.Xiaole Cui, Yanhong Ji, Zhengxiang Wang, Yingying Du, Haoran Guo, Liang Wang, Hualan Chen, Qiyun Zhu. A 113-amino-acid truncation at the NS1 C-terminus is a determinant for viral replication of H5N6 avian influenza

virus in vitro and in vivo. Veterinary Microbiology, 2018(225):6-16
12.Xuyong Li, Baotao Liu, Shujie Ma, Pengfei Cui, Wenqiang Liu, Yubao Li, Jing Guo, Hualan Chen. High frequency of reassortment after co-infection of chickens with the H4N6 and H9N2 influenza A viruses and the biological characteristics of the reassortants. Veterinary Microbiology, 2018(222):11-17
13.Junyong Wang, Yan Zeng, Shuai Xu, Jiayun Yang, Wanbing Wang, Bo Zhong, Jinying Ge, Lei Yin, Zhigao Bu, Hong-Bing Shu, Hualan Chen, Cao-Qi Lei, Qiyun Zhua. A Naturally Occurring Deletion in the Effector Domain of H5N1 Swine Influenza Virus Nonstructural Protein 1 Regulates Viral Fitness and Host Innate Immunity. Journal of Virology, 2018(92):doi: 10.1128/JVI.00149-18
14.Guanghui Dang, Yingying Cui, Lei Wang, Tiantian Li, Ziyin Cui, Ningning Song, Liping Chen, Hai Pang and Siguo Liu. extracellular sphingomyelinase rv0888 of Mycobacterium tuberculosis contributes to Pathological lung injury of Mycobacterium smegmatis in Mice via inducing Formation of neutrophil extracellular Trap. Frontiers in Immunology, 2018(9):677
15.Xin Hua, Qin Yang, Wanjiang Zhang, Zhimin Dong, Shenye Yu, Stefan Schwarz and Siguo Liu. Antibacterial Activity and Mechanism of Action of Aspidinol Against Multi-Drug-Resistant Methicillin-Resistant Staphylococcus aureus. Frontiers in pharmacology, 2018(9):doi:10.3389/fphar.2018.00619
16.Xiumei Wang, Yao Zhu, Xin Hua, Fuguang Chen, Changzhen Wang, Yanhe Zhang, Siguo Liu and Wanjiang Zhang. F14:A-:B- and IncX4 Inc groupcfr-positive plasmids circulating in Escherichia coli of animal origin in Northeast China. Veterinary Microbiology, 2018(217):53-57
17.Zhe Li, Hongxiu Liu, Huafang Li, Guanghui Dang, Ziyin Cui, Ningning Song, Quankai Wang, Siguo Liu, Liping Chen. PE17 protein from Mycobacterium tuberculosis enhances Mycobacterium smegmatis survival in macrophages and pathogenicity in mice. Microbial Pathogenesis, 2019(126):63-73
18.Jinliang Wang, Zilong Wang, Renqiang Liu, Lei Shuai, Xinxin Wang, Jie Luo, Chong Wang, Weiye Chen, Xijun Wang, Jinying Ge, Xijun He, Zhiyuan Wen, Zhigao Bu. Metabotropic glutamate receptor subtype 2 is a cellular receptor for rabies virus. PLoS pathogens, 2018(7):e1007189
19.Ma L, Li F, Zhang J-W, Li W, Zhao D-M, Wang H, Hua R-H, Bu Z-G. Host factor SPCS1 regulates the replication of Japanese encephalitis virus through interactions with transmembrane domains of NS2B. Journal of Virology, 2018, 92(12):e00197-18
20.Minmin Zhang, Yirui Sun, Weiye Chen, Zhigao Bu. The 135 Gene of Goatpox Virus Encodes an Inhibitor of NF-kB and Apoptosis and May Serve as an Improved Insertion Site To Generate Vectored Live Vaccine. Journal of Viology, 2018(92):e00190-18
21.Da Xu, Jiabao Song, Ganwu Li, Wentong Cai, Shucheng Zong, Zhaoli Lia, Wenxing Liua, Sen Hu, Zhigao Bu. A novel small RNA Bmsr1 enhances virulence in Brucella melitensis M28. Veterinary Microbiology, 2018(223):1-8
22.Jiale Ma, Chunxia An, Fengwei Jiang, Huochun Yao, Catherine Logue, Lisa K. Nolan and Ganwu Li. Extraintestinal pathogenic Escherichia coliincrease extracytoplasmic polysaccharide biosynthesis for serum resistance in response to bloodstream signals. MOLECULAR MICROBIOLOGY, 2018(110):689-706
23.Yinli Bao, Haobo Zhang, Xinxin Huang, Jiale Ma, Catherine M. Logue, Lisa K. Nolan & Ganwu Li. O-specific polysaccharide confers lysozyme resistance to extraintestinal pathogenic Escherichia coli. Virulence, 2018(9):666-680

b) International conferences: 9
1.Egyptian Society of Virology 7th International Conference Egypt, 11/27
2.The Joint Congress of the 7th Meeting of Asian Organization of Mycoplasmology (7th AOM) Japan 05/18
3.2018 Symposium on Prevention and Control of Food and Mouth Diseases and Highly pathogenic Avian Influenza, Korea, 06/21
4.The 10th International Symposium on Avian Influenza, UK, 04/15
5.The 3rd International Conference on One Medicine One Science, USA, 04/30
6.37th Annual Meeting of the American Society for Virology (ASV), USA 07/14
7.Seminar on Poultry Disease Diagnosis and Prevention,Pakistan, 10/01
8.Global Alliance for Research on Avian Diseases, Vietnam, 01/17
9.Poultry Science Conference in Pakistan, Pakistan, 09/27

c) National conferences: 1
1.25th international pig veterinary society congress 06/11

d) Other
(Provide website address or link to appropriate information): 1
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