WOAH Collaborative Centre Reports Activities 2023

Activities in 2023

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Centre Information

Title of WOAH Collaborating Centre	Food-Borne Parasites from the Asia-Pacific Region
Address of WOAH Collaborating Centre	Ministry of Education Institute of Zoonosis Jilin University 5333 Xian Road 130062 Changchun CHINA (PEOPLES REP. OF China)
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Name Director of Institute (Responsible Official):	Liu Mingyuan,Ministry of Education Institute of Zoonosis Jilin University 5333 Xian Road 130062 Changchun China
Name (including Title and Position) of Head of the Collaborating Centre (WOAH Contact Point):	Liu Mingyuan,Ph.D Director of Institute of Zoonosis Jilin University
Name of the writer:	Xuelin Wang and Yang Wang

TOR1 AND 2: SERVICES PROVIDED

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

Category	Title of activity	Scope
Disease control (true)	Immunological and serological diagnosis for Trichinella spiralis, Clonorchis sinensis, Toxoplasma and Cryptopsoridium	Farm pigs,dogs,mice, pet cats in China. Fish and Caracals in Southeast Asia
Epidemiology, surveillance, risk assessment, (true)	Prevalence of meat-transmitted Taenia and Trichinella parasites in the Far East countries ,Analysis of Codon Usage Patterns in Giardia duodenalis Based on Transcriptome Data from GiardiaDB	meat-transmitted Taenia and Trichinella parasites,Giardia duodenalis
Training, capacity building (true)	Training staff of Parasitic Diseases	Work in Institute of Parasitic Diseases of Asia-Pacific Region.
	rypanosoma evansi evades host innate immunity by releasing extracellular vesicles to activate TLR2-AKT signaling pathway,Effects of Trichinella spiralis and its excretory/secretory products on autophagy of host muscle cells in vivo and in vitro,The	

Zoonoses (true)	dynamics of select cellular responses and cytokine expression profiles in mice infected with juvenile Clonorchis sinensis,MicroRNA profiling of Neospora caninum tachyzoites (NC-1) using a high-throughput approach and Protective Immunity Against Neospora caninum Infection Induced by 14-3-3 Protein in Mice	Trypanosoma evansi,Trichinella spiralis,Clonorchis sinensis and Neospora caninum
Aquatic animal diseases (true)	Neospora caninum and Unique Tubulin-Based Structures in the Zoonotic Apicomplexan Parasite Cryptosporidium parvum	Cryptosporidium parvum
Animal welfare (true)	Animal health product consulation	Prof Liu Mingyuan, Wang Xuelin and Liu Zengshan worked in OIE Collaborating Center for Food-borne Parasites from Asian-Pacific Region serve for farm animal and pets
Diagnosis, biotechnology and laboratory (true)	Food-Borne Parasites from the Asia-Pacific Region - Key Laboratory for Zoonoses OIE Collaborating Centres Reports Activities, 2021 3 Zoonoses Title of activity Scope Trypanosoma evansi evades host innate immunity by releasing extracellular vesicles to activate TLR2-AKT signaling pathway Trypanosoma evansi Effects of Trichinella spiralis and its excretory/secretory products on autophagy of host muscle cells in vivo and in vitro Trichinella spiralis The dynamics of select cellular responses and cytokine expression profiles in mice infected with juvenile Clonorchis sinensis Clonorchis sinensis MicroRNA profiling of Neospora caninum tachyzoites (NC-1) using a high-throughput approach Neospora caninum Protective Immunity Against Neospora caninum Infection Induced by 14-3-3 Protein in Mice Neospora caninum Aquatic animal diseases Title of activity Scope A Single-Pass Type I Membrane Protein from the Apicomplexan Parasite Cryptosporidium parvum with Nanomolar Binding Affinity to Host Cell Surface Cryptosporidium parvum Unique Tubulin-Based Structures in the Zoonotic Apicomplexan Parasite Cryptosporidium parvum Cryptosporidium parvum Animal welfare Title of activity Scope Animal health product consulation Prof Liu Mingyuan,Wang Xuelin and Liu Zengshan worked in OIE Collaborating Center for Food-borne Parasites from Asian-Pacific Region serve for farm animal and pets Diagnosis, biotechnology and laboratory Title of activity Scope Host defense against Neospora caninum infection via IL-12p40 production through TLR2/TLR3-AKT-ERK signaling pathway in C57BL/6 mice, Comparative analysis of excretory-secretory products of muscle larvae of three isolates of Trichinella pseudospiralis by the iTRAQ method, Development of a rapid and sensitive immunochromatographic strip based on EuNPs-ES fluorescent probe for the detection of early Trichinella spiralis-specific IgG antibody in pigs, Development of a rapid and sensitive immunochromatographic strip based on EuNPs-ES fluorescent probe for the detection of early Trichinella spiralis-specific IgG antibody in pigs and Recombinant cystatin-like protein-based competition ELISA for Trichinella spiralis antibody test in multihost sera	Trichinella spiralis

Vaccines (true)	Food-Borne Parasites from the Asia-Pacific Region - Key Laboratory for Zoonoses 4 OIE Collaborating Centres Reports Activities, 2021 Recombinant cystatin-like protein-based competition ELISA for Trichinella spiralis antibody test in multihost sera Trichinella spiralis Vaccines Title of activity Scope Adjuvanticity of beta -Glucan for Vaccine Against Trichinella spiralis, The immune protection induced by a serine protease from the Trichinella spiralis adult against Trichinella spiralis infection in pigs and The immune protection induced by a serine protease from the Trichinella spiralis adult against Trichinella spiralis infection in pigs	Trichinella spiralis
Feed safety (true)	Molecular characterization of Cryptosporidium spp. and Giardia duodenalis in dairy cattle and Primary characterization of the immune response in pigs infected with Trichinella spiralis	In China

TOR3: HARMONISATION OF STANDARDS

2. Proposal or development of any procedure that will facilitate harmonisation of international regulations applicable to the main fucus area for which you were designated

Proposal title	Scope/Content	Applicable area
Collaboration with WOAH Reference Laboratories	Members of WOAH	Laboratory expertise Training and education health management Animal production Veterinary products
Coordinate scientific and technical studies in collaboration with other centres, laboratories or organisations	Members of WOAH	Laboratory expertise Training and education health management Animal production Veterinary products Wildlife health and biodiversity

3. In exercising your activities, have you identified any regulatory research needs* relevant for WOAH?

No

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

Yes

Name of WOAH CC/RL/other organisation(s)	Location	Region of networking Centre	Purpose
WOAH CC for Food-borne Parasites in European and North America	France and Canada	Americas Asia and Pasific Europe	Cooperation in controlling and epidemiology food borne zoonotic parasite

TOR4 AND 5: NETWORKING AND COLLABORATION

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

No

TOR6: EXPERT CONSULTANTS

6. Did your Collaborating Centre place expert consultants at the disposal of WOAH?

Yes

NAME OF EXPERT	KIND OF CONSULTANCY	SUBJECT
Liu Mingyuan	Parasitosis morphology diagnosis,serology diagnosis, molecular typing diagnosis and Surveillance of epidemiology.	Nematodes, trematodes, cestodes and protozoan
Wang Xuelin	Parasitosis morphology diagnosis,serology diagnosis and molecular typing diagnosis.	Trichinella sp, Anisakidae, Clonorchis,Cysticercus ,Toxoplasma, Cryptosporidium and Giardia
Zhu Guan	Parasitosis morphology diagnosis,serology diagnosis and molecular typing diagnosis.	Parasitosis morphology diagnosis,serology diagnosis and molecular typing diagnosis.
Pascal Boireau	Parasitosis morphology diagnosis,serology diagnosis and molecular typing diagnosis.	Nematodes, trematodes, cestodes and protozoan
Xiao lei Liu	Parasitosis morphology diagnosis,serology diagnosis and molecular typing diagnosis.	Nematodes
Yang Wang	Epidemiology	Nematodes
Jing Ding	Parasitosis morphology diagnosis,serology diagnosis.	Trematodes, cestodes and protozoan

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

7. Did your Collaborating Centre provide advice/services to requests from Members in your main focus area?

Yes

Liu Mingyuan,Parasitosis morphology diagnosis,serology diagnosis,molecular typing diagnosis.Surveillance of epidemiology.

8. Did your Collaborating Centre provide scientific and technical training, within the remit of the mandate given by WOAH, to personnel from WOAH Members?

No

TOR8: SCIENTIFIC MEETINGS

9. Did your Collaborating Centre organise or participate in the organisation of scientific meetings related to your main focus area on behalf of WOAH?

No

TOR9: DATA AND INFORMATION DISSEMINATION

10. Publication and dissemination of any information within the remit of the mandate given by WOAH that may be useful to Members of WOAH

a) Articles published in peer-reviewed journals:

28

1: Feng X, Liu Y, Zhao Y, Sun Z, Xu N, Zhao C, Xia W. Recombinase PolymeraseAmplification-Based Biosensors for Rapid Zoonoses Screening. Int J Nanomedicine.2023 Nov 6;18:6311-6331. doi: 10.2147/IJN.S434197. PMID: 37954459; PMCID:PMC10637217.

2: Li C, Li C, Xu F, Wang H, Jin X, Zhang Y, Liu X, Wang R, You X, Liu M, Bai X, Yang Y. Identification of antigens in the Trichinella spiralis extracellular vesicles for serological detection of early stage infection in swine. Parasit Vectors. 2023 Oct 26;16(1):387. doi: 10.1186/s13071-023-06013-7. PMID: 37884927; PMCID: PMC10604534.
3: Qiao W, Zhang P, Jiang N, Zhang S, Bai H, Xie L, Sun L, Wang X. Albumin nanostructure assisted ABZ anti-parasite immune therapy for T. spiralis muscle infection. Biomater Adv. 2023 Jul;150:213434. doi: 10.1016/j.bioadv.2023.213434. Epub 2023 Apr 18. PMID: 37087912.
4: Shi W, Xu Q, Liu Y, Hao Z, Liang Y, Vallée I, You X, Liu M, Liu X, Xu N. Immunosuppressive ability of Trichinella spiralis adults can ameliorate type 2 inflammation in a murine allergy model. J Infect Dis. 2023 Nov 28;jiad518. doi: 10.1093/infdis/jiad518. Epub ahead of print. PMID: 38016013.
5: Wang J, Tang B, You X, Cai X, Jia W, Liu X, Liu M, Jin X, Ding J. Trichinella spiralis excretory/secretory products from adult worms inhibit NETosis and regulate the production of cytokines from neutrophils. Parasit Vectors. 2023 Oct 20;16(1):374. doi: 10.1186/s13071-023-05979-8. PMID: 37864246; PMCID: PMC10588246.
6: Ma X, Bai X, Li H, Ding J, Zhang H, Qiu Y, Wang J, Liu X, Liu M, Tang B, Xu N. A rapid and visual detection assay for Clonorchis sinensis based on recombinase polymerase amplification and lateral flow dipstick. Parasit Vectors. 2023 May 19;16(1):165. doi: 10.1186/s13071-023-05774-5. PMID: 37208693; PMCID:PMC10197247.
7. Xiuqin Chen, Xiaolei Liu, Yao Yu, Haolu Wang, Chengyao Li, Isabelle Vallée, Mingyuan Liu, Lianjing Zhao*, Xue Bai*, FRET with MoS2 nanosheets integrated CRISPR/Cas12a sensors for robust and visual food-borne parasites detection, Sensors and Actuators B: Chemical, 2023 Aug 2;8:1472.*
8: Wang J, Liu X, Sun R, Mao H, Liu M, Jin X. Akkermansia muciniphila participates in the host protection against helminth-induced cardiac fibrosis via TLR2. PLoS Pathog. 2023 Oct 3;19(10):e1011683. doi: 10.1371/journal.ppat.1011683. PMID: 37788279; PMCID: PMC10547169.
9: Li C, Liu Y, Liu X, Bai X, Jin X, Xu F, Chen H, Zhang Y, Vallee I, Liu M, Yang Y. The gut microbiota contributes to changes in the host immune response induced by Trichinella spiralis. PLoS Negl Trop Dis. 2023 Aug 16;17(8):e0011479. doi: 10.1371/journal.pntd.0011479. PMID: 37585413; PMCID: PMC10431649.
10: Wang J, Jin X, Li C, Chen X, Li Y, Liu M, Liu X, Ding J. In vitro knockdown of TsDNase II-7 suppresses Trichinella spiralis invasion into the host's intestinal epithelial cells. PLoS Negl Trop Dis. 2023 Jun 8;17(6):e0011323. doi: 10.1371/journal.pntd.0011323. PMID: 37289740; PMCID: PMC10249883.
11: Chen H, Cao Z, Liu M, Diamond MS, Jin X. The impact of helminth-induced immunity on infection with bacteria or viruses. Vet Res. 2023 Oct 3;54(1):87. doi: 10.1186/s13567-023-01216-3. PMID: 37789420; PMCID: PMC10548622.
12: Zhang H, Zhang N, Li J, Zhao P, Li X, Wang X, Zhang X, Yuan B, Gao F, Gong P, Zhang X. Development of Nested Polymerase Chain Reaction with Novel Specific Primers for Detection of Tritrichomonas muris Infection in Laboratory Mice. Animals (Basel). 2023 Oct 11;13(20):3177. doi: 10.3390/ani13203177. PMID: 37893900; PMCID: PMC10603715.
13: Huang T, Li L, Li J, Li X, Li S, Wang X, Zhang N, Yu Y, Zhang X, Zhao Z, Guo Y, Cao L, Gong P. Rapid, sensitive, and visual detection of Clonorchis sinensis with an RPA-CRISPR/Cas12a-based dual readout portable platform. Int J Biol Macromol. 2023 Sep 30;249:125967. doi: 10.1016/j.ijbiomac.2023.125967. Epub 2023 Jul 24. PMID: 3749499
14: Wang L, Cao S, Li L, Cao L, Zhao Z, Huang T, Li J, Zhang X, Li X, Zhang N, Wang X, Gong P. Establishment of an ultrasensitive and visual detection platform for Neospora caninum based-on the RPA-CRISPR/Cas12a system. Talanta. 2023 Nov 20;269:125413. doi: 10.1016/j.talanta.2023.125413. Epub ahead of print. PMID:38042139.
15: Zhao Z, Li X, Zhang N, Li J, Zhao N, Gao M, Zhang X, Wang X, Zhao P, Li L, Sun M, Cao L, Gong P. Multiple Regulations of Parasitic Protozoan Viruses: A Double-Edged Sword for Protozoa. mBio. 2023 Feb 28;14(1):e0264222. doi:10.1128/mbio.02642-22. Epub 2023 Jan 12. PMID: 36633419; PMCID: PMC9973342.
16: Sun M, Zhao Z, Li Y, Cao L, Li J, Zhang X, Li X, Zhang N, Cheng S, Wang X, Gong P. Giardia VSPAS7 protein attenuates Giardia intestinalis-induced host macrophage pyroptosis. Parasit Vectors. 2023 Oct 11;16(1):359. doi: 10.1186/s13071-023-05949-0. PMID: 37821972; PMCID: PMC10566177.
17: Zhao P, Li J, Li X, Dong J, Wang X, Zhang N, Li S, Sun M, Zhang X, Wang Z, Liang M, Li Y, Cao L, Gong P. The NLRP3 inflammasome recognizes alpha-2 and alpha-7.3 giardins and decreases the pathogenicity of Giardia duodenalis in mice. Parasit Vectors. 2023 Mar 3;16(1):85. doi: 10.1186/s13071-023-05688-2. PMID: 36869360; PMCID: PMC9983531.
18: Cao L, Liu J, Cao S, Zhao P, Sun X, Dong H, Bello BK, Guo Y, Wang N, Zhang N, Li Y, Li X, Gong P. Protective efficacy of Toxoplasma gondii bivalent MAG1 and SAG1 DNA vaccine against acute toxoplasmosis in BALB/c mice. Parasitol Res. 2023 Mar;122(3):739-747. doi: 10.1007/s00436-022-07745-8. Epub 2023 Jan 5. PMID: 36600165.
19: Rong Y, Zhang X, Chen X, Li J, Gong P, Wang X, Li X, Zhang X, Yue T, Zhang H, Zhou X, Zhang N. Development of an LFD-RPA Assay for Rapid Detection of Pentatrichomonas hominis Infection in Dogs. Curr Issues Mol Biol. 2023 Nov 17;45(11):9252-9261. doi: 10.3390/cimb45110579. PMID: 37998756; PMCID: PMC10670101.
20: Yue T, Zhang X, Gong P, Li J, Wang X, Li X, Ma Y, Chen X, Zhang X, Cheng S, Zhang H, Zhang N. Antitumor effect of invasive Lactobacillus plantarum delivering associated antigen gene sHSP between Trichinella spiralis and Lewis lung cancer cells. Int Immunopharmacol. 2023 Feb;115:109708. doi: 10.1016/j.intimp.2023.109708. Epub 2023 Jan 11. PMID: 36638662.
21: Zhang H, Zhao C, Zhang X, Li J, Gong P, Wang X, Li X, Wang X, Zhang X, Cheng S, Yue T, Zhang N. A potential role for Giardia chaperone protein GdDnaJ in regulating Giardia proliferation and Giardiavirus replication. Parasit Vectors. 2023 May 25;16(1):168. doi: 10.1186/s13071-023-05787-0. PMID: 37226181; PMCID: PMC10210397.
22: Liu S, Zhang N, Yu Q, Li J, Wang X, Li X, Zhang X, Cheng S, Yue T, Zhang H, Gong P, Zhang X. Immunol detection of cathepsin L from Fasciola hepatica infection in sheep by monoclonal antibody-based colloidal gold test strip assay. Acta Biochim Biophys Sin (Shanghai). 2023 Aug 28;55(10):1668-1671. doi: 10.3724/abbs.2023128. PMID: 37635410; PMCID: PMC10579808.
23: Zhang N, Zhang H, Khan LA, Jafari G, Eun Y, Membreno E, Gobel V. The biosynthetic-secretory pathway, supplemented by recycling routes, determines epithelial membrane polarity. Sci Adv. 2023 Jun 28;9(26):eade4620. doi:10.1126/sciadv.ade4620. Epub 2023 Jun 28. PMID: 37379377; PMCID: PMC10306302.
24: Wang Y, Gong P, Zhang X, Wang X, Zhang X, Zhang N, Yu Y, Ma Y, Zhang H, Zhang X, Li X, Li J. TLR3 activation by Clonorchis sinensis infection alleviates the fluke-induced liver fibrosis. PLoS Negl Trop Dis. 2023 May 11;17(5):e0011325. doi: 10.1371/journal.pntd.0011325. PMID: 37167198; PMCID: PMC10174496.
25: Wang Y, Zhang X, Wang X, Zhang N, Yu Y, Gong P, Zhang X, Ma Y, Li X, Li J. Clonorchis sinensis aggravates biliary fibrosis through promoting IL-6 production via toll-like receptor 2-mediated AKT and p38 signal pathways. PloS Negl Trop Dis. 2023 Jan 24;17(1):e0011062. doi: 10.1371/journal.pntd.0011062. PMID: 36693049; PMCID: PMC9873171.
26: Wang Y, Wang X, Zhang N, Yu Y, Bao P, Ma Y, Zhang H, Zhang X, Zhang X, Gong P, Li X, Li J. Extracellular vesicles of Clonorchis sinensis promote IL-6 and TNF-α secretion via the Toll-like receptor 9-mediated ERK pathway in biliary epithelial cells. Dev Comp Immunol. 2023 Feb;139:104555. doi: 10.1016/j.dci.2022.104555. Epub 2022 Sep 29. PMID: 36183840.
27: Liu M, Zhang D, Wang D, Wu X, Zhang Y, Yin J, Zhu G. Cost-effective In Vivo and In Vitro Mouse Models for Evaluating Anticryptosporidial Drug Efficacy: Assessing Vorinostat, Docetaxel, and Baicalein. J Infect Dis. 2023 Nov 11;228(10):1430-1440. doi: 10.1093/infdis/jiad243. PMID: 37418629.
28: Yang B, Yan Y, Wang D, Zhang Y, Yin J, Zhu G. On-target inhibition of Cryptosporidium parvum by nitazoxanide (NTZ) and paclitaxel (PTX) validated using a novel MDR1-transgenic host cell model and algorithms to quantify the effect on the parasite target. PLoS Negl Trop Dis. 2023 Mar 27;17(3):e0011217. doi: 10.1371/journal.pntd.0011217. PMID: 36972284; PMCID: PMC10079235.

b) International conferences:

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1. 16th International Conference on Trichinellosis, August 30th-1st September,2023, SERBIA
Report: Role of intestinal flora in host immune response induced by Trichinella spiralis, The 18th National Conference and the 9th International Symposium on Parasitology

of the Chinese Zoological Parasitology Committee. April, 2023, Shenyang, CHINA.
2. 4th International Babesia Conference, April, 2023, Yale University, US.
Report: Investigation of equine piroplasms infection in some provinces of China.

c) National conferences:
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1. The 18th National Conference and the 9th International Symposium on Parasitology of the Chinese Zoological Parasitology Committee. April, 2023, Shenyang, CHINA.
Report: TLRs activation by Clonorchis sinensis excretory/secretory proteins and extracellular vesicles regulated the fluke-induced liver fibrosis.
2. National Zoonosis Conference, May, 2023, Qingdao, CHINA.
Report: To understand the mechanism of liver fibrosis induced by Clonorchis sinensis from the perspective of TLRs and probe into the adjuvant treatment strategy.
3. 18th National Academic Conference of Chinese Zoological Parasitology Committee, April, 2023, Shenyang, CHINA.
Report: Novel secretory proteins and cytoskeletal structures in the zoonotic parasite Cryptosporodium parvum: implication of their roles in the parasite invasion.
4. The 17th Academic Symposium of Veterinary Food Hygiene Branch of China Animal Science General Medical Association, November, 2023, Yangzhou, CHINA.
Report: Immunology detection without blind area of Trichinella trichinella in slaughtered pigs.

d) Other (Provide website address or link to appropriate information):
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PATENT AUTHORIZATION
1.Jihua Li, The invention of a chitosan/nanoparticle preparation method related to Eimeria tenella, July 2023, CHINA, CN113041344B
2. Mingyuan Liu, B-cell epitope polypeptide, hybridoma cell line, clonal antibody and application of serine protease inhibitor in muscle larva stage of Trichinella spiralis, September 2023, CHINA,
3. Xuelin Wang, DC vaccine induced by ES complex for prevention, treatment and diagnosis of trichinosis in pigs, April 2023, CHINA, CN110420322B
4. Xichen Zhang, Preparation method and application of yolk antibody against trichinella spiralis excreted/secreted antigen, November 2023, CHINA, CN114163525B
5. Mingyuan Liu, B-cell epitope polypeptide, hybridoma cell line, clonal antibody and application of serine protease inhibitor in muscle larva stage of trichinella spiralis,April 2023, US 11634481B2
6. Xiaolei Liu, a Kit, preparation method and application in animals trichinosis detection, December 2023, CHINA, ZL202210048741.1

11. What have you done in the past year to advance your area of focus, e.g. updated technology?
Molecular Typing Diagnosis
1.Study on Isolation, identification and molecular mechanism of the fast-initiating molecule of Trichinella type II immune response, Supported by Key Project of NSFC, Execution time: 2023-2027, 32230104.Mingyuan Liu
2.Development of a Tsp-UPT-LF-POCT test strip without blind area based on the phase specific novel diagnostic marker molecular of trichinella spiralis for the diagnosis of Porcine Trichinosis,Supported by rural office of Jilin Province science and technology department, Execution time: 2023-2025,20230202086NC. Xuelin Wang
3.Preparation of anticoccidia active substances from secondary metabolites of Nematophagous Fungi,Supported by rural office of Jilin Province science and technology department, Execution time: 2023-2025, 20230202084NC, Nan Zhang.
4.Establishment and application of CRISPR-Cas12a rapid detection system for experimental sheep parasitic disease, Supported by Supplies bureau of Jilin Province science and technology department, Execution time: 2024-2025,Pengtao Gong.gong。
New vaccine explore
1.Development of genetic engineering vaccine for prevention and control of food-borne major zoonotic trichinosis, Supported by the National Key Research and Development Program of China, Execution time: 2023-2026, 2023YFE0107300, Mingyuan Liu。
2.Preparation and protective effect evaluation of a attenuated Neospora strain, Supported by Key research & development project of Jilin Province Science and Technology development Plan, Execution time: 2024-2027, Xin Li.
3.Establishment and application of a C57BL/6 mouse model infected with Neospora in drug research, Supported by Supplies bureau of Jilin Province science and technology department, Execution time: 2023-2024, 20230505043ZP,Xiaocen Wang.
Mechanism explore
1.Study on mechanism of NLRP6 activation against Trichinella trichinella infection, Supported by Youth Fund of NSFC, Execution time: 2023-2025,Xuemin Jin.
2.Study on the molecular interaction mechanism of serine protease (TspE1) and serine protease inhibitor (Ts-serpin) of Trichinella spiralis mediated synergistic regulatory effect of antigen presenting cells,Supported by Youth Fund of NSFC, Execution time: 2023-2025, 32202835,Ning Xu.
3.Study on mechanism of immune escape of intestinal ILC2s ChAT-ACh pathway destructed by acetylcholinesterase of of Pseudophinella spiralis,Supported by Department of Education of Jilin Province,CHINA, Execution time: 2023-2024, JJKH20231200KJ,Jing Din.
4.The role of necrotic apoptosis and mechanism in Cryptosporidium parvum infection,Supported by General 。Program of NSFC, Execution time: 2024-2027, 32373034,Jianhua Li.
5.Role and molecular mechanism of Eimeria tenella virus in parasite disease ,Supported by General Program of NSFC, Execution time: 2024-2027, 32373033, Xichen Zhang.
6.Study on the mechanism of macrophage migration inhibition factor in the pathogenesis of Giardia, Supported by Youth Fund of NSFC, Execution time: 2023-2025, 32202834,Xin Li.
Parasitic disease prevention and control
1.Parasitic disease prevention and control post of national sheep wool industry technology system,Supported by National modern agricultural industrial technology system of "14th Five-Year" project, Execution time: 2023-2027,Pengtao Gong.
2.Exploring the bacterial-type lactate dehydrogenase (LDH) as a novel drug target in the zoonotic cryptosporidium parasite, Supported by Talent project of NSFC, Execution time: 2023-2024, 32250710141,Guan Zhu.

12. Additional comments regarding your report:
Our work schedule only include the field of our report. More work detail will be execute in next workschedule.