World Organisation for Animal Health

Han-Ching Wang - - CHINESE_TAIPEI

WOAH Reference Laboratory Reports Activities 2025

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LABORATORY INFORMATION

***Name of disease (or topic) for which you are a designated WOAH Reference Laboratory:**	White spot syndrome
***Address of laboratory:**	No.500, Sec. 3, Anming Rd., Annan Dist., Tainan City 709, Taiwan
***Tel:**	+886-6 384 24 48
***E-mail address:**	wanghc@mail.ncku.edu.tw
Website:	
***Name (including Title) of Head of Laboratory (Responsible Official):**	Dr. Han-Ching Wang
***Name (including Title and Position) of WOAH Reference Expert:**	Dr. Han-Ching Wang
***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 WOAH Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
IQ2000 (PCR)	Yes	79	5
Real-time PCR (IQreal+qPCR)	No	1512	0
Western Blots	No	2	0
Pockit Central	No	181	0
Direct diagnostic tests		Nationally	Internationally
non	No	0	0

TOR2: REFERENCE MATERIAL

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

No

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

No

4. Did your laboratory produce vaccines?

No

5. Did your laboratory supply vaccines to WOAH Members?

TOR3: NEW PROCEDURES

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

No

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

No

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

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

TOR4: DIAGNOSTIC TESTING FACILITIES

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

No

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

Yes

Name of the WOAH Member Country receiving a technical consultancy	Purpose	How the advice was provided
IRAN	Disease diagnosis for surveillance	Remote/In loco
SINGAPORE	Guidance for WOAH registration of WSD diagnostic kits	Remote/In loco
UNITED STATES OF AMERICA	Discussion on WSD vaccine development	In person
AUSTRALIA	Expert advice on WOAH aquatic animal diseases App for WSD	Remote/In loco

TOR5: COLLABORATIVE SCIENTIFIC AND TECHNICAL STUDIES

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

Yes

Title of the study	Duration	Purpose of the study	Partners (Institutions)	WOAH Member Countries involved other than your country
WSSV/shrimp interaction	9 years	WSSV/shrimp interaction Mechanisms of anti-viral protein interaction and signalling pathways	Chulalongkorn University, Thailand	THAILAND
WSSV/shrimp interaction	4 years	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Arizona University	UNITED STATES OF AMERICA
WSSV/shrimp interaction	4 years	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Tokyo University of Marine Science and Technology	JAPAN
WSSV/shrimp interaction	4 years	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Biotec, NSTDA	THAILAND
WSSV/shrimp interaction	4 years	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Chulalongkorn University.	THAILAND
WSSV/shrimp interaction	4 years	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Malaya University.	MALAYSIA
WSSV/shrimp interaction	4 years	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and	Santo Tomas University.	PHILIPPINES

		host responses		
Develop an antibody targeting WSSV VP28	3 years	Induce passive immunization in shrimp	Gyeongsang National University	KOREA (REP. OF)
Develop an antibody targeting WSSV VP28	3 years	Induce passive immunization in shrimp	The National Fisheries Research and Development Institute's (NFRDI)	PHILIPPINES

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

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 collected and analyzed WSSV-related samples

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

Yes

If the answer is yes, please provide details of the data collected:
We published our epidemiological findings for WSSV as scientific papers.

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:

3

1. Guo FJ, Huang KL, Chen CY, Cheng SW, Ng YS, Wang HC. (2025) WSSV-induced reversal of the malate-aspartate shuttle facilitates viral replication in shrimp hemocytes. Cell Communication and Signaling. 23:507*

2. Chen CY, Chen CL, Ng YS, Lee DY, Lin SS, Huang CK, Kuma R, Wang HC. (2025) Glucose- and glutamine-driven de novo nucleotide synthesis facilitates WSSV replication in shrimp. Cell Communication and Signaling 23:191.*

3. Wang HC, Somboonwiwat K, Boonchuen P. (2025) Viral circular RNA-encoded protein, ceVP28, divulges an unprecedented antiviral response in invertebrates. Proc. Natl. Acad. Sci. USA. 122: e2321707122.

b) International conferences:

9

1. Wang HC (2025) Reframing the understanding of WSSV pathogenesis via multi-omics dissection of host control "5th Conference of the International Society of Fish and Shellfish Immunology (5th ISFSI)" Tainan, Taiwan. Nov 4-8, 2025 (Invited speaker)*

2. Ng YS, Guo FJ, Huang KL, Chen CY, Cheng SW, Wang HC (2025) WSSV regulates malate-aspartate shuttle during infection. "5th Conference of the International Society of Fish and Shellfish Immunology (5th ISFSI)" Tainan, Taiwan. Nov 4-8, 2025 (Oral presentation)*

3. Chen CY, Chen CL, Lee DY, Liu CH, Lin SS, Senapin S, Sangsuriya P, Wang HC (2025) White spot syndrome virus facilitates and relies on shrimp de novo nucleotide synthesis to support viral pathogenesis. "5th Conference of the International Society of Fish and Shellfish Immunology (5th ISFSI)" Tainan, Taiwan. Nov 4-Nov 8, 2025 (Poster presentation)*

4. Castillo-Corea BRJ, Lin SS, Senapin S, Sangsuriya P, Wang HC (2025) Multifunctional roles of WSSV079 and WSSV164 in RNA regulatory networks during WSSV replication in Litopenaeus vannamei. "5th Conference of the International Society of Fish and Shellfish Immunology (5th ISFSI)" Tainan, Taiwan. Nov 4-Nov 8, 2025 (Poster presentation)*

5. Cheng SW, Lin SS, Wang HC (2025) Host acetyl-CoA pathways support WSSV replication. "5th Conference of the International Society of Fish and Shellfish Immunology (5th ISFSI)" Tainan, Taiwan. Nov 4-Nov 8, 2025 (Poster presentation, Best poster award)*

6. Chen Y, Wang HC (2025) Deciphering the mechanism behind shrimp body color regulation. "5th Conference of the International Society of Fish and Shellfish Immunology (5th ISFSI)" Tainan, Taiwan. Nov 4-Nov 8, 2025 (Poster presentation)*

7. Lin YC, Senapin S, Sangsuriya P, Wang HC (2025) Mitochondrial pyruvate carrier proteins mediate host-pathogen interactions during WSSV infection in shrimp. "5th Conference of the International Society of Fish and Shellfish Immunology (5th ISFSI)" Tainan, Taiwan. Nov 4-Nov 8, 2025 (Poster presentation, Best poster award)*
8. Cheng SW, Wang HC (2025) Glutamate-pyruvate transaminase (GPT1) as a key metabolic regulator during WSSV infection in Litopenaeus vannamei "12th Symposium on Diseases in Asian Aquaculture" Chennai, India. Sep 23-27, 2025. (Oral presentation- Student Travel Awards)*
9. Castillo-Corea BRJ, Liang YC, Ng YS, Chen CY, Cheng SW, He ST, Kumar R, Lin SS, Senapin S, Sangsuriya P, Wang HC (2025) WSSV proteins drive glutamine metabolism through glutamate dehydrogenase activation in Litopenaeus vannamei "12th Symposium on Diseases in Asian Aquaculture" Chennai, India. Sep 23-27, 2025. (Oral presentation- Student Travel Awards)*

c) National conferences:

12
1. Lin YC, Senapin S, Sangsuriya P, Wang HC (2025) Exploring the role of the Mitochondrial Pyruvate Carrier in Supporting WSSV Replication in Litopenaeus vannamei. "the master student poster competition organized by the Division of Agriculture and Marine Biotechnology, Department of Biotechnology and Bioindustry Sciences, NCKU" Tainan, Taiwan. Dec. 14, 2025 (Poster presentation-the second prize)*
2. Castillo-Corea BRJ, Liang YC, Ng YS, Chen CY, Cheng SW, He ST, Kumar R, Lin SS, Senapin S, Sangsuriya P, Wang HC (2025) Protein-protein Interactions Approach Provide New Insight on Glutamine Metabolism Regulation During WSSV Replication in Litopenaeus vannamei. "7th the Taiwan Marine Biotechnology Society Annual Meeting" Yilan, Taiwan. Oct. 14, 2025. (Poster presentation, First prize award)*
3. Chen Y, Wang HC, Wang HC (2025). Deciphering the Genetic and Molecular Basis of Body Color and Its Functional Link to Antiviral Immunity in Black Tiger Shrimp (Penaeus monodon). "7th the Taiwan Marine Biotechnology Society Annual Meeting" Yilan, Taiwan. Oct. 14, 2025. (Poster presentation)*
4. Lin YC, Senapin S, Sangsuriya P, Wang HC* (2025). Host-pathogen interaction reveals the importance of Mitochondrial Pyruvate Carriers during WSSV replication in Litopenaeus vannamei. "7th the Taiwan Marine Biotechnology Society Annual Meeting" Yilan, Taiwan. Oct. 14, 2025. (Poster presentation -Third prize award)*
5. Wang HC. (2025) Metabolic reprogramming of carbohydrate, amino acid, nucleotide, and lipid pathways facilitates white spot syndrome virus replication in shrimp. "The 21st Taiwan Society for Mass Spectrometry Annual Conference" Taoyuan, Taiwan. July 1-3. (Invited speaker)
6. Guo FJ, Huang KL, Wang HC (2025). White spot syndrome virus (WSSV) infection triggers reversal of the malate-aspartate shuttle in Litopenaeus vannamei. "2025 5th CBB Research Day" Tainan, Taiwan. June 30, 2025. (Oral presentation-Third prize award).*
7. Chang YC, Chen CL, Lin SS, Senapin S, Sangsuriya P, Wang HC (2025). Investigation of shrimp CAD protein–protein interactions and their impact on WSSV replication using interactomics approaches. "2025 5th CBB Research Day" Tainan, Taiwan. June 30, 2025. (Oral presentation)*
8. Teoh YH, Lin SS, Senapin S, Sangsuriya P, Wang HC (2025). Integrated proteomic and transcriptomic analysis reveals the role of WSSV non-specific endonuclease (WSSV246) in viral replication. "2025 5th CBB Research Day" Tainan, Taiwan. June 30, 2025. (Oral presentation)*
9. Lin YC, Senapin S, Sangsuriya P, Wang HC (2025) Mitochondrial pyruvate carrier-mediated metabolism is involved in WSSV infection. "2025 5th CBB Research Day" Tainan, Taiwan. June 30, 2025. (Poster presentation)*
10. Wang HC, Chen Y, Wang HC (2025). Dual functional roles of red pigment concentrating hormone (RPCH) and crustacyanin (CRCN) in pigmentation and immune modulation during white spot syndrome virus (WSSV) infection in Penaeus monodon. "2025 5th CBB Research Day" Tainan, Taiwan. June 30, 2025. (Poster presentation-Excellence award)*
11. Chang YC, Chen CL, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2025) Investigating how LvCAD-mediated de novo pyrimidine biosynthesis and LvHDAC1 regulation contribute to WSSV replication in Litopenaeus vannamei. "The Fisheries Society of Taiwan Annual Meeting". January 11, 2025. (Poster presentation)*
12. Teoh YH, Lin SS, Senapin S, Sangsuriya P, Wang HC (2025). Using protein-protein interactions to elucidate pathogenic mechanisms of WSSV non-specific endonuclease (WSSV246). "The Fisheries Society of Taiwan Annual Meeting". Taipei, Taiwan. Jan 11, 2025. (Poster presentation)*

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

1. International Center for the Scientific Development of Shrimp Aquaculture
https://sites.google.com/view/icdsa/

TOR7: SCIENTIFIC AND TECHNICAL TRAINING

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

Yes

a) Technical visit : 0

b) Seminars : 0

c) Hands-on training courses: 0

d) Internships (>1 month) 5

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
D	PHILIPPINES	4

D	MALAYSIA	1

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; CNS 17085:2018	2023-2026. pdf	ISO17025.pdf

19. Is your quality management system accredited?

Yes

Test for which your laboratory is accredited	Accreditation body
WSSV PCR detection	Taiwan Accreditation Foundation

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

Yes

National Cheng Kung University (NCKU) has an established institution-wide biorisk management system. As the WOAH Reference Laboratory is located within NCKU, our laboratory is required to comply fully with this system, ensuring biosafety and biosecurity in all activities related to the pathogen and disease concerned.

TOR9: SCIENTIFIC MEETINGS

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

No

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

No

TOR10: NETWORK WITH WOAH REFERENCE LABORATORIES

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

Yes

24. Are you a member of a network of WOAH Reference Laboratories designated for the same pathogen?

No

25. Did you organise or participate in inter-laboratory proficiency tests with WOAH Reference Laboratories designated for the same pathogen during the past 2 years?

No

We plan to participate in inter-laboratory proficiency tests in this year.

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

No

TOR11: OTHER INTERLABORATORY PROFICIENCY TESTING

27. Did your laboratory organise or participate in inter-laboratory proficiency tests with laboratories other than WOAH Reference Laboratories for the same pathogen during the past 2 years?

No

We plan to participate in inter-laboratory proficiency tests in this year.

TOR12: EXPERT CONSULTANTS

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

Yes

Kind of consultancy	Location	Subject (facultative)
WOAH ad hoc group member	remote and In-person	Request for AHG assessment of Crayfish plaque on

		susceptibility of crustacean species

29. Additional comments regarding your report:

No