

WOAH Reference Laboratory Reports Activities 2024

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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)

Diagnostic Test	Indicated in WOAH Manual (Yes/No)	Total number of test performed last year	
Indirect diagnostic tests		Nationally	Internationally
IQ2000 (PCR)	Yes	377	16
Real-time PCR	No	337	0
Western Blots	No	112	0
Direct diagnostic tests		Nationally	Internationally



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?

No

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?

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

8. L No

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

No

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
AUSTRIA	Disease diagnosis, pathogen characterization and disease surveillance planning	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 Mechanisms of anti-viral		

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Han-Ching Wang CHINESE_IAIPE

WSSV/shrimp interaction	8 years	protein interaction and signalling pathways Chulalongkorn University, Thailand Thailand	Chulalongkorn University, Thailand	THAILAND
WSSV/Shrimp interactome	third year	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Arizona University	UNITED STATES OF AMERICA
WSSV/Shrimp interactome	third year	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Tokyo University of Marine Science abd Technology	JAPAN
WSSV/Shrimp interactome	third year	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Biotec, NSTDA	THAILAND
WSSV/Shrimp interactome	third year	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Malaya University.	MALAYSIA
WSSV/Shrimp interactome	third year	Integrative omics strategy for Shrimp-WSSV interactome to elucidate viral pathogenesis and host responses	Santo Tomas University.	PHILIPPINES
Develop an antibody targeting WSSV VP28	Second year	Induce passive immunization in shrimp	Gyeongsang National University	Korea (Rep. of)
Develop a probiotic bacterium expressing nanobody and/or dsRNAs against shrimp viral pathogen WSSV	Second year	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?

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:

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No



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:

2

1. Tan YK, Castillo-Corea BRJ, Kumar R*, Lai PH, Lin SS, Wang HC* (2024) Shrimp SIRT4 Promotes White Spot Syndrome Virus Replication. Fish Shellfish Immunol. 145:109328.

2. Ng YS, Chen CY, Cheng SW, Tan YK, Lin SS, Senapin S, Sangsuriya P, Wang HC*. (2024) WSSV early protein WSSV004 enhances viral replication by suppressing LDH activity. Int. J. Biol. Macromol. 271: 132482.

b) International conferences:

17

1. Chen CY, Chen CL, Lee DY, Liu CH, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) Metabolism alterations in shrimp during white spot syndrome virus infection: evidence of nucleotide metabolism reprogramming. "29th Biological Sciences Graduate Congress (BSGC 2024)" Singapore. Dec 10-Dec 11, 2024. (Oral presentation)

2. Chen CY, Chen CL, Lee DY, Liu CH, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) White spot syndrome virus facilitates and relies on shrimp de novo nucleotide synthesis to support viral pathogenesis. "The Omics in the Ocean — The 10th International Symposium of Marine Biology and Biotechnology & The 7 th Taiwan Society of Marine Biotechnology Academic Symposium" Pingtung, Taiwan. Sep 26-Sep 28, 2024. (Poster presentation- Popularity Special Award)

3. Cheng SW, Lin SS, Wang HC* (2024) Acetyl-CoA metabolism turbulence during white spot syndrome virus (WSSV) infection in Penaeus vannamei. "The Omics in the Ocean — The 10thInternational Symposium for Marine Biology and Biotechnology & The 7th Taiwan Society of Marine Biotechnology Academic Symposium" Pingtung, Taiwan. Sep 26-28, 2024. (Poster presentation- Second runner-up in the PhD's category)

4. Castillo-Corea BRJ, Liang YC, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024). Interactomics Provide New Insights into WSSV Proteins Regulating Glutamine Metabolism During Virus Replication" The Omics in the Ocean — The 10th International Symposium of Marine Biology and Biotechnology & The 7 th Taiwan Society of Marine Biotechnology Academic Symposium" Pingtung, Taiwan. Sep 26-Sep 28, 2024. (Poster presentation)

5. Guo FJ, Huang KL, Wang HC* (2024) Triggering the malate-aspartate shuttle facilitates white spot syndrome virus (WSSV) replication in Litopenaeus vannamei. "The Omics in the Ocean — The 10th International Symposium of Marine Biology and Biotechnology & The 7th Taiwan Society of Marine Biotechnology Academic Symposium" Pingtung, Taiwan. Sep 26-Sep 28, 2024. (Poster presentation - First prize in the Master's category)

6. Chang YC, Chen CL, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) Impacts of LvCAD on WSSV replication through de novo pyrimidine synthesis in Litopenaeus vannamei. " The Omics in the Ocean — The 10th International Symposium of Marine Biology and Biotechnology & The 7 th Taiwan Society of Marine Biotechnology Academic Symposium" Pingtung, Taiwan. Sep 26-Sep 28, 2024. (Poster



presentation - excellent work in the Master's category)

7. Teoh YH, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) Investigating pathogenic mechanisms of WSSV non-specific endonuclease (WSSV246) through protein-protein interactions " The Omics in the Ocean — The 10th International Symposium of Marine Biology and Biotechnology & The 7 th Taiwan Society of Marine Biotechnology Academic Symposium" Pingtung, Taiwan. Sep 26-Sep 28, 2024 (Poster presentation).

8. Ng YS, Wang HC*, Lo CF*. (2024) Progressing shrimp aquaculture: disease control and P. monodon broodstock breeding for a sustainable future. "International Conference on Responsible Fisheries and Sustainable Aquaculture" Cagayan de Oro, Philippines. July 3-5, 2024. (Oral presentation)

9. Chen CY, Lee DY, Liu CH, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) White Spot Syndrome Virus facilitates and relies on host de novo nucleotide synthesis to support viral pathogenesis. "International Conference on Responsible Fisheries and Sustainable Aquaculture" Cagayan de Oro, Philippines. July 3-5, 2024. (Oral presentation)

10. Ng YS, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) White spot syndrome virus protein regulates LDH activity during infection. "The crustacean society summer meeting 2024" Taipei, Taiwan. May 27-June 1, 2024. (Oral presentation)

11. Chen CY, Lee DY, Liu CH, Senapin S, Sangsuriya P, Lin SS, Wang HC* (2024) White Spot Syndrome Virus Facilitates and Relies on Host De Novo Nucleotide Synthesis to Support Viral Pathogenesisi. "The crustacean society summer meeting 2024" Taipei, Taiwan. May 27-June 1, 2024. (Oral presentation)

12. Castillo-Corea BRJ, Liang YC, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024). Regulation of glutamine metabolism by WSSV during virus replication in Penaeus vannamei. "The crustacean society summer meeting 2024" Taipei, Taiwan. May 27-June 1, 2024. (Oral presentation)

13. Cheng SW, Lin SS, Wang HC* (2024) Acetyl-CoA Metabolism's Significance in WSSV Infection within Penaeus vannamei. "The crustacean society summer meeting 2024" Taipei, Taiwan. May 27-June 1, 2024. (Oral presentation)

14. Liu CW, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024). WSSV-mediated regulation of pyrimidine biosynthesis for its replication in shrimp. "The crustacean society summer meeting 2024" Taipei, Taiwan. May 27-June 1, 2024. (Poster presentation)

15. Chang YC, Chen CL, Lin SS, Wang HC* (2024). The mechanism of LvCAD involved in WSSV replication through activation of pyrimidine de novo synthesis in Litopeneaus vannamei. "The crustacean society summer meeting 2024" Taipei, Taiwan. May 27-June 1, 2024. (Poster presentation) (Best Poster Award – Second Place)

16. Guo FJ, Huang KL, Wang HC* (2024). The important role of malate-aspartate shuttle during WSSV replication in Litopenaeus vannamei. "The crustacean society summer meeting 2024" Taipei, Taiwan. May 27-June 1, 2024. (Poster presentation)

17. Teoh YH, Lin SS, Wang HC* (2024). Analyzing protein-protein interactions of WSSV non-specific endonuclease (WSSV246) and its pathogenic mechanisms. "The crustacean society summer meeting 2024" Taipei, Taiwan. May 27-June 1, 2024. (Poster presentation)

c) National conferences:

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1. Castillo-Corea BRJ, Liang YC, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024). Regulation of Glutamine Metabolism by WSSV Viral Proteins During Virus Replication in Penaeus vannamei. "2024 NCKU Grand Review". Tainan, Taiwan. Nov 5, 2024. (Poster presentation-Excellence award).

2. Kumar R, and Wang HC* (2024). Unraveling the Role of SIRT4 in WSD and Enhancing Gut Microbiota Resilience by probiotic intervention in shrimp. "113 NCKU Grand Review" NCKU, Tainan, Taiwan. Nov 5th, 2024. (Poster presentation - Outstanding Research award)

3. Cheng SW, Lin SS, Wang HC* (2024). Disruption of Acetyl-CoA Metabolism in Penaeus vannamei during White Spot Syndrome Virus (WSSV) Infection. "113 NCKU Grand Review" NCKU, Tainan, Taiwan. Nov 5th, 2024. (Poster presentation)

4. Ng YS, Chen CY, Cheng SW, Tan YK, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024). The role of WSSV004 in regulating lactate dehydrogenase during shrimp infection by white spot syndrome virus. "2024 NCKU Grand Review". Tainan, Taiwan. Nov 5, 2024. (Poster presentation- Outstanding Research award).

 Chang YC, Chen CL, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) The role of LvCAD in the WSSV replication mechanism in Litopenaeus vannamei de novo pyrimidine synthesis. "2024 4th CBB Research Day" Tainan, Taiwan. June 27, 2024. (Poster presentation)
Teoh YH, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) Protein-protein interactions of WSSV non-specific endonuclease (WSSV246)



and its pathogenic mechanisms. "2024 4th CBB Research Day" Tainan, Taiwan. June 27, 2024. (Poster presentation) 7. Castillo-Corea BRJ, Liang YC, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024). Regulation of Glutamine Metabolism by WSSV Viral Proteins During Virus Replication in Penaeus vannamei. "2024 4th CBB Research Day" Tainan, Taiwan. June 27, 2024. (Oral presentation-Third prize award).

8. Liu CW, Liu CH, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) WSSV regulates pyrimidine biosynthesis during replication in shrimp. "2024 4th CBB Research Day" Tainan, Taiwan. June 27, 2024. (Poster presentation-Excellence award)

9. Guo FJ, Huang KL, Wang HC* (2024) Role of the malate-aspartate shuttle in Litopenaeus vannamei during WSSV replication. "2024 4th CBB Research Day" Tainan, Taiwan. June 27, 2024. (Poster presentation)

10. Ng YS, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) Proteins of white spot syndrome virus modulate LvLDH activity during infection. "2024 4th CBB Research Day" Tainan, Taiwan. June 27, 2024. (Oral presentation- Fourth award).

11. Chen CY, Lee DY, Liu CH, Lin SS, Senapin S, Sangsuriya P, Wang HC* (2024) White Spot Syndrome Virus facilitates and relies on host de novo nucleotide synthesis to support viral pathogenesis. "2024 4th CBB Research Day" Tainan, Taiwan. June 27, 2024. (Oral presentation-First prize)

12. Castillo-Corea BRJ, Liang YC, Saengchan Senapin, Pakkakul Sangsuriya, Wang HC* (2024). Glutamine metabolism regulated by WSSV during virus replication in white shrimp (Penaeus vannamei). "The fisheries society of Taiwan ANNUAL MEETING". Pingtung, Taiwan. Jan 16, 2024. (Poster presentation- Third prize award)

13. Liu CW, Wang HC* (2024). WSSV-mediated regulation of pyrimidine biosynthesis for its replication in shrimp "The fisheries society of Taiwan ANNUAL MEETING". Pingtung, Taiwan. Jan 16, 2024. (Poster presentation)

14. Cheng SW, Wang HC* (2024). The role of acetyl-CoA metabolism during WSSV infection in Penaeus vannamei "The fisheries society of Taiwan ANNUAL MEETING". Pingtung, Taiwan. Jan 16, 2024. (Poster presentation- Honorable mention award).

15. Teoh YH, Wang HC* (2024). Investigating interactions of viral and shrimp proteins with WSSV non-specific endonuclease (WSSV246) "The fisheries society of Taiwan ANNUAL MEETING". Pingtung, Taiwan. Jan 16, 2024. (Poster presentation)

16. Guo FJ, Huang KL, Wang HC* (2024). How is malate-aspartate shuttle involved in WSSV replication? "The fisheries society of Taiwan ANNUAL MEETING". Pingtung, Taiwan. Jan 16, 2024. (Poster presentation- First runner-up).

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

1

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: 5

d) Internships (>1 month) 1

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
С	PHILIPPINES	3
С	THAILAND	2

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D	BELGIUM	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	PDF	2023-2026 ISO17025 -1認證證書 (英文).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

Taiwan Accreditation Foundation

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. Do you network (collaborate or share information) with other WOAH Reference Laboratories designated for the same pathogen?

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 carry it out within the next two years.

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?

Not applicable (only WOAH Reference Laboratory designated for the disease

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 carry it out within the next two years.

TOR12: EXPERT CONSULTANTS

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

Yes

Kind of consultancy	Location	Subject (facultative)
OIE expert	remote	Request for assessment of WSSV AHG on susceptibility of crustacean species to infection with WOAH listed diseases/ Request for assistance to update the list of susceptible crustacean species WSSV infection (M. nipponense)

29. Additional comments regarding your report: