

# CURRICULUM VITAE



## A. BUTIR-BUTIR PERIBADI (Personal Details)

Nama Penuh (Full Name)	<b>TAN WEN SIANG</b>		Gelaran (Title): <b>Professor</b>
No. MyKad / No. Pasport (Mykad No. / Passport No.) <b>680122-09-5047</b>	Warganegara (Citizenship) Malaysia	Bangsa (Race) Chinese	Jantina (Gender) <b>Male</b>
Jawatan (Designation)	<b>Professor</b>	Tarikh Lahir (Date of Birth)	<b>22 January 1968</b>

Alamat Semasa (Current Address)	Jabatan/Fakulti (Department/Faculty)	E-mel dan URL (E-mail Address and URL)
Department of Microbiology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia Tel: 603-89466715 Fax: 603-89430913	Department of Microbiology, Faculty of Biotechnology and Biomolecular Sciences	E-mail: wstan@upm.edu.my URL: <a href="http://www.biotech.upm.edu.my/">http://www.biotech.upm.edu.my/</a>  H/P: 016-6331962

## B. KELAYAKAN AKADEMIK (Academic Qualification)

Nama Sijil / Kelayakan (Certificate / Qualification obtained)	Nama Sekolah Institusi (Name of School / Institution)	Tahun (Year obtained)	Bidang pengkhususan (Area of Specialization)
Bachelor of Science (Hons)	Universiti Pertanian Malaysia	1993	Biochemistry and Microbiology
Master of Science	Universiti Pertanian Malaysia	1995	Molecular Biology
Doctor of Philosophy	University of Edinburgh, UK	1998	Molecular Biology

## C. KEMAHIRAN BAHASA (Language Proficiency)

Bahasa / Language	Lemah Poor (1)	Sederhana Moderate (2)	Baik Good (3)	Amat Baik Very good (4)	Cemerlang Excellent (5)
English					✓
Bahasa Melayu					✓
Chinese					✓
Lain-lain (other):					

**D. PENGALAMAN SAINTIFIK DAN PENGKHUSUSAN***(Scientific experience and Specialisation)*

<i>Organization</i>	<i>Position</i>	<i>Start Date</i>	<i>End Date</i>	<i>Expertise</i>
University of Edinburgh	Visiting Researcher	April 2005	December 2005	Crystallography

**E. PEKERJAAN (Employment)**

<i>Majikan / Employer</i>	<i>Jawatan / Designation</i>	<i>Jabatan / Department</i>	<i>Tarikh lantikan / Start Date</i>	<i>Tarikh tamat / Date Ended</i>
Universiti Pertanian Malaysia	Tutor	Department of Biochemistry & Microbiology, Faculty of Science & Environmental Studies	1994	1997
Universiti Putra Malaysia	Lecturer	Department of Biochemistry & Microbiology, Faculty of Science & Environmental Studies	1998	2002
Universiti Putra Malaysia	Associate Professor	Department of Biochemistry & Microbiology, Faculty of Science & Environmental Studies	2002	2008
Universiti Putra Malaysia	Professor	Department of Microbiology, Faculty of Biotechnology & Biomolecular Sciences	2008	present

**F. ANUGERAH DAN HADIAH (Honours and Awards)**

<i>Name of awards</i>	<i>Award Authority</i>	<i>Level</i>	<i>Year</i>
ICI Gold Medal	Universiti Putra Malaysia	University	1993
The Ministry of Science, Technology and Environmental Award	The Ministry of Science, Technology and Environmental	National	1993
Chemopharm Award (1993)	Chemopharm Sdn. Bhd.	University	1993
Universiti Putra Malaysia Scholarship	Universiti Putra Malaysia	University	1994 -1997
Roseanne Campbell Trust for Hepatitis Research Scholarship	Roseanne Campbell Trust	International	1997
Young Researcher Award	Faculty of Science	University	2001
Excellent Teaching Award	Faculty of Science	University	2002
Gold Medal in I-TEX (2003)	International Invention, Innovation, Industrial Design & Technology Exhibition	International	2003
Gold Medal in Expo Science and Technology (2003)	Expo Science and Technology	National	2003
Main Auditor Award	Faculty of Science	University	2004
Die Norken Stiftung Visiting and Research Fellowship	Die Norken Stiftung	International	2005
ITEX Special Award: Best Invention in Biotechnology	RamRais and Partner	International	2006
Gold Medal in EUREKA	EUREKA	International	2006
Roseanne Campbell Trust Summer Scholarship	Roseanne Campbell Trust	International	2007
Plenary speaker at the 7 <sup>th</sup> National Congress on Genetics	Malaysian Genetics Association	National	2007

Invited speaker at the 30 <sup>th</sup> Symposium of the Malaysian Society for Microbiology	Malaysian Society for Microbiology	National	2008
Invited speaker at the 18 <sup>th</sup> Scientific Meeting of the Malaysian Society for Molecular Biology and Biotechnology	Malaysian Society for Molecular Biology and Biotechnology	National	2009
Plenary speaker at the 35 <sup>th</sup> Conference of the Malaysian Society for Biochemistry and Molecular Biology	Malaysian Society for Biochemistry and Molecular Biology	National	2010
Boehringer Ingelheim Fonds travel grant	Boehringer Ingelheim	International	2010
Short-Term Visit and Short-Term Stay Program with University of Fukui Japan	JASSO, Japan Student Services Organization	International	2011-2016
Top Research Scientists Malaysia	Academy of Sciences Malaysia	National	2012
Invited speaker at the International Conference of Beneficial Microbs	ICOBM 2014	International	2014
Invited speaker at the UK-Malaysia Vaccinology Workshop	UPM & Pirbright Institute, UK	International	2016

**G. SENARAI PENERBITAN (Sila masukan nama pengarang, tajuk, nama jurnal, jilid, muka surat dan tahun diterbitkan)** (*List of publications – author (s), title, journal, volume, page and year published*)

<b>Journal</b>	<ol style="list-style-type: none"> <li>1. Yusoff, K., Ng, B.K., <b>Tan, W.S.</b>, Lau, C.H. and Ibrahim, A.L. (1993). Detection of Malaysian field isolates of Newcastle disease virus in allantoic fluid by RNA-polymerase chain reaction. <i>Asia Pacific Journal of Molecular Biology and Biotechnology</i>. <b>1</b>: 108-112.</li> <li>2. <b>Tan, W.S.</b>, Lau, C.H., Ng, B.K. Ibrahim, A.L. and Yusoff, K. (1995). Nucleotide sequence of the haemagglutinin-neuraminidase (HN) gene of a Malaysian heat resistant viscerotropic-velogenic Newcastle disease virus. <i>DNA sequence</i>. <b>6</b>: 47-50.</li> <li>3. Yusoff, K., <b>Tan, W.S.</b>, Lau, C.H., Ng, B.K. and Ibrahim, A.L. (1996). Sequence of the haemagglutinin-neuraminidase gene of the Newcastle disease virus oral vaccine strain V4(UPM). <i>Avian Pathology</i>. <b>25</b>: 837-844.</li> <li>4. Yusoff, K., Tey, B.T. and <b>Tan, W.S.</b> (1997). Determination of the 3' terminal sequence of the HN genes of Newcastle disease virus isolates by direct nucleotide sequencing. <i>Asia Pacific Journal of Molecular Biology and Biotechnology</i>. <b>5</b>: 48-50.</li> <li>5. <b>Tan, W.S.</b>, Dyson, M.R. and Murray, K. (1999). Two distinct segments of the hepatitis B virus surface antigen contribute synergistically to its association with the viral core particles. <i>Journal of Molecular Biology</i>. <b>286</b>: 797-808.</li> <li>6. Ong, H.K.A., Ali, A.M., Omar, A.R., <b>Tan, W.S.</b> and Yusoff, K. (1999). N-linked glycosylated HN protein of NDV strain AF2240 expressed in baculovirus-infected Sf9 cells. <i>Journal of Biochemistry, Molecular Biology &amp; Biophysics</i>. <b>3</b>: 147-151.</li> <li>7. <b>Tan, W.S.</b> and Dyson, M.R. (2000). A simple method to determine the binding affinities of proteins expressed in rabbit reticulocyte lysates. <i>Journal of Biochemistry, Molecular Biology &amp; Biophysics</i>. <b>4</b>: 41-49.</li> <li>8. Yusoff, K. and <b>Tan, W.S.</b> (2001). Newcastle Disease Virus: macromolecules and opportunities. <i>Avian Pathology</i>. <b>30</b>: 439-455.</li> <li>9. Kho, C.L., <b>Tan, W.S.</b> and Yusoff, K. (2001). Sequence analysis of the nucleoprotein of a Newcastle disease virus heat resistant strain: comparison with other members of <i>Paramyxoviridae</i>. <i>Journal of Biochemistry, Molecular Biology &amp; Biophysics</i>. <b>5</b>: 463-471.</li> <li>10. Kho, C.L., <b>Tan, W.S.</b> and Yusoff, K. (2001). Production of the nucleocapsid protein of Newcastle disease virus in <i>Escherichia coli</i> and its assembly into ring- and nucleocapsid-like particles. <i>Journal of Microbiology</i>. <b>31</b>: 293-299.</li> <li>11. Kok, W.L., Yusoff, K., Nathan, S. and <b>Tan, W.S.</b> (2002). Cloning, expression and display of the PreS domain of hepatitis B virus on filamentous bacteriophage M13. <i>Journal of Biochemistry, Molecular Biology &amp; Biophysics</i>. <b>6</b>: 55-58.</li> <li>12. Kho, C.L., <b>Tan, W.S.</b> and Yusoff, K. (2002). Production of the phosphoprotein of Newcastle disease virus in <i>Escherichia coli</i>. <i>Journal of Biochemistry, Molecular Biology &amp; Biophysics</i>. <b>6</b>: 117-121.</li> <li>13. Ramanujam, P., <b>Tan, W.S.</b>, Nathan, S. and Yusoff, K. (2002). Selection of peptide inhibitors that inhibit the replication of Newcastle disease virus. <i>Archives of Virology</i>. <b>147</b>: 981-993.</li> <li>14. <b>Tan, W.S.</b> (2002). Inhibition of hepatitis B virus assembly with synthetic peptides derived from the viral surface and core antigens. <i>Journal of General and Applied</i></li> </ol>
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*Microbiology*. **48**: 103-107.

15. Ong, S.T., **Tan, W.S.**, Syed, S.H., Mohd. Lila, M.A., Abdul. Rahman, A. and Yusoff, K. (2002). Cloning and expression of the nucleocapsid protein gene of Nipah virus in different strains of *Escherichia coli*. *Journal of Biochemistry, Molecular Biology & Biophysics*. **6**: 347-350.
16. Rabu, A., **Tan, W.S.**, Kho, C.L., Omar, A.R and Yusoff, K. (2002). Chimeric Newcastle disease virus nucleocapsid with parts of viral hemagglutinin-neuraminidase and fusion proteins. *Acta Virologica*. **46**: 211-217.
17. Ong, H.T., Duraisamy, G., **Tan, W.S.**, Seow, H.F. (2002). Nucleotide sequences of variants of human hepatitis B virus. *Med J Malaysia*. **57**
18. Ong, H.T., **Tan, W.S.**, Yusoff, K., Exner, M., Hamdan, H., Duraisamy, G. and Seow, H.F. (2002). Determination of hepatitis B viral load by real time quantitative PCR. *Med J Malaysia*. **57** (Suppl A): 86.
19. Ho, K.L., Yusoff, K. Seow, H.F. and **Tan, W.S.** (2003). Selection of high affinity binding phages on hepatitis B core particles with a disulfide constrained phage display library. *Journal of Medical Virology*. **69**: 27-32.
20. **Tan, W.S.**, Dyson, M.R. and Murray, K. (2003). Hepatitis B virus core antigen: enhancement of its production in *Escherichia coli*, and interaction of the core particles with the viral surface antigen. *Biological Chemistry*. **384**: 363-371.
21. Kho, C.L., **Tan, W.S.**, Tey, B.T and Yusoff, K. (2003). NDV nucleocapsid: self assembly and length determination domains. *Journal of General Virology*. **84**: 2163-2168.
22. Tang, S.S., **Tan, W.S.**, Devi, S., Wang, L., Pang, T., and Thong, K.L. (2003). Mimotopes of Vi Antigen of *Salmonella enterica* serovar Typhi Identified from Phage Display Peptide Library. *Clinical and Diagnostic Laboratory Immunology*. **10**: 1078-1084.
23. Ong, H.T., Ng, K.P., Duraisamy, G., **Tan, W.S.**, Seow, H.F. (2003). Human hepatitis B virus variants in Malaysia. *Journal of Clinical Virology*. **28**: S78-S79.
24. Tan, G.H., Yusoff, K., Seow, H.F. and **Tan, W.S.** (2003). Display of the immunodominant region of hepatitis B surface antigens on bacteriophage T7. *Journal of Clinical Virology*. **28**: S80.
25. Sivasamugham, L.A., Cardosa, M.J., **Tan, W.S.** and Yusoff, K. (2003). Fusion of the immunodominant regions of VP1 of human Enterovirus 71 to the C-terminal end of the nucleocapsid protein of Newcastle disease virus. *Journal of Clinical Virology*. **28**: S105-S106.
26. Kho, C.L., **Tan, W.S.**, Tey, B.T and Yusoff, K. (2004). Regions on nucleocapsid protein of Newcastle disease virus that interact with phosphoprotein. *Archives of Virology*. **149**: 997-1005.
27. Ramanujam, P., **Tan, W.S.**, Nathan, S. and Yusoff, K. (2004). Pathotyping of Newcastle disease virus with a filamentous bacteriophage. *BioTechniques*. **36**: 296-300.
28. **Tan, W.S.**, Ramanujam, P., Nathan, S. and Yusoff, K. (2004). Effect of pH and temperature for the binding of a fusion phage to NDV. *Malaysian Journal of Biochemistry and Molecular Biology*. **9**: 35-37.
29. **Tan, W.S.**, Ong, S.T., Eshaghi, M, Foo, S.Z. and Yusoff, K. (2004). Solubility, immunogenicity and physical properties of the nucleocapsid protein of Nipah virus produced in *Escherichia coli*. *Journal of Medical Virology*. **73**: 105-112.
30. Tan, S.W., Ideris, A., Omar, A.R., Yusoff, K. and **Tan, W.S.** (2004). Detection of Newcastle disease virus using a SYBR green I real time polymerase chain reaction. *Acta Virologica*. **48**: 23-28.
31. Kusumaningtyas, E., **Tan, W.S.**, Zamrod, Z., Eshaghi, M. and Yusoff, K. (2004). Existence of two forms of L protein of Newcastle disease virus due to a compensatory mutation in Domain V. *Archives of Virology*. **149**: 1859-1865.
32. Tey, B.T., Yong, K.H., Ong, H.P., Ling, T.C., Ong, S.T., Tan, Y.P., Ariff, A. and **Tan W.S.** (2004). Optimal conditions for hepatitis B core antigen production from shaken flask fermentation of *Escherichia coli*. *Biotechnology and Bioprocess Engineering*. **9**: 374-378.
33. Eshaghi, M., **Tan, W.S.**, Yusoff, K. (2004). Nipah virus glycoprotein: production in baculovirus and application in diagnosis. *Virus Research*. **106**: 71-76.
34. Ling, T.C., Loong, C.K., **Tan, W.S.**, Tey, B.T., Wan Abdullah, W.M. and Ariff, A. (2004). Purification of filamentous bacteriophage M13 by expanded bed anion chromatography. *Journal of Microbiology*. **42**: 228-232.
35. Eshaghi, M., **Tan, W.S.**, Yusoff, K. (2005). Identification of epitopes in swine anti-Nipah virus sera using a linear phage-displayed random peptide library. *Journal of Medical Virology*. **75**:147-152.
36. Eshaghi, M., **Tan, W.S.**, Chin, W.K and Yusoff, K. (2005). Purification of the extra-

- cellular domain of Nipah virus glycoprotein produced in *Escherichia coli* and its application in diagnosis. *Journal of Biotechnology*. 116: 221-226.
37. Hasmoni, S.S., Yusoff, K and **Tan, W.S.** (2005). Detection and precipitation of hepatitis B core antigen using a fusion bacteriophage. *Journal of General and Applied Microbiology* . 51: 125-131.
  38. Sieo, C.C., Abdullah, N., **Tan, W.S.** and Ho, Y.W. (2005). Influence of  $\beta$ -glucanase-producing-*Lactobacillus* strains on intestinal characteristics and feed passage rate of broiler chickens. *Poultry Science*. 84: 734-741.
  39. Ji, L.K., Eshaghi, M., Yusoff, K. and **Tan, W.S.** (2005) Inhibition of Newcastle disease virus infectivity in Vero cell line with recombinant bacteriophage. *Malaysian Journal of Biochemistry and Molecular Biology*. 11: 20-23.
  40. Tan, G.H., Yusoff, K. Seow, H.F. and **Tan, W.S.** (2005). Antigenicity and immunogenicity of the immunodominant region of hepatitis B surface antigen displayed on bacteriophage T7. *Journal of Medical Virology*. 77: 475-480.
  41. **Tan, W.S.**, Tan, G.H., Yusoff, K. and Seow, H.F. (2005). A phage-displayed cyclic peptide that interacts tightly with the immunodominant region of hepatitis B surface antigen. *Journal of Clinical Virology*. 34: 35-41.
  42. Sieo, C.C., Abdullah, N., **Tan, W.S.** and Ho, Y.W. (2005). Manipulation of *Lactobacillus*-probiotic strains to produce heterologous  $\beta$ -Glucanase for chickens. *Malaysian Journal of Animal Science*. 9: 37-39.
  43. Sieo, C.C., Abdullah, N., **Tan, W. S.** and Y.W. Ho (2005). Effects of beta-glucanase-producing *Lactobacillus* strains on growth, dry matter and crude protein digestibilities and apparent metabolisable energy in broiler chickens. *Br Poult Sci*. 46:333-339.
  44. Eshaghi, M., **Tan, W.S.**, Ong, S.T. and Yusoff, K. (2005). Purification and characterization of Nipah virus nucleocapsid protein produced in Baculovirus. *Journal of Clinical Microbiology*. 43: 3172-3177.
  45. Sieo, C. C., Abdullah, N., **Tan, W. S.** and Y. W. Ho. (2005). Plasmid profiling and curing of *Lactobacillus* strains isolated from the gastrointestinal tract of chicken. *Journal of Microbiology* 43: 251-256.
  46. Tan, Y.P., Ling, T.C., Yusoff, K., **Tan, W.S.** and Tey, B.T. (2005). Comparative evaluation of three purification methods for the nucleocapsid protein of Newcastle disease virus from *Escherichia coli* homogenates. *Journal of Microbiology*. 43: 295-300.
  47. Ong, H.T., Duraisamy, G., **Tan, W.S.** and Seow, H.F. (2005). Genotyping of hepatitis B virus in Malaysia based on the nucleotide sequence of preS and S genes. *Microbes Infect*. 7: 494-500.
  48. Chia, S.L., **Tan, W.S.**, Shaari, K., Yusoff, K., and Jois, S.D.S. (2006). Structural analysis of peptides that interact with Newcastle disease virus. *Peptide*. 27: 1217-1225.
  49. Tan, Y.P., Ling, T.C., **Tan, W.S.**, Yusoff, K. and Tey, B.T. (2006). Recovery of histidine-tagged nucleocapsid protein of Newcastle disease virus using immobilised metal affinity chromatography. *Process Biochemistry*. 41: 874-881.
  50. Tan, Y.P., Ling, T.C., **Tan, W.S.**, Yusoff, K. and Tey, B.T. (2006). Purification of recombinant protein of Newcastle disease virus from unclarified feedstock using expanded bed adsorption chromatography. *Protein Expression and Purification*. 46: 114-121.
  51. Tey, B.T., Chua, M.I., Chua, G.S., Ng, Y.T., Awang Biak, D.R., **Tan, W.S.**, Ling, T.C. (2006). Production of hepatitis B core antigen in a stirred tank bioreactor: The influence of temperature and agitation. *Biotechnology and Bioprocess Engineering*. 11: 164-167.
  52. Sivasamugham, L.A., Cardosa, M.J., **Tan, W.S.** and Yusoff, K. (2006). Recombinant Newcastle disease virus capsids displaying Enterovirus 71 VP1 fragment induce a strong immune response in rabbits. *Journal of Medical Virology*. 78: 1096-1104.
  53. Ho, C.W, Chew, T.K., Ling, T.C., Kamaruddin, S., **Tan, W.S** and Tey, B.T. (2006). Efficient mechanical cell disruption of *Escherichia coli* by an ultrasonicator and recovery of intracellular hepatitis B core antigen. *Process Biochemistry*. 41: 1829-1834.
  54. Lee, T.C., M., Nathan, S., Yusoff, K. and **Tan W.S.** (2006). Detection of virulent Newcastle disease virus using a phage-capturing dot blot assay. *Journal of Virological Methods*. 136: 224-229.
  55. Sieo, C.C., Abdullah, N., **Tan, W.S.** and Y.W. Ho. (2006). In vivo study on the persistence of transformed  $\beta$ -glucanase-producing *Lactobacillus* strains in gastrointestinal tract of chickens. *Journal of Animal and Feed Sciences*. 15: 261-274.
  56. Sieo, C.C., Abdullah, N., **Tan, W.S.** and Y.W. Ho. (2006). Optimization of electrotransformation conditions to improve genetic engineering potential of *Lactobacillus* spp. isolated from gastrointestinal tract of chickens. *Biotechnology*. 5: 244-274.

57. Siew, C.C., Abdullah, N., **Tan, W.S.** and Y.W. Ho. (2006). Transformation and expression of  $\beta$ -glucanase gene in *Lactobacillus* strains isolated from gastrointestinal tract of chickens. *Research Journal of Microbiology*. **1**: 492-502.
58. Ng, M.Y. T., **Tan, W. S.**, N. Abdullah, Ling, T.C., and Tey, B.T (2006). Thermal treatment in the purification of hepatitis B core antigen from *Escherichia coli* homogenate. *Journal of Virological Methods*. **137**: 134-139.
59. Tan, G.H., Yusoff, K. Seow, H.F. and **Tan, W.S.** (2007). A phage-displayed single chain variable fragment that interacts with hepatitis B core antigen: library construction, selection and diagnosis. *Journal of Clinical Virology*. **38**: 49-56.
60. **Tan, W.S.**, McNae, I.W., Ho, K.L. and Walkinshaw, M.D. (2007). Crystallization and X-ray analysis of the T=4 particle of hepatitis B core protein with an N-terminal extension. *Acta Crystallography Section F: Structural Biology and Crystallization Communication*. **F63**: 642-647.
61. Thong, K.L., Tang, S.S., **Tan, W.S.**, Devi, S (2007). Peptide mimotopes of complex carbohydrates in *Salmonella enterica* serovar typhi which react with both carbohydrate-specific monoclonal antibody and polyclonal sera from typhoid patients. *Microbiology and Immunology*. **51**: 1045-1052.
62. Ng, M.Y.T., **Tan, W.S.**, N. Abdullah, Ling, T.C. and Tey, B.T (2007). Direct purification of recombinant hepatitis B core antigen from two different pre-conditioned unclarified *Escherichia coli* feedstocks via expanded bed chromatography. *Journal Chromatography A*. **1172**: 47-56.
63. Tang, K.F., Abdullah, P. Yusoff, K. and **Tan, W.S.** (2007). Interaction of hepatitis B core antigen and peptide inhibitors. *Journal of Medicinal Chemistry*. **50**: 5620-5626.
64. Ho, C.W., **Tan, W.S.**, Kamaruddin, S., Ling, T.C. and Tey, B.T. (2008). The release of hepatitis B core antigen from *Escherichia coli* by batch mode bead milling. *Process Biochemistry*. **43**: 206-212.
65. Ho, C.W., **Tan, W.S.**, Kamaruddin, S., Ling, T.C. and Tey, B.T. (2008). The direct recovery of recombinant hepatitis B core antigen from disruptate derived from continuous flow bead milling. *Biotechnology and Applied Biochemistry*. **50**: 49-59.
66. Lee, K.W. and **Tan, W.S.** (2008). Recombinant hepatitis B virus core particles: association, dissociation and encapsidation of green fluorescent protein. *Journal of Virological Methods*: **151**: 172-180.
67. Ho, C.W., Yap, W.B., **Tan, W.S.**, Ling, T.C. and Tey, B.T. (2008). Comparative evaluation of different cell disruption methods for the release of recombinant hepatitis B core antigen from *Escherichia coli*. *Biotechnology and Bioprocess Engineering*. **13**: 577-583.
68. Saadun, R., **Tan, W.S.**, Omar, A.R., Bejo, M.H., Eshaghi, M. and Yusoff, K. (2008). The nucleocapsid protein of Newcastle disease virus promotes solubility of the VP2 hypervariable region of infectious bursal disease virus in *Escherichia coli*. *Pertanika Journal of Tropical Agricultural Science*: **31**: 91-99.
69. Ng, M.Y.T., **Tan, W.S.**, N. Abdullah, Ling, T.C. and Tey, B.T (2008). Effect of different operating modes and biomass concentrations on the recovery of recombinant hepatitis B core antigen from thermal-treated unclarified *Escherichia coli* feedstock. *Journal of Biotechnology*. **138**: 74-79.
70. Chew, F.N., **Tan, W.S.**, Ling, T.C., Tan, C.S. and Tey, B.T. (2009). Quantification of green fluorescent protein using a gel-based imaging method. *Analytical Biochemistry*. **384**: 353-355.
71. Raus, R.A., Ali, A.M. and **Tan, W.S.**, Salleh, H.M, Eshaghi, M. and Yusoff, K. (2009). Localization of the antigenic sites of Newcastle disease virus nucleocapsid using a panel of monoclonal antibodies. *Research in Veterinary Science*. **86**: 174-182.
72. Ong, S.T., Yusoff, K., Abdullah, J.O., Kho, C.L. and **Tan, W.S.** (2009). Mutagenesis of the Nucleocapsid Protein of Nipah Virus Involved in Capsid Assembly. *Journal of General Virology*. **90**: 392-397.
73. Tey, B.T., Ooi S.T., Yong, K.C., Ng, M.Y.T., Ling, T.C. and **Tan, W.S.** (2009). Production of fusion M13 phage bearing the di-sulphide constrained peptide sequence (C-WSFFSNI-C) that interacts with hepatitis B core antigen. *African Journal of Biotechnology*. **8**: 268-273.
74. Ho, C.W., **Tan, W.S.**, Chong, F.C., Ling, T.C. and Tey, B.T. (2009). A preparative purification process for recombinant hepatitis B core antigen using online capture by expanded bed adsorption followed by size exclusion chromatography. *Journal of Microbiology and Biotechnology*. **19**: 416-423
75. Wong, S.K., **Tan, W.S.**, Tan, C.S., Omar, A.R. and Yusoff, K. (2009). Immunogenic properties of recombinant ectodomain of Newcastle disease virus hemagglutinin-neuraminidase protein expressed in *Escherichia coli*. *Acta Virologica*. **53**: 35-41.
76. Tang, K.H., Yusoff, K. and **Tan, W.S.** (2009). Display of Hepatitis B Virus PreS1 Peptide on bacteriophage T7 and Its Potential in Gene Delivery into HepG2 Cells.

- Journal of Virological Methods*. **159**: 194-199.
77. Wongchuphan, R., Tey, B.T., **Tan, W.S.**, Taip, F.S. and Ling, T.C. (2009). Application of dye-ligand adsorbents for the capturing of rabbit immunoglobulin G. *Biochemical Engineering Journal*. **45**: 232-238.
  78. Chong, F.C., **Tan, W.S.**, Awang Biak, D.R., Ling, T.C and Tey, B.T. (2009). Purification of histidine-tagged nucleocapsid protein of Nipah virus using immobilized metal affinity chromatography. *Journal of Chromatography B*. **877**: 1561-1567.
  79. Yap, W.B., Tey, B.T., Ng, M.Y.T., Ong, S.T. and **Tan, W.S.** (2009). N-terminally His-tagged hepatitis B core antigens: construction, expression, purification and antigenicity. *Journal of Virological Methods*. **160**: 125-131.
  80. Chew, F.N., **Tan, W.S.**, Ling, T.C. and Tey, B.T. (2009). Single-step purification of the recombinant green fluorescent protein from intact *Escherichia coli* cells using preparative PAGE. *Electrophoresis*. **30**: 3017-3023
  81. Subramanian, S.K., Tey, B.T., Hamid, M. and **Tan, W.S.** (2009). Production of the matrix protein of Nipah virus in *Escherichia coli*: virus-like particles and possible application in diagnosis. *Journal of Virological Methods*. **162**: 179-183.
  82. Chong, F.C., **Tan, W.S.**, Yusoff, K., Awang Biak, D.R., Ling, T.C and Tey, B.T. (2010). Modulation of protease activity to enhance the recovery of recombinant nucleocapsid protein of Nipah virus. *Process Biochemistry*. **45**: 133-137.
  83. Chong, F.C., **Tan, W.S.**, Biak, D.R.A., Ling, T.C and Tey, B.T. (2010). A preparative hydrophobic interaction chromatography for purification of recombinant nucleocapsid protein of Nipah virus from *Escherichia coli* homogenate. *Separation and Purification Technology*. **71**: 97-101.
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<b>Books/Monographs</b>	<ol style="list-style-type: none"> <li>1. <b>Tan, W.S.</b> (2016). Fighting the hepatitis B virus: past present &amp; future. UPM Press, Serdang. ISBN 978-967-344-640-7.</li> <li>2. <b>Tan, W.S.</b>, Abdullah, J.O., Sieo, C.C., Shafee, N., Mustafa, S., Leow, T.C., Jahanshiri, F., Saad, W.Z., Tong, C.C., Abd Wahab, M.N. and Abdullah, N. (2008). Molecular techniques for Identification fo bacteria. Faculty of Biotechnology and Biomolecular Sciences, UPM. ISBN 978-983-44346-0-1.</li> <li>3. Yong, C.Y. and <b>Tan, W.S.</b> (2015). Production of hepatitis B vaccines by beneficial microorganisms. In M.-T. Liang (ed.), Beneficial microorganisms in medical and health applications, Microbiology Monographs, Springer International Publishing Switzerland. pp. 167-180. ISBN 978-3-319-23213-3.</li> </ol>

<b>Chapter in book</b>	<ol style="list-style-type: none"> <li>1. Tey, B.T., Yap, K.C., Ali, A.M. and <b>Tan, W.S.</b> (2006). The X-link Inhibitor of Apoptosis Protein (XIAP) Enhances the Survivability of C2E7 Hybridoma Cells under A Serum Deprived condition. In: Iijima, S., Nishijima, K-I. (eds). <i>Animal Cell Technology: Basic &amp; Applied Aspects</i>. Netherlands: Springer. pp. 67-72.</li> <li>2. Tey, B.T., Yap K.C., Yamaji, H., Ali, A.M., <b>Tan, W.S.</b> (2010) Supplementation of Phosphatidylcholine Protects the Hybridoma Cells from Apoptosis induced by Serum Withdrawal. In M. Kamihira, Y Katakura, and A. Ito (eds.), <i>Animal Cell Technology: Basic &amp; Applied Aspects</i>, Vol 16. Springer, Netherlands. pp 73-77. (ISBN 978-90-481-3891-3).</li> </ol>
<b>Proceedings</b>	Over 280 articles in proceedings/seminars
<b>Other publications</b>	3 theses; 12 articles in bulletin; 12 nucleotide sequence deposited in GenBank; 2 three dimensional structure deposited in Protein Data Bank.
<b>Intellectual Property</b>	<ol style="list-style-type: none"> <li>1. Nucleotide sequences of the nucleocapsid (NP) gene of a Malaysian velogenic Newcastle disease virus strain AF2240. (USA): USA 6,939,957. <b>Granted.</b></li> <li>2. Nucleotide sequences of the nucleocapsid (NP) and phosphoprotein (P) genes of a Malaysian velogenic Newcastle disease virus strain AF2240 and the production of the NP and P proteins in <i>Escherichia coli</i>. (Malaysia): MY-125227. <b>Granted.</b></li> <li>3. Recombinant nucleocapsid protein and G glycoprotein of Nipah virus. (Malaysia): PI 20032473. (Singapore): 200402182-0. <b>Granted.</b></li> <li>4. Peptides that inhibit the replication of Newcastle disease virus. (Malaysia): MY142458. <b>Granted.</b></li> <li>5. Peptides that inhibit the association of the surface and core antigens of hepatitis B virus. (Malaysia): PI 20014538.</li> <li>6. The nucleocapsid protein of Newcastle disease virus as a carrier for immunogens. (Malaysia): PI 20021709.</li> <li>7. Detection of hepatitis B surface antigen. (Malaysia): PI20042788. <b>Granted.</b></li> <li>8. Recovery process for recombinant hepatitis B core antigen. (Malaysia): PI20080736</li> <li>9. Method for quantitation of recombinant green fluorescent protein (Malaysia): MY-146629-A. <b>Granted.</b></li> <li>10. A method for purifying the nucleocapsid protein of Nipah virus (Malaysia): MY-155904-A. <b>Granted.</b></li> <li>11. A method for controlling proteolytic degradation of recombinant proteins: PCT/MY2009/000105</li> <li>12. A novel method for the purification of intracellular proteins (Malaysia): PI20094405</li> <li>13. A method to purify recombinant virus nucleocapsid protein of Nipah virus using hydrophobic interaction chromatography (Malaysia): PI20094406.</li> <li>14. Hepatitis B core particles with His tags (Malaysia): 20094721.</li> <li>15. Recombinant matrix protein of Nipah virus (Malaysia): 20094720, WO/2011/056060, PCT/MY2010/000211.</li> <li>16. Purification of antibodies against hepatitis B virus (Malaysia): PI2010005910.</li> <li>17. Virus-like Particles of <i>Macrobrachium rosenbergii</i> Nodavirus Capsid as a Carrier for Immunogenic Components (Malaysia): PI2014702540.</li> </ol>

<b>H. PROJEK PENYELIDIKAN TERDAHULU</b> (Past Research Project)					
<i>Project No.</i>	<i>Project Title</i>	<i>Role</i>	<i>Year</i>	<i>Source of fund</i>	<i>Status</i>
06-02-04-0054	Selection of peptides that inhibit the replication of hepatitis B virus	Project leader	1999-2001	MOSTI	Completed
50205-99-34	Identification of Newcastle disease virus receptor	Project leader	1999-2000	UPM	Completed
01-02-04-0107	Molecular characterization of Newcastle disease virus	Researcher	1999-2001	MOSTI	Completed
09-02-02-0123	Identification of bacterial and viral specific peptide inhibitors	Researcher	2000-2002	MOSTI	Completed
26-02-03-0128	Molecular characterization and functional studies of Nipah viral proteins	Researcher	2000-2003	MOSTI	Completed

00-373 RG/BIO/AS	Display of hepatitis B surface antigens on bacteriophage T7	Project leader	2001-2003	TWAS	Completed
09-02-04-0355-EA001	Display of hepatitis B antigens on bacteriophages: a new approach for designing therapeutic proteins	Project leader	2002-2004	MOSTI	Completed
01-02-04-003 BTK/ER/006	Development of novel therapeutic and diagnostic reagents from NDV	Researcher	2002-2005	MOSTI	Completed
06-02-04-0608-EA001	Detection of hepatitis B virus core antigen with a recombinant bacteriophage	Project leader	2003-2005	MOSTI	Completed
09-02-04-0622-EA001	Production and purification of hepatitis B core antigen from <i>Escherichia coli</i>	Researcher	2004-2006	MOSTI	Completed
09-02-04-0893-EA001	Identification of the binding site of viral hepatitis B inhibitor	Project leader	2004-2006	MOSTI	Completed
BM14 UK	Structural analysis of the complex of viral hepatitis B Capsid and a Peptide inhibitor	Project leader	2005	ESRF (France)	Completed
01-01-07-161FR	Synthesis and characterization of hepatitis B nanoparticles displaying immunogenic regions of Nipah virus	Project leader	2006-2008	MOHE	Completed
03-01-04-SF0015	Delivery of therapeutic peptides into human liver cells using virus-like nanoparticle	Project leader	2006-2008	MOSTI	Completed
01-02-04-003 BTK/ER/006	Identification of the self-assembly domain of Nipah virus nucleocapsid protein and its application in diagnosis	Project leader	2006-2008	MOSTI	Completed
05-01-04-SF0049	Bacteriophage as potential therapeutic agent against prevalent pathogens in local broiler chickens	Researcher	2006-2008	MOSTI	Completed
ABI (A)-11	Molecular farming for production of recombinant vaccine against Nipah virus	Project leader	2006-2009	ABI	Completed
04-10-07-278FR	Thermodynamic studies of hepatitis B virus inhibitors derived from the viral surface antigen	Project leader	2007-2009	MOHE	Completed
BF053 UPM	Recombinant NP-ELISA kit for the identification of Newcastle disease virus	Researcher	2008-2010	CRDF	Completed
RUGS-91977	Production and purification of hepatitis B virus protein	Researcher	2009-2011	RUGS	Completed
RUGS-91791	A scale-able production and direct purification process for recombinant green fluorescent protein (GFP) from <i>Escherichia coli</i>	Researcher	2009-2011	RUGS	Completed
05-01-09-0623RU	Structural studies of hepatitis B core particles in complex with peptide ligands	Researcher	2009-2011	RUGS	Completed
FRGS-UPM-180	Interactions between the matrix and nucleocapsid proteins of nipah virus	Project leader	2009-2011	FRGS	Completed
05-01-04-SF1016	Production of Nipah virus-like particles and development of an ELISA for the detection of Nipah virus antibodies	Project leader	2009-2011	MOA	Completed
05-01-09-0748RU	Genetically engineered bacteriophage for gene transfer to hepatocytes	Project leader	2009-2011	UPM	Completed
05-01-04-SF1149	Display of foot-and-mouth disease virus antigen on bacteriophage and its application in diagnosis	Project leader	2010-2012	MOA	Completed

05-02-11-1421RU	Cloning and expression of the capsid protein of <i>Macrobrachium rosenbergii</i> nodavirus in <i>Escherichia coli</i>	Project leader	2011-2012	UPM	Completed
05-02-11-1422RU	Structural and binding characterizations of a cyclic peptide inhibitor to hepatitis B virus surface antigen	Project leader	2011-2012	UPM	Completed
10-01-04-SS007	Structural studies of hepatitis B virus capsid using microgravity crystallization approaches	Project leader	2011-2013	MOSTI	Completed
02-01-14-SF1148	Linkage of cell penetrating peptides to hepatitis B virus capsid for specific targeting delivery into liver cells	Project leader	2011-2013	MOSTI	Completed
ERGS/1/2012/STG08/UPM/01/24	Display of the epitopes of hepatitis B virus on nodavirus nanoparticles	Project leader	2012-2015	MOHE	Completed
05-02-12-171RU	Specific delivery of drugs into liver cells by virus-based nanoparticles	Project leader	2012-2014	UPM	Completed
FRGS/2/2013/SKK04/UPM/01/1	Specific drug delivery to colorectal cancer cells by using nanogluce conjugated hepatitis B virus capsid	Project leader	2012-2015	MOHE	Completed
02-01-04-SF1749	Display of the matrix protein of influenza A virus on the surface of nodavirus capsid and its application in vaccine development	Researcher	2013-2016	MOSTI	Completed

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J. RANGKAIAN SOSIAL ( <i>Social Networking</i> )	
<i>Facebook</i>	<a href="https://www.facebook.com/wensiang.tan">https://www.facebook.com/wensiang.tan</a>
<i>LinkedIn</i>	<a href="https://my.linkedin.com/in/wen-siang-tan-912b206a">https://my.linkedin.com/in/wen-siang-tan-912b206a</a>
<i>Researchgate</i>	<a href="https://www.researchgate.net/profile/Wen_Siang_Tan">https://www.researchgate.net/profile/Wen_Siang_Tan</a>
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<i>PubMed</i>	<a href="https://www.ncbi.nlm.nih.gov/pubmed/?term=tan+wensiang">https://www.ncbi.nlm.nih.gov/pubmed/?term=tan+wensiang</a>