

Vinod RMT Balasubramaniam, PhD

vinod.balasubramaniam@monash.edu



Education:

Icahn School of Medicine in Mount Sinai, New York Postdoctoral training <i>Molecular virology</i>	2015-2017
Monash University Doctor of Philosophy (Ph.D.) <i>Host Cellular Genes Regulations during H5N1 Avian Influenza Virus Infection And Their Protein-Protein Interactions</i>	2014
AIMST University, Malaysia Bachelor of Science (B.Sc. Hons) majoring in Biotechnology <i>Amplification and Cloning of a Phenylalanine Ammonia Lyase promoter gene fragment from Dendrobium crumenatum</i>	2007

Employment history:

Monash University Malaysia B. Pharm: Microbiology and Immunology <i>Tutor- Demonstrated culture techniques for microorganism cultivations and morphologies</i>	2011-2013
Monash University Malaysia Jeffrey Cheah School of Medicine and Health Sciences <i>Post-doctoral fellow</i>	2014-2015
Microbiology Department, Icahn School of Medicine at Mount Sinai, New York, NY 10029, USA <i>Post-doctoral Research Associate</i>	2015 – 2017

Research Summary:

Host cellular machinery plays a vital role in the survival of viruses. The outcome of infection is determined by complex host-virus interactions with a large number of altered transcriptional and translational rates, and functional kinetics of participating genes. To date, the first-hand information on the molecular changes in the host induced by the virus to promote its replication and also the pathways triggered in the host that result in immunity and or clearance of the viral infection are still lacking. Having insights into the host's responses to viruses would help define targets for therapeutic intervention. I'm particularly interested in crosstalks between host and viral proteins; specifically, how host cells interact and the molecular mechanisms underlying the pathophysiological process of virus infection. Some of my previous and recent ongoing work include;

- Regulations of host cellular responses (comparison with various types of *Gallus gallus* organs) during infection with *Highly Pathogenic Avian Influenza virus*.
- Protein-protein interaction between host proteins (*Gallus gallus* lung and brain cDNA libraries) and *Influenza A* nucleoprotein.
- Interaction of *Aedes aegypti* proteins with *Dengue* serotype 2 Envelope protein.
- Evasion of *Zika* virus from Type I Interferon response in human and mouse cells.
- Live visualization of hemagglutinin dynamics during infection by using biarsenically labeled replication competent *Influenza A* virus.
- Using STAT2 knockout mice as disease model for *Zika* virus pathogenesis.
- Role of host KSHRP protein in *Influenza A* lifecycle.
- Deciphering neurotropism mechanism by Flaviviruses.

List of Publications:

- Sreeramanan, S., **Balasubramaniam, V.**, Sashi, S., & Xavier, R. (2008). Optimization of the Transient Gus a Gene Transfer of Phalaenopsis Violacea Orchid via Agrobacterium Tumefaciens: An Assessment of Factors Influencing the Efficiency of Gene Transfer Mechanisms. *Advances in Natural Applied Sciences*, 2(2), 77-88.
- **Balasubramaniam, V.**, Hassan, S.S., Omar, A.R., Mohamed, M., Noor, S.M., Mohamed, R., & Othman, I. (2011). Cellular transcripts regulated during infections with highly Pathogenic H5N1 Avian Influenza virus in 3 host systems. *Virology Journal*, 8(1), 196.
- **Balasubramaniam, V.**, Wai, T.H., Omar, A.R., Othman, I., & Hassan, S.S. (2012). Cellular transcripts of chicken brain tissues in response to H5N1 and Newcastle disease virus infection. *Virology Journal*, 9(1), 53.
- **Balasubramaniam, V.**, Wai, T.H., Tejo, B.A., Omar, A.R., & Hassan, S.S. (2013). Highly Pathogenic Avian Influenza Virus Nucleoprotein Interacts with TREX Complex Adaptor Protein Aly/REF. *PLoS ONE*, 8(9), e72429.
- Wai, T.H., **Balasubramaniam, V.**, Tejo, B.A., Ahmad, H., & Hassan, S.S. (2014). CPB1 of Aedes aegypti Interacts with DENV2 E Protein and Regulates Intracellular Viral Accumulation and Release from Midgut Cells. *Viruses*, 6(12), 5028-5046.
- Wai, T.H., **Balasubramaniam, V.**, Fang, C.M., Ahmad, H., & Hassan, S.S. (2015). Protein-protein interactions between Ae. Aegypti midgut and dengue virus 2: two-hybrid screens using the midgut cDNA library. *The Journal of Infection in Developing Countries*, 9(12), 1338-49.
- Grant, A., Ponia, S.S., Tripathi, S., **Balasubramaniam, V.**, Miorin, L., Sourisseau, M., Schwarz, M.C., Sánchez-Seco, M.P., Evans, M.J., Best, S.M., & García-Sastre, A. (2016). Zika Virus Targets Human STAT2 to Inhibit Type I Interferon Signaling. *Cell Host Microbe*, 19(6), 882-90.
- Soonthornvacharin, S., Rodriguez-Frandsen, A., Zhou, Y., Galvez, F., Huffmaster, N., Tripathi, S., **Balasubramaniam, V.**, Inoue, A., de Castro, E., Moulton, H., Stein, D., Sánchez-Aparicio, M., De Jesus, P.D., Nguyen, Q., König, R., Krogan, N., García-Sastre, A., Yoh, S., & Chanda, S.K. (2017). Systems-based Analysis of RIG-I-dependent Signaling Identifies KHSRP as an Inhibitor of RIG-I Receptor Activation. *Nature Microbiology*, 2, 17022.
- Tripathi, S., **Balasubramaniam, V.R.M.T.**, Brown, J.A., Mena, I., Grant, A., Bardina, S.V., Maringer, K., Schwarz, M., Maestre, A., Sourisseau, M., Albrecht, R., Krammer, F., Evans, M., Fernandez-Sesma, A., Lim, J.K., & García-Sastre, A. (2017). A Novel Murine Model Reveals Lineage Specific Differences in Zika Virus Pathogenesis and Host Inflammatory Immune Response. *PLoS Pathogens*, 13(3), e1006258.

- Khairat, J.E., **Balasubramaniam, V.**, Othman, I., Omar, A.R., & Hassan, S.S. (2017). Interaction of Recombinant Gallus gallus SEPT5 and Brain Proteins of H5N1-Avian Influenza Virus-Infected Chickens. *Proteomes*, 5(3), 23.
- Zhou, H., Liu, L., Li, R., Qin, Y., Fang, Q., **Balasubramaniam, V.R.M.T.**, Wang, G., Wei, Z., Ouyang, K., Huang, W., & Chen, Y. (2017). High prevalence and genetic diversity of canine astrovirus in pet dogs. *Virology Journal*, 14, 156.
- Janssens, S., Schotsaert, M., Karnik, R., **Balasubramaniam, V.**, Dejosez, M., Meissner, A., García-Sastre, A., & Zwaka, T.P. (2018). Zika Virus Alters DNA Methylation of Neural Genes in an Organoid Model of the Developing Human Brain. *mSystems*, 3, e00219-17.
- Wai, T.H., **Balasubramaniam, V.**, Kwan, O.M. & Fang, C.M. (2018). Viral Determinants and Vector Competence of Zika Virus Transmission. *Frontiers in Microbiology*, 9, 1040.
- Jaafar, N.I., Vasudevan, R., Ismail, P., Abdul Aziz, A.F., Mohamad, N.A., Kandavello, G., Raja Adnan, R.N.E., & **Balasubramaniam, V.** (2018). Analysis of Angiotensin Converting Enzyme, Endothelial Nitric Oxide Synthase & Serotonin Gene Polymorphisms among Atrial Septal Defect Subjects with and without Pulmonary Arterial Hypertension. *Journal of Cardiovascular Development and Disease*, 5, 48.
- Wickremsinghe, I.A.C., **R. M. T. Balasubramaniam, V.**, Mot, Y.Y., Dhanoa, A., & Hassan, S.S. (2018). Identification of Differentially Expressed Genes in BALB/c Mouse Liver upon Primary Infection with DENV1 and Sequential Heterologous Infection with DENV2. *Pathogens*, 7, 78.

Peer Reviewed Proceedings Published/Awards:

NATIONAL (Malaysia)

- **Conference on Applied Sciences (CAS), 13th -14th June 2006, Shah Alam, Malaysia.**
Sreeramanan, S., **Vinod, B.**, Shymala, S., and Xavier, R. *Transfer and expression of kanamycin, a selectable marker resistance gene in Labisia pumila var alata (Kacip Fatimah) plants.*
BEST POSTER AWARD – AGROBIOTECHNOLOGY CATEGORY
- **Regional Conference on Molecular Medicine (RCMM) 2nd-4th May 2009, Kelantan, Malaysia.**
Sharifah S.H., **Vinod B.**, Maizan M., Suriani M.N., Ramlan M., and Othman I. *Transcriptome Analysis of Lungs and Brains of Chickens during Infection with a Low Pathogenic H5N2 and High Pathogenic H5N1 Viruses.*

- **International Postgraduate Conference on Biotechnology (IPCB) 15th –18th December 2011, UMT, Terengganu, Malaysia.**
Vinod RMT Balasubramaniam, Sharifah S Hassan, Tham H Wai, Abdul R Omar, Iekhsan Othman. *Cellular Transcripts of Chicken Brain Tissues in Response to H5N1 infection.*
BEST POSTER AWARD-MICROBIAL BIOTECHNOLOGY CATEGORY
- **International Postgraduate Conference on Biotechnology (IPCB) 15th –18th December 2011, UMT, Terengganu, Malaysia.**
Tham Hong Wai, Sharifah S Hassan, **Vinod RMT Balasubramaniam**, Hamdan Ahmad. *Expression and Purification of Dengue Virus Non-Structural Protein 1 (NS1) for Virus-Host Cell Protein Interaction Studies.*
- **38th Annual Conference of the Malaysian Society for Biochemistry and Molecular Biology (MSBMB) 28th – 29th August 2013, Marriott Putrajaya, Federal Territory, Malaysia.**
Vinod RMT Balasubramaniam, Hong Wai Tham, Bimo Ario Tejo, Abdul Rahman Omar and Sharifah S Hassan. *Highly Pathogenic Avian Influenza Nucleoprotein Interacts with TREX Complex Adaptor Protein Aly/REF.*
- **38th Annual Conference of the Malaysian Society for Biochemistry and Molecular Biology (MSBMB) 28th – 29th August 2013, Marriott Putrajaya, Federal Territory, Malaysia.**
Hong Wai Tham, **Vinod RMT Balasubramaniam**, Hamdan Ahmad and Sharifah Syed Hassan. *Construction of whole adult Aedes aegypti cDNA library for use in yeast-two hybrid system in Dengue research.*
- **International Meeting & 42nd Annual Conference of the Malaysian Society for Biochemistry and Molecular Biology (MSBMB) 16th – 17th August 2017, Pullman Kuala Lumpur.**
Vinod RMT Balasubramaniam, Guojun Wang, Nacho Mena, Ying Chen, Abdul Rahman Omar, Shahjahan Yasin, Iekhsan Othman and Sharifah Syed Hassan. *Interactomics of H5N1 Avian Influenza.*
- **3rd Advanced Medical and Dental Institute International Biohealth Sciences Conference 18th – 20th January 2018, Riverside Majestic Hotel, Kuching, Sarawak.**
Vinod RMT Balasubramaniam, Abdul Rahman Omar, Shahjahan Yasin, Iekhsan Othman and Sharifah Syed Hassan. *Zika NS5 Protein Interactomics Reveal Possible Role Played By RPS20 In Pathogenesis.*

INTERNATIONAL

- **Awarded scholarship to participate in 7th HKU-PASTEUR VIROLOGY COURSE, 7 - 23 July 2010 HKU-Pasteur Research Centre, Hong Kong.**
- **Keystone Symposia Meeting on “Pathogenesis of Influenza: Host-Virus Interaction” 23rd May-28th May 2011, Sheraton Hong Kong Hotel & Towers, Kowloon, Hong Kong, China.**
Vinod B., Sharifah Syed Hassan, A.R. Omar, I. Othman. *Cellular transcripts regulated during infections with Highly Pathogenic H5N1 Avian Influenza virus in 3 host systems.*

- **AOHUPO 6th Congress, 5th May-7th May 2012, Beijing, China**
Vinod RMT Balasubramaniam, Iekhsan Othman, Abdul R Omar and Sharifah S Hassan.
Differential Proteomics of Bursal Tissues of Chickens Infected with Highly Pathogenic H5N1 Avian Influenza virus.
YOUNG SCIENTIST TRAVEL AWARD
- **HUPO 11th Annual Congress (HUPO 2012), 9th -13th September 2012, Hynes Convention Center, Boston, Massachusetts, USA.**
Vinod RMT Balasubramaniam, Iekhsan Othman, Abdul R Omar and Sharifah S Hassan. *Chicken Serine/Arginine-rich Splicing Factor Interacts with Nucleoprotein of Highly Pathogenic Avian Influenza Virus.*
- **Influenza2012: One Influenza, One World, 11th -13th September 2012, St. Hilda's College, Oxford, United Kingdom.**
Vinod RMT Balasubramaniam, Abdul R Omar, Iekhsan Othman and Sharifah S Hassan. *Construction of a chicken lung cDNA library and interaction with Highly Pathogenic Avian Influenza (HPAIV) H5N1 Nucleoprotein.*
- **IMED 2013, February 15th -18th 2013, Hilton Vienna, Austria.**
Vinod RMT Balasubramaniam, Bimo A Tejo, Abdul Rahman Omar, Iekhsan Othman and Sharifah Syed Hassan. *SRSF3 interacts with Nucleoprotein of Influenza A virus: Implications on viral mRNA nuclear export?*
- **IMED 2013, February 15th -18th 2013, Hilton Vienna, Austria.**
 Tham Hong Wai, **Vinod RMT Balasubramaniam**, Hamdan Ahmad, Iekhsan Othman and Sharifah Syed Hassan. *Discovery of novel mosquito-dengue viral protein interactions: Construction of whole adult Aedes aegypti cDNA library for use in yeast-two-hybrid system.*
- **9th Annual NIAID Centers of Excellence for Influenza Research and Surveillance (CEIRS) Conference, June 26th - June 29th, 2016 Memphis, TN, USA.**
Vinod Balasubramaniam, Luiz Gustavo dos Anjos Borges, Randy Albrecht, Adolfo García-Sastre, Shashank Tripathi. *Live visualization of Hemagglutinin dynamics during infection by using biarsenically labeled replication competent Influenza A virus.*
- **30th Symposium on Virus-Host Interactions, The New York Academy of Medicine (NYAM), January 31st, 2017 New York, NY 10029, USA.**
 Shashank Tripathi, **Vinod Balasubramaniam**, Julia A. Brown, Ignacio Mena, Alesha Grant, Susana V. Bardina, Kevin Maringer, Ana Maestre, Marion Sourisseau, Randy Albrecht, Florian Krammer, Matthew Evans, Ana Fernandez-Sesma, Jean K. Lim, Adolfo García-Sastre. *A Novel Murine Model Reveals Lineage Specific Differences in Zika Virus Pathogenesis and Host Inflammatory Immune Response.*

- **Keystone Symposia Meeting on “Type I Interferon: Friend and Foe Alike” March 19th - March 23rd 2017, Fairmont Banff Springs, Banff, Alberta, Canada.**
Raquel Muñoz- Moreno, Asiel Arturo Benitez, Carles Martínez- Romero, **Vinod Balasubramaniam**, Maryline Panis, Ignacio Mena, Juan Ayllón, David Sachs, Benjamin R. tenOever, Adolfo García-Sastre. *A novel Influenza A barcoded- library reveals NSI adaptations to the host.*
- **Negative Strand Viruses, NSV 2018, June 17th – June 22nd 2018, Verona, Italy.**
Raquel Muñoz-Moreno, Carles Martínez-Romero, Asiel Arturo Benitez, Christian Forst, Daniel Blanco-Melo, Raffael Nachbagauer, **Vinod Balasubramaniam**, Ilseob Lee, Sadaf Aslam, Maryline Panis, Ignacio Mena, Juan Ayllón, David Sachs, Florian Krammer, Benjamin R. Tenover, Adolfo García-Sastre. *A Barcoded Library Unveils NSI-Driven Influenza Virus Tropism.*

Supervision of Graduate Research Students:

1. Candidate: (Ms) Nur Omar Macha (22353178)
Degree: Doctor of Philosophy, PhD (0047)
Supervisor: Associate
Percentage: 20%
Date of commence: 1/9/2015, On-going (Full-time)
2. Candidate: (Mr) Hesham Moustafa Elshahawi (26088762)
Degree: Postgraduate Diploma
Supervisor: Associate
Percentage: 30%
Date of commence: 1/3/2018, On-going (Full-time)
3. Candidate: (Ms) Nur Amelia Azreen (30131286)
Degree: Doctor of Philosophy, PhD (0047)
Supervisor: Associate
Percentage: 50%
Date of commence: 1/11/2018, On-going (Full-time)

Teaching:

- my Development PhD program : MUM MNHS: CRISPR and qRT-PCR Techniques in Microbiology (FMNHS-Malaysia MUM0118A) (10 hours)
- Student Project Cases tutor (2018)
- Young Scholars Program Co-Coordinator

Grants:

- **2018 Tropical Medicine & Biology Platform Monash University Malaysia Seed Fund, Project Leader (RM 10,000)**
Mapping of Zika virus NS5 protein interactomics with human universal cDNA library. - Dr. Vinod RMT Balasubramaniam (ECR), Assoc Prof Sharifah Syed Hassan, Hesham (HDR student).
- **Jeffrey Cheah Scholar-in-Residence Programme (2018)**, travel grant (flight, accommodation, meals) in Brasenose College, Oxford (7th August 2018 to 7th September 2018). Attachment in Prof. William James lab, Oxford Stem Cell Centre, (Unraveling Zika Virus pathogenesis using IPS derived cerebral organoids).
- **2018 Fundamental Research Grant Scheme (FRGS) from Ministry of Higher Education (MOHE) Malaysia, Project Leader (2018-2021)**
Deciphering Zika virus induced neurotropism via whole genome mapping of Zika virus interactomics with human brain library. - Dr. Vinod, Assoc Prof Sharifah Syed Hassan, Dr. Tham Hong Wai.

Strengths:

Molecular Biology, Microbiology, Virology, IFN Signaling, 2D Proteomics, Protein-protein interaction, Animal cell culture, siRNA based antivirals, Avian Influenza, Flavivirus, cDNA Library.

Languages:

English, Bahasa Malaysia and Tamil

Memberships:

*Global Health and Emerging Pathogens Institute (GHEPI), Mount Sinai, New York
International Society for Infectious Diseases (ISID)
American Society for Virology (ASV)
Malaysian Society for Biochemistry & Molecular Biology (MSBMB)
Monash Alumni
Jeffrey Cheah School of Medicine Early Career Research (ECR) representative
Monash University Malaysia Academic Staff Association (MUMASA)*