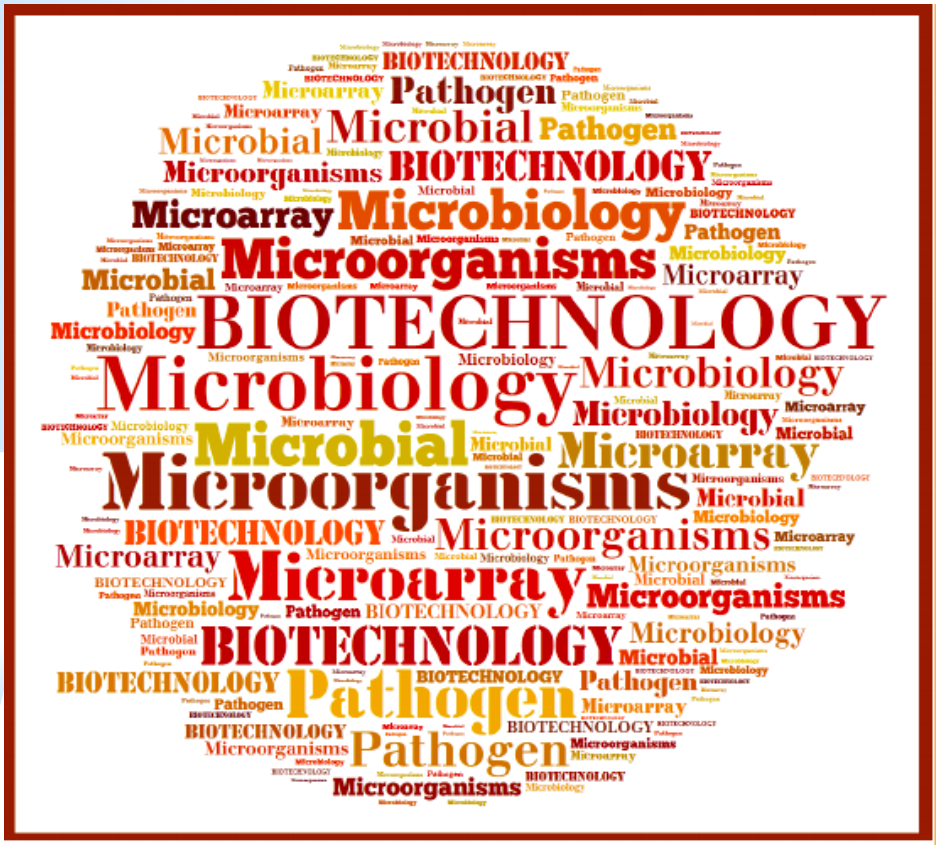
Singapore Society for Microbiology and Biotechnology 45th Annual General Meeting



Venue:
MD4, Level 2
Seminar Room,
10 Medical Drive,
Yong Loo Lin School of
Medicine,

Date: 8th March 2018, 3.00-5.00pm
Venue: MD4, level 2 Seminar Room, NUS

Programme:

3.00 pm – Seminar by Dr Richard Sayre, CSO, Pebble Labs:
Targeted Suppression of Essential Pathogen Genes for Control of Vector-Borne Diseases in Mosquitoes

3.30 pm – Seminar by A/Prof Dang Thuy Tram, NTU
Modulation of host wound healing response to implantable biomaterials and cell-based systems

4.00 pm – Tea-break

4.15 pm – SSMB 45th Annual General Meeting

SSMB 45th AGM Talk 1:

Targeted Suppression of Essential Pathogen Genes for the Control of Vector-Borne Diseases in Mosquitoes: Bacterial Production and Delivery of Interfering RNAs to Control Viral Replication

Dr Richard Sayre, Ph. D, Chief Scientific Officer, Pebble Labs, USA.

Abstract

Mosquito-borne pathogens including; dengue, Chikungunya, yellow fever, and zika account for over a 100,000 deaths globally each year. Significantly, human mortality and morbidity, due to vector-borne diseases, has the potential to spread rapidly due to increased global travel, environmental changes associated with global warming, and the resulting increased contact between humans and insect vectors. Various strategies have been developed to control mosquitoes that transmit these diseases including; the application of broad-spectrum chemical pesticides, and more recently the release of engineered sterile mosquitoes. In contrast, Pebble Labs' vision is to make mosquitoes free of human pathogens and do so at minimal cost and impact on the environment. Our strategy for eradicating pathogens from mosquitoes is to engineer and deliver to the mosquitoes enteric or endosymbiotic bacteria that produce and deliver double-stranded RNA (dsRNA). These dsRNAs specifically target and suppress the expression of essential pathogen genes required for their replication. We show that bacterially delivered dsRNAs are processed into small interfering RNAs that through the action of the mosquito Dicer-RISC complex resulting in the degradation of targeted messenger RNAs. Using model alpha viruses that infect mosquitoes as targets, we demonstrate complete suppression of viral replication in adult mosquitoes following a blood meal. Our engineered bacteria have been chosen so that they persist throughout all life stages of the mosquito. By infecting mosquito larvae in water with bacteria designed to deliver viral inactivating dsRNAs, we also substantially reduce the costs of dsRNA production and delivery, and increase its effectiveness for targeted pathogen control. Significantly, this platform technology also has applications for the control of diseases and parasites in plant crops and farm (shrimp) animals. These applications will be discussed.

Biography

Dr. Richard Sayre is currently the Chief Scientific Officer for Pebble Labs and a Senior Research Scientist at the New Mexico Consortium (NMC). Dr. Sayre's research interests include; characterization of primary processes in photosynthesis, algal and plant biotechnology, and nutritional biofortification of crop plants. Dr. Sayre completed his undergraduate degree in biology at Humboldt State University, his Ph. D. at the University of Iowa, and did postdoctoral work at Harvard University. From 1986-2008, Dr. Sayre was a faculty member (1986-2008) and later Chairman of the Department of Plant Cellular and Molecular Biology at Ohio State University. Prior to coming to the NMC, Dr. Sayre was the Director (2008-2011) of the Enterprise Rent-A-Car Institute for Renewable Fuels at the Donald Danforth Plant Science Center in St Louis. Subsequently, Dr. Sayre joined Los Alamos National Laboratory (LANL) in 2011 as a Senior Research Scientist-6, one of only twenty scientists at LANL with this top research classification. In 2017, he retired from LANL to devote more time to Pebble Labs. Dr. Sayre has directed a number of major research programs throughout his career. From 2005-2010, Dr. Sayre directed Phase I of the BioCassava Plus Program funded by the Grand Challenges in Global Health Program of the Bill and Melinda Gates Foundation. The BioCassava Plus program focused on developing enhanced cassava cultivars to provide complete nutrition for subsistence farmers in sub-Saharan Africa. Dr. Sayre has also served as the Principle Investigator (2009-2011) for the Center for Advanced Biofuel Systems, a Dept. of Energy (DOE) Energy Frontier Research Center, and was the scientific director of the National Alliance for Advanced Biofuels (2010-2013). He is currently the Director of the PACE algal biomass and bioproducts program supported by the US-DOE. Dr. Sayre has received several honors including: Distinguished Professor in the College of Biological Sciences, Ohio State University (2005-2008); honorary member of Phi Beta Kappa (2006); Fulbright Scholar at the Inst. Quimica, University Sao Paulo, Brazil. (2007); Selected by Nature as one of "Five Crop Researchers Who Could Change the World" (Nature 456: 563-569, 2008); invited attendee at Google/Nature/O'Reilly SciFoo Camp for Innovators (2009); and was elected a Fellow of the American Association for the Advancement of Sciences (2011). Dr. Sayre has published over 120 peer-reviewed articles and is an associate editor for Frontiers in Energy Research, was the founding editor of Algal Research, and past co-organizer of the International Conference on Algal Biomass, Biofuels and Bioproducts.

Web site: http://newmexicoconsortium.org/research/plants

SSMB 45th AGM Talk 2:

Modulation of host wound healing response to implantable biomaterials and cell-based systems

Dr Dang Thuy Tram, Assistant Professor, School of Chemical and Biomedical Engineering, Nanyang Technological University, Singapore

Abstract

Host wound healing response to biomaterials and medical devices poses tremendous challenges to their clinical applications. The activities of early immune cells and long-term fibrotic overgrowth often lead to the failure of implantable medical devices. In this talk, I will discuss the use of non-invasive imaging approach to characterize the activity of early inflammatory biomarkers in the host response to implanted polymeric biomaterials and drug delivery systems. This approach gives new fundamental insight into the influence of material surface charge on the generation of early inflammatory markers to facilitate rational design of biomaterial surfaces which favourably modulates biomaterial-mediated host response. In another application, our strategy also leads to the identification of drug candidate that reduces fibrotic overgrowth on therapeutic cell-based systems to improve their efficacy in diabetes treatment.

Biography

Dr Dang Thuy Tram is Assistant Professor at the School of Chemical and Biomedical Engineering and a Fellow of the Ageing Research Institute for Society and Education (ARISE) at Nanyang Technological University (NTU), Singapore. Dr Dang received her B.Sc degree from the University of Illinois, Urbana-Champaign (USA) and Ph.D. degree from Massachusetts Institute of Technology (USA), both in Chemical Engineering. She also conducted her postdoctoral training as a Controlled Release Society fellow at Brigham and Women's Hospital, Harvard Medical School (USA). Prior to joining NTU, she was a Senior Research Fellow at the Institute of Medical Biology, Agency for Science, Technology & Research (A*STAR), Singapore. She was the recipient of the A*STAR Singapore National Science Fellowship, MIT Edward Clark Presidential Fellowship and the Controlled Release Society Sung Wan Kim postdoctoral fellowship. Dr Dang's Therapeutic Cellular and Drug Delivery System Laboratory at NTU currently focuses on the design of biomaterials, drug delivery and cell-based systems for therapeutic applications in the treatment of diabetes and wound healing.