THAMMASAT UNIVERSITY
FACULTY OF PUBLIC HEALTH

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Abstracts of

5th One Health Lecture Series

on Emerging Infectious Diseases and Environmental Health

Date and Time : **16 December 2020, 08:00-14:45 h**

Hosted by : Faculty of Public Health, Thammasat University, Rangsit Campus, Pathumthani Province, Thailand
Co-hosted by : Hokkaido University and Rakuno Gakuen University, Japan
Venue : Online seminar

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A Tentative Program of the 5th One Health Lecture Series on Emerging Infectious Diseases and Environmental Health

Hosted by : Faculty of Public Health, Thammasat University, Rangsit Campus, Pathumthani Province, Thailand

Co-hosted by : Hokkaido University and Rakuno Gakuen University, Japan

Date and Time : 16 December 2020 , 08:00-14:45 h (Thai time, GMT+7)

Venue : Online Seminar

Time	Topic	Speaker
08:00 - 08:30	Program orientation and video presentation of One Health Lecture Series milestone	Moderators Asst. Prof. Adisak Bhumiratana
08:30 - 08:50	Welcome address by Dean	Assoc. Prof. Dr. Sasitorn Taptagaporn Faculty of Public Health, Thammasat University
	Opening remark by Vice Rector for International Affairs	Assoc. Prof. Dr. Kitti Prasirtsuk Thammasat University
08:50 - 09:30	*Keynote lecture:* How to tackle infectious diseases by "One Health" approach	Prof. Dr. Yasuhiko Suzuki Research Center for Zoonosis Control, Hokkaido University
09:30 - 09:45	*Special lecture:* Defying SARS-CoV-2 gravity in the lower Mekong region: a transdisciplinary (One Health) approach to pandemic preparedness planning	Dr. Andrew Lee Corwin Faculty of Public Health, Thammasat University
09:45 - 10:00	*Special lecture:* Whole of Society Interventions: Myth or Reality?	Asst. Prof. Dr. William Aldis Faculty of Public Health, Thammasat University
10:00 - 10:15	Profiling of viral protein-RNA interaction during infection of emerging tick-borne bandavirus	Dr. Keita Matsuno Research Center for Zoonosis Control, Hokkaido University
10:15 - 10:30	Relationship between hepatitis E virus and the host	Prof. Dr. Katsuro Hagiwara School of Veterinary Medicine, Veterinary Virology, Rakuno Gakuen University
10:30 - 10:45	Cell-mediated Immune Response to Avian Influenza H5N1 Virus	Asst. Prof. Dr. Pirom Noisumdaeng Faculty of Public Health, Thammasat University
10:45 - 11:00	Microplastics contamination in aquatic animals in the Chao Phraya river estuary	Dr. Manapron Wongsoonthornchai Faculty of Public Health, Thammasat University

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Venue : **Online Seminar**

Time	Topic	Speaker
11:00 - 12:00	**Lunch break**	
12:00 - 12:15	Characterization of SARS-CoV-2 variants with mutations at the S1/S2 cleavage site	Dr. Michihito Sasaki Research Center for Zoonosis Control, Hokkaido University
12:15 - 12:30	Infectivity of bioaerosols - possible association with air pollutants	Assoc. Prof. Dr. Jun Noda School of Veterinary Medicine, Environmental Health, Rakuno Gakuen University
12:30 - 12:45	Assessment of indoor air quality and particle size distribution of total bacteria and *Staphylococcus* spp. in a hospital	Dr. Kanjana Changkaew Faculty of Public Health, Thammasat University
12:45 - 13:00	**Afternoon Break**	
13:00 - 13:15	Interdisciplinary and international approach to overcoming mine pollution in Zambia	Dr. Hokuto Nakata Faculty of Veterinary Medicine, Hokkaido University
13:15 - 13:30	Parasitic Helminthiasis and Wild Animal Medical Center of Rakuno Gakuen University, Japan	Prof. Dr. Mitsuhiko Asakawa School of Veterinary Medicine, Parasitology and Zoology Rakuno Gakuen University
13:30 - 13:45	*Brugia pahangi* parasitic ecosystem: landscape ecology and epidemiology of epizootic *B. pahangi* in Thailand	Asst. Prof. Adisak Bhumiratana Faculty of Public Health, Thammasat University
13:45 - 14:00	Rabies dynamics in ecosystem in northern South Africa	Prof. Dr. Kohei Makita School of Veterinary Medicine, Veterinary epidemiology, Rakuno Gakuen University
14:00 - 14:15	Health risk assessment of exposure to multiple heavy metals among children living in a Vietnamese informal e-waste recycling village	Dr. Hien Thi Thu Ngo Department of Public Health, Faculty of Health Sciences, Thang Long University
14:15 - 14:30	Studies on DNA gyrase of *Campylobacter jejuni* as the target of quinolones	Dr. Ruchirada Changkwanyeun Faculty of Public Health, Thammasat University
14:30 - 14:45	Closing address by Dean	Assoc. Prof. Dr. Sasitorn Taptagaporn Faculty of Public Health, Thammasat University

Welcome Address

by Associate Professor Dr. Sasitorn Taptagaporn

The Dean of Faculty of Public Health, Thammasat University

16 December 2020

Excellencies,

Associate Professor Dr.Kitti Prasirtsuk, Vice Rector for International Affairs of Thammasat University,
Prof. Hiroshi KIDA, Head, Research Center for Zoonosis Control
Prof. Yasuhiko SUZUKI, Director, Research Center for Zoonosis Control
Associate Prof. Masaru USUI, School of Veterinary Medicine, Rakuno Gakuen University
Prof. Mayumi ISHIZUKA, Faculty of Veterinary Medicine, Hokkaido University
Professor Dr. Kohei Makita, Rakuno Gakeun University,
Distinguished Delegates, Ladies and Gentlemen,

On behalf of the Faculty of Public Health, Thammasat University, I am honored to express our deep consolidation of hosting the fifth One Health Lecture Series on Emerging Infectious Diseases and Environmental Health on 16 December 2020, at Faculty of Public Health, Thammasat University. Today, our continued consolidation of this fifth online seminar emerged out of our collaboration network among three universities: Hokkaido University, Rakuno Gakuen University, and Thammasat University.

Undoubtedly, this seminar marks the start of fruitful academic collaboration and cooperation among our universities. Faculty of Public Health, Thammasat University sincerely appreciates all distinguished delegates from Hokkaido University, Rakuno Gakuen University, and all other participants attending to this online seminar; who are interested in doing multidisciplinary research and obtaining currently emerged One Health issues from multisectors including various universities, ministries, national organizations, and international organizations.

In September 11, 2019, the Hokkaido University and Thammasat University renewal academic exchange agreement. Our universities entered into formal memorandum of understanding on academic exchange student and collaboration. Based on university agreement, Faculty of Public Health, Thammasat University utilized augmented mechanisms for development of international PhD program in Global Health under MOU on Cotutelle program between Hokkaido University and Faculty of Public Health, Thammasat University that could accelerate the program open for the international applications in academic year 2019.

In March 2016, the Rakuno Gakuen University and Thammasat University signed Memorandum of Understanding on academic agreement. Faculty of Public Health, Thammasat University and Rakuno Gakuen University joint active and fruitful technical cooperation such as research, academic symposium several time during the past five years. We are convinced that there are great potentials that both universities can strengthen the technical cooperation for our mutual benefits more. And our faculty certainly is hoping to continue the research and the engagement with your university.

Activities act on our shared and mutual interest with regard to our commitment to education and research on zoonosis and One Health are as follows: Firstly, the meetings on collaborating and cooperating research and education, strengthening network, and continuing Lecture Series on One Health;

Secondly, the development of collaborative research projects between Hokkaido, Rakuno Gakuen, and Thammasat University.

An ongoing 2017–2018 project entitled "Surveillance of antimicrobial resistance in bacteria isolated from swine farms and pork in Thailand", granted by Thammasat University in collaboration with Hokkaido University and Rakuno Gakuen University.

Other ongoing project entitled "Surveillance and characterization of antimicrobial resistant *Escherichia coli* and *Salmonella* from swine farms and pork in Thailand", granted by WHO in collaboration with Hokkaido University under WHO AGISAR Country project in 2016–2017.

Thirdly, human resource development by accepting our scientist enrolling into PhD program and staff doing research at Hokkaido University in 2016–2018.

These are only the beginning, I do hope we closely build and strengthen more collaboration in various strands of global health between our universities. This seminar helps us understand more about how to build interdisciplinary collaboration to the "One World, One Health" that require our collaborative and cooperative efforts. Again, I am most grateful for sharing great visions and contributing greatly to our success.

Thank you.

Assoc. Prof. Dr. Sasitorn Taptagaporn

Dean
Faculty of Public Health, Thammasat University

Vice Rector for International Affairs Speech

The 5th One Health Lecture Series on Emerging Infectious Diseases and Environmental Health Faculty of Public Health, Thammasat University

16 December 2020

Prof. Hiroshi KIDA, Head, Research Center for Zoonosis Control
Prof. Yasuhiko SUZUKI, Director, Research Center for Zoonosis Control
Associate Prof. Masaru USUI, School of Veterinary Medicine, Rakuno Gakuen University
Prof. Mayumi ISHIZUKA, Faculty of Veterinary Medicine, Hokkaido University
Professor Dr. Kohei Makita, Rakuno Gakeun University,
Distinguished Delegates, Ladies and Gentlemen,

It gives me great pleasure to extend to you our appreciation on behalf of Thammasat University and to say how grateful we are to Hokkaido University, Rakuno Gakuen University and the Faculty of Public Health, for hosting a 2020 online seminar, the 5th "One Health Lecture Series on Emerging Infectious Diseases and Environmental Health", here at Thammasat University.

The tri-partite agreement and partnership between the Research Center for Zoonosis Control, Hokkaido University, Rakuno Gakuen University, and Faculty of Public Health, Thammasat University provide a much needed platform for global collaboration in the partnership in research and educational programs to strengthen the public health and One Health workforce to meet the challenges of the 21st century. Our collaborations have started in 2016 in the form of the annual "Lecture Series on One Health" for four consecutive years. And today our successful collaboration has brought about the fifth online seminar, which I strongly believe that it can effectively link to the development of collaborative research and education programs, focusing on operationalizing the One Health approach to global public health.

I firmly believe this seminar can contribute significantly to sharing research knowledge and experiences in public health and one health, that shall broaden the perspectives of our young researchers to be more motivated, and more significantly, producing high-impact research for the benefit of our global society.

I can reassure you all that I will firmly support our collaboration with my full capacity. And I wish all of you very successful deliberation of our important task today.

Thank you very much.

Assoc. Prof. Dr. Kitti Prasirtsuk

Vice Rector for International Affairs
Thammasat University

Keynote lecture

How to Tackle Infectious Diseases by "One Health" Approach

Prof. Dr. Yasuhiko Suzuki

Director
Research Center for Zoonosis Control,
Hokkaido University
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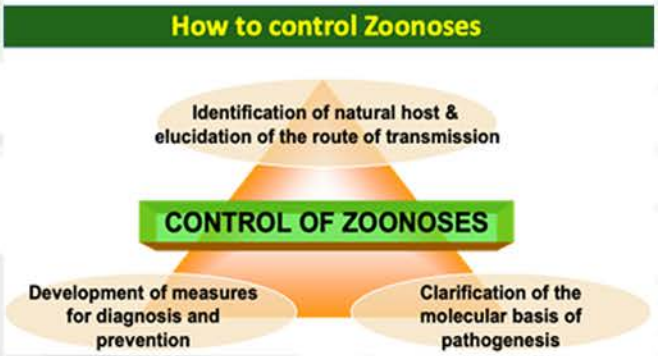
Infectious diseases, such as COVID-19, influenza, ebola virus disease, Middle East Respiratory Syndrome (MERS), anthrax, tuberculosis, sleeping sickness and so forth are zoonoses, which are constantly emerging and/or re-emerging worldwide, and become of major concern to public health. These zoonoses have been caused by agents that have been maintained in their reservoirs (domestic or wild animal species) often without any symptom and are transmitted to other animals, livestock or humans by chance and cause severe diseases in the new hosts.

In this situation, well-organized network specialized in the control of zoonoses plays a key role for the control of zoonoses. Such an organization can lead comprehensive researches on diagnosis, host range, ecology and the pathogenicity of zoonotic agents to establish strategies for prediction, prevention and control of zoonoses.



Hokkaido University has established Research Center for Zoonosis Control in April 2005 in order to conduct researches and education for the control of zoonoses. Research Center for Zoonosis Control has been conducting unique activities in researches and education by employing experts from various distinct fields such as microbiology, immunology, pathology, pharmacology and bioinformatics. Such a research environment is most desirable for collaborators from other institutions worldwide.

Research Center for Zoonosis Control is operating one of the biggest biosafety level 3 (BSL 3) facilities in Japan, which is essential for the researches on the highly pathogenic zoonotic agents. The BSL 3 facilities are ready to use by researchers and public health employees from other institutions. This enables wide collaborations in various distinct areas of emerging / re-emerging infectious diseases.

In this Keynote Lecture, activities of Research Center for Zoonosis Control to tackle infectious diseases by "One Health" approach will be introduced.

Defying COVID-19 Gravity in the Lower Mekong Region: a Transdisciplinary "One Health" Approach to Pandemic Preparedness

Dr. Andrew Lee Corwin

Faculty of Public Health
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Dire COVID-19 expectations in Lower Mekong Region (LMR) can be understood as Cambodia, Lao PDR, Myanmar, Thailand and Vietnam have stared-down a succession of Emerging Infectious Disease (EID) zoonotic threats emanating from neighboring China. And yet, the LMR, excepting Myanmar, has proved surprisingly resilient in keeping COVID-19 contained to mostly sporadic cases. The comparable success of the LMR in averting pandemic disaster can be attributed to years of preparedness investments, triggered by Avian Influenza A(H5N1) concerns. A forward looking transdisciplinary "one health" approach to capacity building provided for the likes of: virological, influenza driven surveillance; laboratory capable diagnostics; field epidemiology training (also fostering animal and human health cooperation); cross-border coordination and simulation training exercises; and vaccine preparation, etc., as applied to COVID-19 containment. The notable achievement of the LMR in averting a COVID-19 disaster can be largely credited to these preparedness measures, and more.

Whole of Society Interventions: Myth or Reality?

William L. Aldis MD

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Complex social problems must be addressed a level sufficient to engage all organizations and individuals whose participation is necessary to solve the problem, or who are impacted by the problem and will suffer consequences if the problem cannot be solved. National governments, governmental ministries and parastatals, affected individuals and their communities, non-governmental organizations including civil society groups, political parties (including opposition parties), private companies, and anti-government groups which may even include rebel military groups, are all possible (and in some cases essential) participants. Collaborative solutions for complex social problems which engage a broad variety of partners from different sectors and disciplines are termed whole of society approaches. Examples of problems requiring this approach are pandemics and zoonotic diseases, climate change, armed conflict, and natural or manmade disasters.

It is possible, with time and careful planning, to define a problem requiring a whole of society approach, identify individuals and organizations who must be engaged, and propose solutions. However, actually implementing a whole of society approach is a daunting challenge. This requires sophisticated analytical, communication, social, negotiation and political skills. In the absence of this skill set and accompanying implementation capacity, whole of society approaches which look good on paper may be neither effective nor sustainable in reality. Considering the complexity of this approach, it is not surprising that many attempts to carry out whole of society approaches do not succeed.

How do we move from aspirational whole of society attempts (the myth) to those which are effective and sustainable (the reality)? This presentation will explore specific operational elements necessary to implement and sustain whole of society approaches, based on examples of interdisciplinary and inter-sectoral collaborations from Sierra Leone, Indonesia, Democratic Republic of the Congo, and Thailand.

Profiling of Viral Protein-RNA Interaction During Infection of Emerging Tick-borne Bandavirus

Dr. Keita Matsuno

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Severe fever with thrombocytopenia syndrome (SFTS) is a fatal tick-borne disease in humans and felines. The causative agent of SFTS is a bandavirus named SFTS virus (SFTSV) that carries a tripartite negative-strand RNA genome. The nucleocapsid protein (N) of SFSTV is an RNA-binding protein forming the ribonucleoprotein complex that is essential for viral RNA synthesis, replication, and virion production. While SFTSV N may also interact with host cell-derived RNAs, host RNAs bound to N have not yet been studied in depth.

Here, we performed immunoprecipitation of SFTSV N and sequenced co-immunoprecipitated RNAs together with N in a strand-specific manner to profile N-binding host RNAs. Whereas the majority of N-binding RNAs were viral RNAs, 3.7% of the N-binding RNAs were identified to be host RNAs. Among these N-binding host RNAs, 27 host RNAs were confirmed to be precipitated with N using real-time PCR in addition to the sequencing. Then, we examine the contribution of these host RNAs in SFTSV replication; Knockdown of most of these host RNAs suppressed the virus replication. The expressions of the N-binding host mRNAs increased in the SFTSV-infected cells, but any changes of those of proteins encoded on the mRNAs were not detected, suggesting N sequesters the host mRNAs.

Our results demonstrate that N-binding to some specific host RNAs is potentially necessary for efficient virus RNA replication and/or transcription. Clarifying viral protein-host RNA interaction may facilitate our understanding on the molecular basis of the pathogenicity of SFTSV.

Relationship Between Hepatitis E Virus and The Host

Prof. Dr. Katsuro Hagiwara

School of Veterinary Medicine,
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Hepatitis E virus (HEV) is one of the causative agents of hepatitis in humans. Clinical symptoms of HEV infection varies from asymptomatic to acute fulminant hepatitis. The case fatality rate among pregnant women is about 20%, which increases during the second and third trimesters. HEV is a non-enveloped, single-stranded positive-sense RNA virus classified in Hepeviridae. The 7.2 kb genome of HEV is composed of three open reading frames including ORF1 (non-structural protein), ORF2 (capsid protein) and ORF3 (accessory proteins associated with virion cellular protein kinase activity and virion release). HEV is environmentally resistant and remain infectious even after heat treatment at 60 °c.

HEV associated with human hepatitis is genetically classified into 4 genotypes. Genotypes 1 and 2 which are water-borne diseases are endemic in Asia, Africa, and South America. The virus causes outbreaks involving large populations by contaminated food and drink. Genotypes 3 and 4 are considered to be zoonosis. The viruses (genotypes 3 and 4) are distributed all over the world, and contaminated water and unheated meat are the main factors. Iatrogenic infection cases such as transfusion-transmitted HEV has been reported at several countries including Japan, and the origin of HEV comes from the organs or blood from infected donor.

Epidemiological studies have revealed that HEV infections in pigs are ubiquitous worldwide and the majority of pigs are seropositive. HEV shedding in feces has been observed mainly in piglets after weaning, but rarely detected in the end of fattening pigs. In addition, detection of HEV has been reported in livers sold in Japan and USA. HEV has been reported to be infected in various animal species and is recognized as a zoonotic disease. Humans can also be a reservoir for the virus. The risk factors for HEV infection are related poor sanitation area in the world and the consumption of undercooked contaminated meat or water. The One Health concept is an important element in the preventive measures against this viral infection.

Cell–mediated Immune Response to Avian Influenza H5N1 Virus

Asst. Prof. Dr. Pirom Noisumdaeng

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The study on immunity to avian influenza H5N1 virus infection in humans is highly important in term of vac cine development and influenza pandemic preparedness. Nevertheless, the information in the particularly cell-mediated immune response is sparse and poorly understood due to with limited numbers of H5N1 survivors. The present study demonstrated the homosubtypic and heterosubtypic T cell mediated immunity against highly pathogenic avian influenza A (H5N1) virus in four H5N1 survivors who are valuable for studying sub type-specific immune response to the virus. Additionally, this study demonstrated the cross-reactive T cell immune response in 33 non-H5N1 subjects including 10 H3N2 patients and 23 healthy individuals. *Ex* vivo IFN-γ ELISpot assay using overlapping peptides spanning the entire nucleoprotein (NP), matrix (M) and hem agglutinin (HA) derived from A/Thailand/1(KAN-1)/2004 (H5N1) virus was employed in adjunct with flow cy tometry for determining T cell functions. Microneutralization (microNT) assay was performed to determine the status of previous H5N1 virus infection.

IFN-γ ELISpot assay demonstrated that survivors no. 1 and 2 had markedly higher T cell responses against H5N1 NP, M and HA epitopes than survivors no. 3 and 4; and the magnitude of T cell responses against NP were higher than that of M and HA. Durability of the immunoreactivity persisted for as long as four years after disease onset. Upon stimulation by NP in IFN-γ ELISpot assay, 60% of H3N2 patients and 39% of healthy subjects exhibited a cross-reactive T cell response. The higher frequency and magnitude of responses in H3N2 patients may be due to blood collection at convalescent phase of the patients. In H5N1 survivors, the effector peptide-specific T cells generated from bulk culture PBMCs by in vitro stimulation displayed a poly function by simultaneously producing IFN-γ and TNF-α, together with upregulation of CD107a in recognition of the target cells pulsed with peptide or infected with rVac-NP virus as investigated by flow cytometry. This study provides an insight into the better understanding on the homosubtypic and heterosubtypic T cell-mediated immune responses in H5N1 survivors and non-H5N1 subjects. NP is an immunodominant target of cross-recognition owing to its high conservancy. Therefore, the development of vaccine targeting the conserved NP may be a novel strategy for influenza vaccine design.

Microplastics Contamination in Aquatic Animals in the Chao Phraya River Estuary

Manaporn Wongsoonthornchai, Ph.D.

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Microplastics (MPs) are plastic particles smaller than 5 mm. MPs enter to the surface water by many pathways such as domestic wastewater, industrial wastewater, and surface runoff; therefore, aquatic animals can easily ingest these MPs. The adverse effects of MPs become from the plastic additives such as phthalates and BPA and hydrophobic contaminants such as PCBs and pesticides. Chao Phraya river estuary is a hotspot area of water pollutions in Thailand and the river estuary is the significant habitat for many aquatic species which are the human foods.

This study is the preliminary study of MPs contaminated in aquatic animals in the Chao Phraya river estuary with the objectives to indicate the contamination of MPs in fish and shrimp and to identify the type of contaminated MPs. Therefore, three types of fish (boeseman croaker fish, croaker fish, and sea catfish) and shrimp were collected from the estuary and analyzed by using the method described in Mathalon A. and Hill P. (2014) and GESAMP. (2019). The results showed that all aquatic animals were contaminated microplastics. The highest number of MPs were found in croaker fish, follow by boeseman croaker fish, shrimp, and sea catfish, respectively. Theses MPs were characterized as fragment, pellet/granule, fiber, and foam. The fiber shape was dominance accounting for 46% of total MPs. The results also showed that the polymer types of MPs are polystyrene, polyphthalamide, polyethylene, and nylon. Moreover, the study revealed that fish entrails were the significant sources of MPs accumulation in fish. Although this study indicated that the aquatic animals in the Chao Phraya river estuary were contaminated with MPs, however, the further studies of MPs contamination are suggested for more species and sample sizes.

Characterization of SARS-CoV-2 Variants with Mutations at the S1/S2 Cleavage Site

Dr. Michihito Sasaki

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The Coronavirus Disease 2019 (COVID-19) is caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). The spike (S) protein of SARS-CoV-2 binds to a host cell receptor which facilitates viral entry. S protein consists of the S1 and S2 subunits, which are responsible for receptor-binding and membrane fusion, respectively. The nascent full-length S protein is cleaved into S1 and S2 subunits that remain associated with noncovalent interactions. During cleavage, the buried fusion peptide becomes exposed at the surface of S protein. Unlike related coronaviruses, the nascent S protein has a polybasic cleavage motif at the S1/S2 cleavage site and is cleaved by the host furin protease. Previous studies suggested that this polybasic motif broadens the cell tropism and transmissibility of the virus. Here, we examine the properties of SARS-CoV-2 variants with mutations at the S1/S2 cleavage site that undergo inefficient proteolytic cleavage. Virus variants with S gene mutations generated smaller plaques and exhibited a more limited range of cell tropism compared to the wild-type strain. These alterations were shown to result from their inability to utilize the entry pathway involving direct fusion mediated by the host type II transmembrane serine protease, TMPRSS2. Notably, viruses with S gene mutations emerged rapidly and became the dominant SARS-CoV-2 variants in TMPRSS2-deficient cells including Vero cells. Our study demonstrated that the S protein polybasic cleavage motif is a critical factor underlying SARS-CoV-2 entry and cell tropism. As such, researchers should be alert to the possibility of de novo S gene mutations emerging in tissue-culture propagated virus strains.

Infectivity of Bioaerosols – Possible Association with Air Pollutants

Assoc. Prof. Dr. Jun Noda

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The ongoing COVID-19 pandemic draws much attention to the airborne infection route. Now it is well accepted by scientific community, WHO, and other institutes that the aerosolized pathogen in the form of bioaerosols can be a pathway for a respiratory infection of COVID-19. However, very little is known about the factors and mechanisms attributing to the prolonged infectivity of the pathogens in the atmospheric environment. In this talk, I will introduce the idea of the possible role of air pollutants as fomites. We hypothesis that the air pollutants can enhance the viability of airborne microbes by preventing them from the degradation process from some stresses; thereby, enhancing the infectivity of pathogenic bioaerosols. Mycobacterium Smegmatis is used as a model airborne bacteria in a laboratory study, and different amounts of soot particles are employed as model air pollutants. The toxic effects of soot on aerosolized M. Smegmatis are first evaluated and excluded by introducing them separately into a chamber, being sampled on a filter, and then cultured and counted. Secondly, the bacteria-soot mixture is exposed to UV with different durations and then cultured for bacterial viability evaluations. The results show that the different survival rates of the low-, medium-, and high- soot groups under UV exposure as stress. These results show a significant enhancement of survival rates by the presence of soot at all UV exposures. This study indicates that the soot induced survival rate of M. smegmatis under UV stress conditions. It represents the possible associations between air pollution and the extended viability of pathogens; therefore, increased airborne infection probability. Understanding the mechanism of airborne infection is one of many steps to increase knowledge for the public health goal to alleviate the threat from infectious disease with the One Health approach.

Assessment of Indoor Air Quality and Particle Size Distribution of Total Bacteria and *Staphylococcus* spp. in a Hospital

Dr. Kanjana Changkaew

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Hospital is a public facility that requires attention for healthy indoor air to protect patients and healthcare workers from hospital-acquired infections. Therefore, Indoor air quality (IAQ) and particle size distribution of total airborne bacteria and *Staphylococcus* spp. in an urban hospital were conducted in five outpatient departments using an Andersen six-stage impactor, together with measurements of indoor temperature, relative humidity and carbon dioxide level. The results showed that total bacteria and *Staphylococcus* spp. concentration ranged 75-2,261 and 12-292 CFU/m^3, respectively, with *S. aureus* concentration in the range 0-7.1 CFU/m^3. Mean total bacterial concentrations at four sampling locations (738±867, 533±372, 689±528 and 551±474 CFU/m^3 for locations A, B, C and D, respectively) were all above the acceptable standard of 500 CFU/m^3. There was no association between bacterial concentration and physical parameters measured, but it was noted mean CO_2 level at all sampling locations was above acceptable standard (1,000 ppm). The particle size distribution demonstrates that 75% of total bacteria and 55% of *Staphylococcus* spp. was in the size range (aerodynamic diameters below 4.7 μm) capable of being deposited in the lower re spiratory tract. High airborne bacterial concentration and CO_2 level were indicative of poor ventilation, over crowding and unsanitary IAQ. Presence of respiratory system microorganisms poses high risks infection of vulnerable patients. These findings highlight the urgent need to rectify this situation and to implement policies for improving and maintaining proper indoor air quality in the studied locations. This type of survey should be carried out on a regular basis in all hospitals across the country.

Interdisciplinary and International Approach to Overcoming Mine Pollution in Zambia

Dr. Hokuto Nakata

Laboratory of Toxicology,
Faculty of Veterinary Medicine, Hokkaido University
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Environmental pollution caused by formal or informal industrial activities has been widespread throughout the world in the past and present. While industrial activities bring socio-economic benefits to mankind, the negative effects of environmental pollution, including destruction of nature and impact on animal and human health, are enormous. In addition, the health hazards have a negative impact on the socio-economy because they cause a decrease in labor productivity and an increase in medical costs. We need to balance and achieve both economic growth and One Health by protecting human and animal health while maximizing the economic benefits of industry.

This session will present our efforts to overcome lead contamination in the Kabwe lead deposit area, the Republic of Zambia. Zambia has been economically dependent on metal resources for many years since its independence, and lead and zinc mining at Kabwe area was practiced for nearly 100 years in the 20th century; smelting activities have continued to the present day even after the mine closed in 1994, and the long years of mining and smelting activities have resulted in the accumulation of extremely high concentrations of lead in the surrounding environment, animals, and people, according to our earlier studies since 2007.

With this background, we have been assessing the health and socio-economic impacts of lead contamination, developing on-demand environmental remediation methods, and verifying methods to prevent the spread of lead by vegetation through the JST/JICA SATREPS project since 2016 in collaboration with the various schools of the University of Zambia, Kabwe Municipal Council and the associated Zambian ministries including Ministry of Health and Ministry of Mines and Mineral Development. In addition, from 2020, under the JST aXis project, we have been conducting treatment and environmental remediation practices for lead poisoning and simulating the medium- and long-term impacts of these practices on the level of environmental pollution and socio-economic impacts, in collaboration with the World Bank funded project of ZMERIP. Our purpose, common to all activities, is to facilitate both industrial and economic development and the achievement of One Health at the same time without denying the importance of industrial activity as the root cause of environmental pollution.

The session will include an overview of interdisciplinary efforts to overcome lead contamination, including agricultural and engineering remediation and lead dispersion prevention methods and quantification of socio-economic impacts, as well as various activities related to the assessment and elucidation of health impacts.

Parasitic Helminthiasis and Wild Animal Medical Center of Rakuno Gakuen University, Japan

Prof. Dr. Mitsuhiko Asakawa

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Prof. Asakawa have studied in the scientific fields including helminthology, especially, morphology, taxonomy, ecology and zoogeography, and including zoonotic and wildlife helminthiasis, for example, its diagnosis, epidemiological survey and countermeasures among human-livestock and variable animals including wildlife, exotic pets, zoo and aquarium animals etc.

In 2004, the Wild Animal Medical Center (WAMC) was established at Rakuno Gakuen University, Hokkaido, Japan, not only to study/educate parasitology mentioned above vobe, but also to performe conservation medicine including zoo and wildlife medicine, medical zoology, pathobiology, forensic veterinary medicine etc.

In this presentation, I will show a couple of topics with special reference to recent cases of helminthiasis and helminth epidemiological studies of pet and free-ranging animals performed by WAMC, in order to understand the activities of WAMC and the Japanese Society of Zoo and Wildlife Medicine, and to establish good relationships between you and us.

Brugia pahangi Parasitic Ecosystem: Landscape Ecology and Epidemiology of Epizootic B. *pahangi* in Thailand

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Childhood infections with *Brugia pahangi* in Thailand has recently been addressed to the emergence of epizootic *B. pahangi*. Domestic cats and dogs have main animal reservoir role in enzootic cycle of transmission of this parasite although they may have a domestic reservoir role in the human transmission of epizootic *B. pahangi*. *Armigeres subalbatus* has a natural vector role for both enzootic and epizootic *B. pahangi* parasites in specific location to which the interactions of human, vector, and domestic animal reservoirs are related.

In this talk, we demonstrate the concept of landscape ecology and epidemiology of *B. pahangi* in order to understand the vulnerability in how *Ar. subalbatus* and its counterpart species were adapted to local environment of a 2-km radius of geographically defined filariasis landscape, as well as to determine the extent to which *Ar. subalbatus* harbored larval loads of *B. pahangi*. Filariasis landscape covering a low-lying disturbed swamp ecotope and other three elevated plantation ecotopes was situated in a filariasis transmission control area of South Thailand.

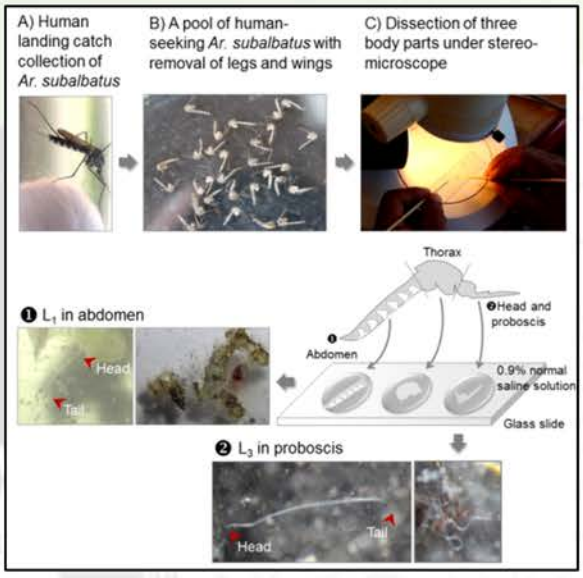

Figure 1. *Ar. subalbatus* mosquito pools including infectious pools. Based on human landing catch collection (A), a pool of adult female mosquitoes of *Ar. subalbatus* was subjected to dissection of three body parts (B) and isolation of L_3 in individuals (C).

Based on periodic assessments of species compositions, abundances, and filarial infections in *Ar. subalbatus* and its counterpart species, *Ar. subalbatus* adapted well to elevated ecotopes not only was more abundant than *Mansonia* vectors (*Ma. uniformis, Ma. indiana,* and *Ma. bonneae*), and other counterpart species, but also had tendency to exhibit the aggregation of the filarial infections (Figure 1), showing about 2-3% $L_1/L_2/L_3$ infection rate only observed in the elevated ecotopes. Based on molecularly diagnosing representative L_3 larva clones isolated from all *Ar. subalbatus* mosquito lines investigated, a newly developed touchup-nested PCR (TUPCR) specific for orthologous filarial beta-tubulin genes only yielded putative amplification patterns of *B. pahangi* and *Dirofilaria immitis* as compared well to that of *Wuchereria bancrofti, Brugia malayi, B. pahangi,* and *D. immitis* microfilarial isolates. Sequenced amplicons of L_3 larva clones were 100% homologous to *B. pahangi* and *D. immitis*.

Such findings strongly suggested that *Ar. subalbatus* was highly potent vector harboring a wide range of filarial larval loads in the studied filariasis landscape, and more profoundly, having the potential of circulating epizootic *B. pahangi* parasites.

Rabies Dynamics in Ecosystem in Northern South Africa

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Rabies remains endemic in wide areas of the world and kill 59,000 people every year. Global efforts of elimination of human deaths by 2030 emphasizes the importance of canine vaccine.

However, there are countries where suffers from complex mechanism of rabies transmission and maintenance, particularly from wildlife. The republic of South Africa is one of such countries.

We have been conducting a series of epidemiological studies in this country, and new information are still accumulated. So far, spatial analyses elucidated the patterns of dog, wildlife and human rabies outbreaks, and ecological factors associated with the maintenance of rabies in the ecosystems.
These ecohealth findings will be briefly introduced in the lecture.

Health Risk Assessment of Exposure to Multiple Heavy Metals among Children Living in a Vietnamese Informal E-waste Recycling Village

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Inappropriate handlings of informal e-waste processing have increasingly become a global environmental and public health issue of concern. This study was conducted to compare the concentrations of five heavy metals found in the environmental media, exposure levels of five heavy metals via different pathways, blood heavy metals, and DNA damage among children residing in an informal e-waste processing village and a reference village in Viet Nam. The results showed that drinking water was safe for heavy metal exposure in both of the villages studied. The mean number of Ni found in cooked rice at the exposed village reached 4.94 times higher than that found at the reference village ($p < 0.01$). The levels of Pb, Cd, Cr, and Ni in indoor soil and surface dust in the exposed village were significantly higher than those in the reference village at $p < 0.01$.

The findings revealed that levels of the average daily intake (ADI) of the five heavy metals collected from a child at the exposed village were 3.90 times higher ($p < 0.01$) than that of a child at the reference village. Ingestion of cooked rice was the largest contributor to the total ADI of the children tested in both villages. However, the risks from water drinking and dermal contact of soil were negligible. The total carcinogenic and non-carcinogenic risks in an exposed child were significantly higher ($p < 0.01$) than their respective risks in the reference children. The non-carcinogenic risk to an exposed child was likely to occur, while the risk to a reference child was negligible. The carcinogenic risks found in children from both of the villages, however, were higher than the acceptable values, indicating the potential health risks to the children from both villages.

Blood levels of nickel and arsenic in the children at the exposed village were significantly higher than those at the reference village at $p < 0.05$; however, no significant differences were observed for lead, cadmium, and chromium in children's blood between the two villages. The overall levels of five heavy metals in exposed children's blood were significantly higher than those in non-exposed children at $p < 0.01$. The DNA damage of the children at the exposed village was significantly greater compared to that of the children at the reference village at $p < 0.01$. It was found that higher exposure to e-waste would lead to higher carcinogenic and non-carcinogenic risks, higher blood metal levels, higher levels of DNA damage in the exposed children as compared to the reference children. This study highlighted the importance of release mitigation of a hazardous heavy metal from an informal e-waste processing facility to prevent its potential effects on human health.

Studies on DNA Gyrase of *Campylobacter jejuni* as the Target of Quinolones

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Quinolones have long been used as the first-line treatment for *Campylobacter* infections. However, an increased resistance to quinolones has raised public health concerns. The development of new quinolone-based antibiotics with high activity is critical for effective, as DNA gyrase, the target of quinolones, is an essential enzyme for bacterial growth in several mechanisms. The evaluation of antibiotic activity against *Campylobacter jejuni* largely relies on drug susceptibility tests, which require at least 2 days to produce results. Thus, an *in vitro* method for studying the activity of quinolones against the *C. jejuni* DNA gyrase is preferred. To identify potent quinolones, we investigated the interaction of *C. jejuni* DNA gyrase with a number of quinolones using recombinant subunits. The combination of purified subunits exhibited DNA supercoiling activity in an ATP dependent manner. Drug concentrations that inhibit DNA supercoiling by 50% (IC_{50}s) of 10 different quinolones were estimated to range from 0.4 (sitafloxacin) to >100 μg/mL (nalidixic acid). Sitafloxacin showed the highest inhibitory activity, and the analysis of the quinolone structure-activity relationship demonstrated that a fluorine atom at R-6 might play the import ant role in the inhibitory activity against *C. jejuni* gyrase. Measured quinolone IC_{50}s correlated well with minimum inhibitory concentrations (R = 0.9943). These suggest that the *in vitro* supercoiling inhibition assay on purified recombinant *C. jejuni* DNA gyrase is a useful and predictive technique to monitor the antibac terial potency of quinolones. And furthermore, these data suggested that sitafloxacin might be a good candidate for clinical trials on campylobacteriosis.

Instruction to Presenters

On behalf of the Faculty of Public Health, Thammasat University, the organizing committee will be hosting a 2020 online One Health seminar—The 5th One Health Lecture Series on Emerging Infectious Diseases and Environmental Health—that will be held on December 16, 2020 at Faculty of Public Health, Thammasat University. The organizing committee will use this fifth online seminar as the platform of building the capacity of collaborative research of mutual interest and benefit and hence the knowledge exchange of our demonstrable operational and public-facing results. Regarding this, the organizing committee would like to encourage our distinguished presenters who contribute significantly their work so as to make the right impact of their presentations. Two options of the preparation of the online presentations are guided as follows.

OPTION ONE

1. Any presenters (as invited speakers of HU, RGU, or TU) are asked to prepare the power point presentation in a palatable format (.pptx or .pdf), and then submit it to the secretariat of organizing committee via e-mail edu.inter@fph.tu.ac.th before December 14, 2020.
2. The presenter is asked to join the zoom, share his or her own power point presentation file as scheduled, and then present orally not exceeding than 15 minutes.
3. During the 15-min presentation as scheduled, the technical staff will operate the chat as an effective channel of welcoming any questions or comments by any participants.
4. The presenter will receive any question if the presentation will be finished in time. Neither questioning nor answering will be operated if the time of the presentation is run out. Otherwise the presenter will join the chat afterwards that allows him or her to respond to any questions or comments.

OPTION TWO

1. Any presenters (as invited speakers of HU, RGU, or TU) are asked to prepare the clip of the power point presentation in a palatable format (.mp4, .mov, or .avi), and then submit it to the secretariat of organizing committee via e-mail edu.inter@fph.tu.ac.th before December 14, 2020.
2. The presenter is asked to join the zoom. The technical staff will operate the presentation by running the clip file to assure that his or her presentation will be delivered not exceeding than 15 minutes.
3. During the 15-min presentation as scheduled, the technical staff will operate the chat as an effective channel of welcoming any questions or comments by any participants.
4. The presenter will respond to any questions or comments on time raised by any participants.

Evaluation Tool

We appreciate your help in evaluating this seminar. Please indicate your rating of the presentation in the categories below by circling (O) the appropriate number, using a scale of 1 (low) through 5 (high).

OBJECTIVES	
This seminar met the following objectives:	
1. Bring together infectious disease specialists to share research, education strategies, and AMR-related challenges	1 2 3 4 5
2. Focus on a holistic One Health approach for understanding and reducing the risks of emerging infectious diseases at the interphase between humans, animals, and the environment	1 2 3 4 5
SPEAKERS & PRESENTATIONS (generally)	
1. Expression of their ideas clearly	1 2 3 4 5
2. Thoroughness of content	1 2 3 4 5
3. Sharing useful examples	1 2 3 4 5
4. Speaking/presenting ability	1 2 3 4 5
5. Effectiveness of audiovisual aids	1 2 3 4 5
6. Responses to questions	1 2 3 4 5
7. Downloadable slide presentations and abstracts	1 2 3 4 5
RELEVANCY	
1. Information could be applied to practice in your education/profession	1 2 3 4 5
2. Information could contribute to achieving personal, educational, or professional goals	1 2 3 4 5
FACILITY	
1. Was adequate and appropriate for this online seminar	1 2 3 4 5
BENEFIT	
This seminar enhanced your understanding of the seminar subject and will help in your educational and/or professional settings.	1 2 3 4 5

SUGGESTIONS / COMMENTS

Your additional suggestions and comments are welcome and greatly appreciated.

THANK YOU

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