





Vietnamese – German Center for Medical Research (VG-CARE) Activities under PACE-UP project

Truong Nhat My, PhD VG-CARE, 108 Military Central Hospital Yogyakarta, Indonesia, 21st – 23rd, August, 2023







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VG-CARE: who we are

 A long-standing and continuous scientific collaboration between the Institute of Tropical Medicine, University of Tuebingen (Germany) and the 108 Military Central Hospital (Vietnam)









VG-CARE: who we are

- Located at 108 Military Central Hospital, Hanoi, Vietnam;
- 1 of 5 biggest hospital in Vietnam with 2500 beds, treating 3000 in-patients and 3500 outpatients per day
- Unrestricted availability of well characterized and documented biological samples of diseases









Research

Epidemiological studies

Clinical Trials

Interventional studies

Teaching

Training

Exchange program

Internships



To build sustainable individual, institutional and infrastructural capacities through continues education and training, research, patient-care along with community engagement to achieve health equity for all populations.









Our activities

- 1. Conduct basic and applied clinical research on infectious diseases in the region
- 2. Conduct GCP/GLP-compliant clinical trials
- 3. Build and strengthen academic sector and research capacities in the region
- 4. Expand and strengthen healthcare capacities









PAN ASEAN Coalition for Epidemic and oUtbreak Preparedness



VG-CARE: a Global Health and Pandemic Prevention Center







Federal Foreign Office



Deutscher Akademischer Austauschdienst German Academic Exchange Service







1. Conduct basic and applied clinical research on infectious diseases in the region

Topic: Prevalence and molecular surveillance of zoonotic pathogens in domesticated and farmed wild animals in Vietnam

Research objectives :

- To understand the distribution of zoonotic pathogens in domesticated and farmed wild animals in Vietnam
- To investigate the prevalence and genetic diversity of zoonotic Hepatitis E virus (HEV)
- To determine the burden of HEV in patients among high-risk groups and in the community



Current status:







1. Conduct basic and applied clinical research on infectious diseases in the region

Topic: Host and viral factors influencing dengue severity and susceptibility

Research objectives :

- Detection of frequent Flaviviruses infection in the population over space and time, Dengue serotypes differentiation.
- Association of concentrations of different cytokines and their genetic variants with different phenotypes and disease severity.

Current status:

- Dengue/Zika/Chikungunya are screened in Hanoi and other city.
- Samples from infected patients from Hanoi (2021) are studied, pro-inflammatory and anti-inflammatory cytokines are analyzed.
- Significant cytokines are selected to look for genetic variants (SNPs).

Preliminary results:

- DENV1 and DENV2 are predominant in Hanoi (North), and DENV1 and DENV4 in Binh Dinh (Central).
- Cytokines (related to both Th1 and Th2 pathways) show significant difference between group of patients.







1. Conduct basic and applied clinical research on infectious diseases in the region

Topic: Ecology of vectors and associated arboviruses in Vietnam

Research objectives :

- To investigate the abundance, richness and diversity of vectors
- Characterization of vector ecology including identification of vertebrate blood-meals
- Identification of arboviruses with a focus on members of the Flaviviridae family

Current status:

- Sampling process almost DONE in Vietnam

	Urban area	Rural area	Nature
In the North	Ha Noi - capital city	Hung Yen province	Ba Vi National park (Hanoi)
In the Center	Hue city	Hue outer area	Bach Ma National park (Hue province)
In the South	Ho Chi Minh city	Ho Chi Minh city	Lo Go - Xa Mat National park (Tay Ninh province)

- Identification of 4000/10000 mosquitoes collected
- Continue to sampling the Highland area of Vietnam









Workshop with two course modules on "Emerging and Re-emerging Infectious Diseases" and "Hands-on training on Basic principles of Biosafety"



Hue, in 2023



Next year in 2024, in Jember, INDONESIA



- Lecturers: International experts from Europe, Africa, Vietnam
- Attendance: > 80 research personnel (MD, MSc, MPH, PhD) including physicians, veterinarians, entomologists, biomedical scientists and epidemiologists from Vietnam and Indonesia







Master Module program:

- 4 Master's student project module at VG-CARE
- Duration: 2022, 2023, 2024, 2025
- Scholarship: 5 months (400€ /month)
- Co-supervision of the Master's module study at VG-CARE by high qualified researchers
- Working in a highly advanced laboratory
- Research experience certification from VG-CARE/PACE-UP program.

Who can apply:

- Master's students in biology/biochemistry/infectious diseases from ASEAN universities who are registered to work for their master's thesis.

- It is desired that the Master's degree be completed no later than in December 2024

For 2024, application deadline will be 30th September 2023

Contact:

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Master Module program 2022:



From **Ha Noi**: **National Institute of Veterinary Research** – "Prevalence and molecular characterization of carbapenem- and colistin-resistant bacteria in pigs and farm workers in Northern Vietnam"

From Hue: Hue University of Medicine and Pharmacy – "Molecular diagnosis of helminth and protozoa parasites in domesticated pig and wild-boar from central Vietnam"

From **Ho Chi Minh city**: **International University** – "Molecular surveillance of zoonotic HEV infection in domesticated pig and farmed wild-boar from Southern Vietnam"







Master Module program 2023:

From **Ha Noi**: **University of Science and Technology of Hanoi** – "Molecular characterization of Carbapenem resistant P. aeruginosa from intensive care patients at a tertiary hospital in Vietnam"

From **Ho Chi Minh city**: **International University** – ""Phenotypic and Genotypic Characterization of Carbapenem-resistant Klebsiella pneumonia intensive care patients"

From **Indonesia**: **University of Jember** – ""Molecular Surveillance of Dengue Serotypes in Indonesia"



ACE-IIP









Hanoi, November 2022: Receiving a BSL-2 Mobile Laboratory with BSL-3 Cabinet



- For infectious disease research, surveillance and mapping hotspots for emerging and re-emerging infectious diseases,
- For training of the medical staff for use in emergencies or disease outbreaks.





2 days Hand-on training from Germfree expert on how to use and maintain the mobile lab









In Emerging and Re-Emerging infectious diseases: SARS-CoV-2 sequencing in Vietnam





Two week training from 22th Sep –1st Oct. 2021

SARS-CoV-2 – Next-Generation sequencing Training



AG Velavan Dr. Srinivas Reddy Pallerla Dr. Hannah Krämer Linh Le











In Emerging and Re-Emerging infectious diseases: SARS-CoV-2 sequencing in Vietnam



- 1st samples collected on Jan. 2020
- 1st submission on Feb. 2020
- Submission increase greatly when VG-CARE start to perform sequencing on Sep. 2021
- More than 2000 samples sequenced
- More than 1600 sequences uploaded to GISAID

December 2021

VG-CARE reports the first OMRICON SARS-CoV-2 variant identified in a Vietnamese patient. VG-CARE continues to contribute to genomic surveillance of SARS-COV-2. VG-CARE has deposited more than 1000 SARS-COV-2 genomes in the global GISAID database. For more information from <u>Ministry of Health</u>, <u>GISAID</u>, <u>press release</u>.

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1st Omicron detection in Vietnam

Country Submission Count

Country	Total #Omicron GRA	#Omicron GRA (B.1.1.529+BA.*) in	%Omicron GRA (B.1.1.529+BA.*) in
Vietnam	(B.1.1.529+BA.*)	past 4 weeks	past 4 weeks
Vietnam	773	266	97.8%

First COVID-19 omicron variant patient in Vietnam doesn't have symptoms as ten-filing Generated 2,221116523

(VOW06LD) - On Tuesday Vietnam confirmed its first case of the omicrovariant of the coronavins. The carrier is a Vietnamese student who landed at No Bai International Airport from the UK. VOV talked to Colonel, Associate Professor, Dr. La Huu Song, Director of the Vietnamese German Center for Medical Research of the Central Military Hospital 105, to learn more about the current health condition of the patient and what people in Vietnam should do following the first detection in hand.







TOPIC: Development of a multiplex Real-time PCR KIT and an Antigen Microarray for the diagnosis, genotyping and prognosis of Dengue Hemorrhagic Fever

- Collaborated with Israel partner, BEN-GURION UNIVERSITY OF THE NEGEV.
- Design and optimize a new Real-Time PCR kit for detection and serotype identification of Dengue virus
- Performance evaluation of the new kit, comparing to commercial available CE-IVD kit.

TOPIC: Molecular characterization of Carbapenem resistant *P. aeruginosa* from ICU patients at 108 Military Central Hospital

- Performing WGS of *P. aeruginosa* using Oxford Nanopore Technology (ONT)
- Molecular characterization of AMR P. aeruginosa isolates
- \rightarrow CAPACITY BUILDING of the use of 3rd generation sequencing of ONT and Bioinformatics pipeline analysis
- ightarrow Collaboration with Dr. Etienne Loire (CIRAD, GREASE Network)



12.12.2022: Dr. Ettiene Loire from @Cirad, @Grease_Network visited VG-Care in #Hanoi where he transmitted his enthusiasm for and knowledge about #bioinformatics to #lifescience students and researchers alike! training the students and







WP5 - Whole Genome Sequencing Molecular surveillance of CRE and CoRE











5. Other Collaborations

Backstory

A history of the MetaSUB consortium: Tracking urban microbes around the globe

Krista A. Ryon,^{4,5} Braden T. Tierney,^{4,5} Alina Frolova,^{1,2} Andre Kahles,^{3,35} Christelle Desnues,⁶ Christos Ouzounis,⁹ Cynthia Gibas,¹⁰ Daniela Bezdan,^{11,12,13} Youping Deng,³⁶ Ding He,¹⁴ Emmanuel Dias-Neto,¹⁵ Eran Elhaik,¹⁶ Evan Afshin,⁷ George Grills,¹⁷ Gregorio Iraola,¹⁸ Haruo Suzuki,¹⁹ Johannes Werner,²⁰ Klas Udekwu,²¹ Lynn Schriml,²² Malay Bhattacharyya,²³ Manuela Oliveira,²⁴ Maria Mercedes Zambrano,²⁵ Nur Hazlin Hazrin-Chong,²⁶ Olayinka Osuolale,²⁷ Paweł P. Łabaj,²⁸ Prisca Tiasse,²⁹ Sampath Rapuri,³⁰ Silvia Borras,³¹ Sofya Pozdniakova,³¹ Tieliu Shi,³² Ugur Sezerman,³³ Xavier Rodo,³¹ Zehra Hazal Sezer,³⁴ and Christopher E. Mason^{7,8,*}

SUMMARY

The MetaSUB Consortium, founded in 2015, is a global consortium with an interdisciplinary team of clinicians, scientists, bioinformaticians, engineers, and designers, with members from more than 100 countries across the globe. This network has continually collected samples from urban and rural sites including subways and transit systems, sewage systems, hospitals, and other environmental sampling. These collections have been ongoing since 2015 and have continued when possible, even throughout the COVID-19 pandemic. The consortium has optimized their workflow for the collection, isolation, and sequencing of DNA and RNA collected from these various sites and processing them for





- 1. To create geospatial metagenomic and forensic genetic maps
- 2. Identify and track antimicrobial resistance markers (AMRs) in the urban built environment
- 3. Identify novel biosynthetic gene clusters (BCGs) for drug discovery



Meta-genomics data from samples collected in Hanoi (between 2017 and 2022) is subjected to analysis and published soon.







5. Joint project of the Global Health Center



Objective: Compile, share and harmonize different HEV-specific SOPs used in different laboratories within global centers and to harmonize genomic surveillance of hepatitis E virus with zoonotic potential in Africa, Latin America, Asia, and Europe.

Activities:

- Training of four MTA/MSc/PhD students (one from each center) in assayspecific SOPs for at least 8 weeks, with 4 weeks spent at each site in Berlin and Tübingen. The training will equip the students with the necessary skills to conduct HEV surveillance in their respective centers and regions.
- Two-day strategic meeting of PIs from all centers in Berlin for project grants











5. Joint project with CERID, Nigeria and PACE-UP

Topic: Impact of Counterfeit and Substandard Medicines on Antimicrobial Resistance

Research objectives:

- To determine the antimicrobial efficacy of over-the-counter antibiotics (Ciprofloxacin, Amoxi-Clav, Cefixim) obtained in Vietnam and Nigeria
- Assess the purity of prescribed oral antibiotics in Vietnam using High-Performance Liquid Chromatography (HPLC)

Current status:

- ✓ Data collection and Procurement of antibiotics in Hue province (completed)
- ✓ Ongoing antimicrobial efficacy testing using a modified disk diffusion and microdilution method with quality standard strain (E. coli ATCC®25922)





PACE-IIP







Next steps and take home messages

Emerging and Re-Emerging infectious diseases

"Genomics surveillance, diagnostics, prevention and outbreak management"



global distribution of relative risk of an EID event caused by zoonotic pathogens from wildlife

Since we live in a global village, team effort needed to prevent and manage emerging infectious diseases







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VG-CARE members:

Dr. Bui Tien Sy



Asc. Prof. Dr. Le Huu Song

Collaborators:

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- Dr. Srinivas Pallerla
- Dr. Hannah Kraemer
- Mrs. Olga Hase-Bergen
- Dr. Etienne Loire (CIRAD, GREASE Network)

- Dr. Tran Thi Huyen Trang

Dr. Nguyen Trong The

Dr. Nghiem Xuan Hoan

- Mrs. Tran Thi Thanh Huyen
- Mrs. Tran Thi Thu Hien
- Mrs. Pham Thi Dinh
- Ms. Dao Thi Huyen

And all team members, students working at VG-CARE!

... as well as all patients, healthcare worker from different department involved from 108 MCH.

Looking forward to go further with you!







