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
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)

MOU - ESTABLISHMENT OF THE CLINICAL RESEARCH UNIT
January 2015

INAUGURATION OF VG-CARE
January 2018

KEEP MOVING FORWARD
2023 and beyond
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 out-patients per day
• Unrestricted availability of well characterized and documented biological samples of diseases
Our goals

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

PACE-UP

VG-CARE: a Global Health and Pandemic Prevention Center

Kumasi, Ghana

Lambaréné, Gabon
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:**

- **Ongoing project**
  - Rectal swabs
  - Oral swabs
  - Stools
  - Lungs
  - Livers
  
  885 samples from 435 individuals were collected

- 554 serum samples (blood donors) are currently tested with
  - HEV-RNA
  - HEV-IgM & IgG

Identify various zoonotic pathogens
Evaluate the burden of Hepatitis E Virus
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

<table>
<thead>
<tr>
<th></th>
<th>Urban area</th>
<th>Rural area</th>
<th>Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the North</td>
<td>Ha Noi - capital city</td>
<td>Hung Yen province</td>
<td>Ba Vi National park (Hanoi)</td>
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<tr>
<td>In the Center</td>
<td>Hue city</td>
<td>Hue outer area</td>
<td>Bach Ma National park (Hue province)</td>
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<tr>
<td>In the South</td>
<td>Ho Chi Minh city</td>
<td>Ho Chi Minh city</td>
<td>Lo Go - Xa Mat National park (Tay Ninh province)</td>
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- Identification of 4000/10000 mosquitoes collected
- Continue to sampling the Highland area of Vietnam
3. Build and strengthen academic sector and research capacities in the region

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

Ha Noi, in 2022

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
3. Build and strengthen academic sector and research capacities in the region

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

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3. Build and strengthen academic sector and research capacities in the region

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”
3. Build and strengthen academic sector and research capacities in the region

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”
4. Expand and strengthen healthcare capacities

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
4. Expand and strengthen healthcare capacities

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
4. Expand and strengthen healthcare capacities

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

1st Omicron detection in Vietnam
4. Expand and strengthen healthcare capacities

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
  → CAPACITY BUILDING of the use of 3rd generation sequencing of ONT and Bioinformatics pipeline analysis
  → Collaboration with Dr. Etienne Loire (CIRAD, GREASE Network)
5. Other Collaborations

Backstory

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

Krista A. Ryon,1,3,5 Braden T. Tierney,1,3,5 Alina Frolova,1,5 Andre Kahles,1,3,5 Christelle Desruex,1,5 Christos Ouzounis,1,5 Cynthia Gibas,1,5 Daniela Bezdan,1,11,12,13 Youping Deng,1,5 Ding He,1,5 Emmanuel Dias-Neto,1,5 Eran Elhaik,1,16 Evan Afshin,1,5 George Grills,1,5 Gregorio Iraola,1,5 Haruo Suzuki,1,5 Johannes Werner,1,5 Klas Udekwu,1,17 Lynn Schriml,1,18 Malay Bhattacharyya,1,19 Manuela Oliveira,1,20 Maria Mercedes Zambrano,1,21 Nur Hazlin Hazrin-Chong,1,22 Olayinka Osuclade,1,23 Pawel P. Labaj,1,24 Prisca Tiasse,25 Sampath Rapus,1 Silvia Borras,1 Sofia Pozdniakova,1,26 Tieliu Shi,1,27 Uğur Sezerman,1,28 Xavier Rodo,1,29 Zehra Hazal Sezer,5 and Christopher E. Mason3,4,

SUMMARY

The MetaSUB Consortium, founded in 2015, is a global consortium with an inter-disciplinary 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

**Topic:** Harmonizing and Standardizing Protocols for molecular and serological diagnostics: Establishing genomic surveillance of Zoonotic Hepatitis E Virus (HEV) in domestic, wild and farmed-wild animals in varied geographical regions

**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 assay-specific 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)
Next steps and take home messages

Emerging and Re-Emerging infectious diseases

“Genomics surveillance, diagnostics, prevention and outbreak management”

Since we live in a global village, team effort needed to prevent and manage emerging infectious diseases
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- Mrs. Tran Thi Thu Hien
- Mrs. Pham Thi Dinh
- Ms. Dao Thi Huyen

Asc. Prof. Dr. Le Huu Song

Collaborators:
- Pr. Dennis Nujardi (Uni. Of Lubeck)
- Dr. Srinivas Pallerla
- Dr. Hannah Kraemer
- Mrs. Olga Hase-Bergen
- Dr. Etienne Loire (CIRAD, GREASE Network)

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!

28-Aug-23
THANK YOU!

Visit our website: 
https://www.vgcare.org/

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