

*e-ASIA Joint Research Program  
Progress Report*

1. Project title : 「Whole-genome sequencing of drug-resistant *Mycobacterium tuberculosis* strains for diagnostics and outbreak detection」

2. Joint Research period : 07, 01, 2015 ~ 06, 31, 2018

3. Principal Investigators :

Country 1: Professor Gregory Cook, University of Otago, New Zealand  
Planned Funding Period: 07, 01, 2015 ~ 06, 31, 2018

Country 2: Professor Wah Win Htike, University of Medicine 1, Myanmar  
Planned Funding Period: 07, 01, 2015 ~ 06, 31, 2018

Country 3: Dr Bacht Alisjahbana, Universitas Padjadjaran, Indonesia  
Planned Funding Period: 07, 01, 2015 ~ 06, 31, 2018

4. Summary of the Progress of the Joint Research:

**Setting:** Tuberculosis (TB) is a curable disease, yet it kills 1.8 million people annually. In 2015, there were estimated to be 10.1 million cases of TB worldwide. Of great concern to all countries is the growing prevalence of multiple (MDR), extensively (XDR), and more recently reports of totally (TDR), drug-resistant strains. Conducting whole-genome sequencing (WGS) in different geographical locations enables investigation of the genetic basis of resistance in and between countries, which is important given that different mutations cause drug resistance to TB across the world.

**Aim:** The overall goal of this project is to identify the genetic basis of resistance in two out of 14 countries present in all three of the World Health Organisation's lists for high burden of TB, TB with HIV, and MDR-TB (Myanmar and Indonesia) using WGS. Specifically, we focused on isolates from Yangon, the largest city in Myanmar (also the city with most TB and MDR-TB cases) and Bandung, third largest city in Indonesia. We will compare genotypic WGS results with routine phenotypic DST results. We will use WGS data to obtain the first insight into the population structure of rifampicin-resistant TB (by GeneXpert) in both countries at the whole genome level.

**Progress:** We are in the process of recruiting 300 rifampicin-resistant isolates from Yangon and 150 rifampicin-resistant isolates from Bandung. All isolates are being cultured and subjected to standard DST recommended by WHO at the National Tuberculosis Reference Laboratories in Yangon and Bandung. We are

also in the process of conducting WGS of DNA extracted from culture-positive isolates. We perform preliminary bioinformatics analysis on WGS data available.

5. Outstanding Results and Achievements (Training, Workshop, Publication, etc, if any):

5-1. Training

5-2. Workshop

5-3. Publication

5-4. Oral Presentation

5-5. Patent,

5-6. Award

6. Future Goals and Plan of Activities within and after the project period:

7. Recommendations and Comments to the Program (if any):

(ex. Any support to request from the Program in order to achieve item 6.)

***Feedback from Science Advisory Council of e-ASIA JRP***

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