

# Geographical distribution of *Burkholderia pseudomallei* in southern Taiwan

## Abstract:

Melioidosis, caused by *Burkholderia pseudomallei*, is a fatally infectious disease and is emerging in Taiwan. The spreading of this disease in Taiwan is more and more seriously. Because of human acquired melioidosis is usually via directly subcutaneous inoculation or pulmonary inhalation of dust/spray contaminated with *B. pseudomallei*, the geographical distribution of this bacterium was surveyed in this project to understand the dangerous areas for prevalence of melioidosis in Taiwan. The soil were sampled in a north-to-south range of Da-An River to Mein-Chou, with a distance of 5-10 km, and from a hole with a depth of 300-600mm. Results indicated that *B. pseudomallei* can be isolated from the cropped field in Er-Ren River (B3 site), Mein-Chou (Ping-Tong), Shui-Shang (Chiayi) and Feng-Yuan (Tai-Chung). The amounts of *B. pseudomallei* or *pseudomallei*-like bacteria were positively correlated with the incidence of melioidosis in these areas. The environmental isolates exhibited polymorphic colony morphology, and at least six types of colony morphology were found subsequent to sub-passage. A total of 33 environmental strains exhibited four clusters and two independent patterns with PFGE (pulsed-field gel electrophoresis) profiling. The sequences of 16S RNA gene in some strains exhibited the characteristics of CAT/GGC heterozygous, which is different from others reported by endemic areas. This implied that the isolates in this study was originated from indigenous, not immigrated from outside. However, the distribution of *B. pseudomallei* in cropped field in Taiwan is extremely uneven. Thus, we attempted to isolate an antagonistic organism from the site that was negative by PCR detection. An environmental strain of *Burkholderia cepacia* NKI379 (genomovar III-A) were demonstrated to be antagonist by generating an inhibition zone (32 mm) on lawns of *B. pseudomallei* in Luria-Bertani agar plate and shown to involve soluble factor(s) that were able to cross a membrane and inhibit the growth of *B. pseudomallei* VGH07 in a Transwell system. This bacterium should undergo further development as a novel approach that may allow the elimination of potentially dangerous *B. pseudomallei* from soil, when the cropped field shows hyperprevalence for the pathogenic organism causing melioidosis.

Key words: melioidosis; geographical distribution; *Burkholderia cepacia*