CAMO (COMPARING ANIMAL MODELS TO ORGANOIDS) - TESTING MEDICAL COUNTERMEASURES WITH MICROPHYSIOLOGICAL SYSTEMS AND COMPARING TO TRADITIONAL ANIMAL MODELS AND CLINICAL TRAILS

Development Of A Neurological Melioidosis Model

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Melioidosis is an infectious disease caused by the gram-negative, motile, nonspore forming bacillus, Burkholderia pseudomallei. The bacterium is responsible for a high proportion of human pneumonia and fatal bacteremia in the endemic areas of Southeast Asia and Northern Australia. The disease has a variable and inconsistent clinical presentation, but typically manifests as a febrile illness with an acute pulmonary infection, acute fulminant septicemia, or chronic suppurative infection. Central nervous melioidosis develops in 1.5 -5% of known cases and thus the dataset is limited. Most cases are reported in the endemic areas of Australia, Thailand, India and Malaysia. Typical clinical signs and symptoms include fever, headache, seizures, unilateral weakness, and paralysis. Encephalomyelitis and brain abscess were the most reported diseases. While there are sub-optimal treatments for the pulmonary form of disease, there are minimal therapeutic interventions available to those who are diagnosed with neurological melioidosis. Treatment is a minimum of eight weeks followed by an eradication phase. Combined, treatment typically is minimum six months with 20% of patients succumbing to the infection. It is necessary to develop a neurological animal model to elucidate key gaps in knowledge concerning the development of central nervous melioidosis and also provide a means to screen therapeutics and vaccines for efficacy in both pulmonary and neurological disease. Towards this effort, a comparative study was undertaken utilizing B. pseudomallei MSHR5855 and the emerging strain, ATS2021. Multiple parameters were evaluated to include pulmonary radiographs, clinical pathology, and histopathology laying the ground work for a neurological model and also key data points that can be compared with microphysiological systems.

Disclaimer: The opinions, interpretations, conclusions, and recommendations presented are those of the authors and are not necessarily endorsed by the US Army.

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