Novel therapeutic and diagnostic for highly invasive K1 infections

R-8737

In animal models of hvKp infection, treatment with these antibodies both alone and in combination have resulted in decreased bacterial load and improved survival

Background

Klebsiella pneumoniae is a gram-negative pathogen of the Enterobacteriaceae family that usually causes pulmonary, urinary tract, wound and soft tissue infections in hospitalized patients. It can be carried asymptomatically in healthy people and the mechanisms why it could cause the invasive disease are not completely understood. In the recent years they have become a worldwide threat due to their acquisition of multidrug resistance genes. Carbapenem-resistant *K. pneumoniae* has been spreading worldwide and the most successful clonal type is the ST258. A different type of *K. pneumoniae* has been emerging in Asian countries, the hypervirulent *K. pneumoniae* (hvKp). These strains cause invasive infections including pyogenic liver abscesses, pneumonia and meningitis in the community. Hypervirulent strains usually belong to K1, K2 and K5 capsular serotypes. It has been reported that in Taiwan K1 and K2 constitute 34.26% of all clinical *K. pneumoniae* isolates recovered from patients with bacteremia. K1 prevalence in hvKp strains is 47-81%, K2 20% and non-K1/K2 serotypes 23-33%, respectively. There is a serious need to develop new diagnostic and therapeutic options for hvKp infections.

Technology

Dr. Bettina Fries, Professor of Medicine, in the department of Molecular Genetics and Microbiology and Chief, Division of Infectious Disease, at Stony Brook University, has developed monoclonal antibodies (mAbs) to capsular polysaccharide (CPS) obtained from the capsule of K. pneumoniae K1 serotype that has the potential for therapeutic and diagnostic uses.

Patent number/Publication:

Manuscript in preparation

Provisional Patent filed covering composition and method of use.

Advantages

- mAbs provide detection tool for K1 infections both in urine and serum samples – sandwich ELISA has been developed.
- sub-nanomolar affinity for K1 CPS
- mAbs promote complement deposition and phagocytosis of bacteria in human and murine macrophages
- In animal models of infection, mAbs decrease the number of bacterial load in multiple organs
- Treatment with mAbs improved survival in animal models of infection.

Applications

- hvKp detection and treatment

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