

Protective Vaccine & Diagnostic for Acinetobacter baumannii Infection

Overview

Bacterial infections often persist due to the formation of protective biofilms, which reduce the effectiveness of antimicrobial agents and immune effectors. *Acinetobacter baumannii* (*A. baumannii*) is an opportunistic, gram-negative bacteria that is associated with infections in health care settings and is estimated to be 2-10% of all gram-negative infections in intensive care wards. The control of *A. baumannii* has increasingly become challenging due to its ability to survive long periods of environmental exposure and the emergence of multi-drug resistant (MDR) strains. The emergence of MDR strains has created a clinical crisis with multiple reports of colistin as the therapeutic of last resort for bacterial clearance.

UMB investigators developed a candidate vaccine against *A. baumannii*, which consists of a unique set of bacterial antigens shown to be immunogenic in a rabbit infection model. Also in development is a new diagnostic test for *A. baumannii*. The diagnostic application uses the inventors' platform technology for detecting antibody response to infection in a point-of-care lateral flow assay format.

Investigators

Mark Shirtliff Janette Harro

Field

Vaccine Diagnostic

Applications

Hospital-associated infection Multi-drug resistance

Technology Status

Available for licensing & sponsored research

Patent Status

Patent pending

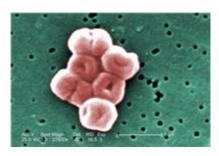
UMB Docket#

MS-2017-032

References

Harro JM, Allison DL, Calhoun JH, & Shirtliff ME (in press)

Perez F & Bonomo RA. Vaccine. 2014 May 7;32(22):2537-9.



Market & Applications

Effective new ways to treat and rapidly identify bacterial infections is an international healthcare priority. Gram-negative pathogens are the primary cause of hospital-acquired infections in critical care wards. The mortality rate associated with *A. baumannii* infections alone range from 26-86%, with approximately 45,000 cases in the US per year, 18,000 of which are due to multi-drug

resistant strains. A. baumannii has been associated with chronic infections including ventilator-associated pneumonia, catheter-associated urinary tract infections, burns, endocarditis, and osteomyelitis, which are infections that establish and persist due to biofilm formation. The critical need for a vaccine against A. baumannii is for patients with such chronic infections, as well as military personnel at risk for trauma.

Technology Background

UMB researchers screened for immunoreactive proteins expressed during *in vivo* infection in a rabbit model, and identified proteins uniquely expressed in the early stages of biofilm maturation. Circulating antibodies against the early biofilm phenotype may target and eradicate the bacterial community to prevent infection.

Advantages

- Unique immunogens are promising vaccine targets and infection biomarkers
- Antigens derived from early biofilm may be the key to preventing infections

Stage of Development

<u>Vaccine:</u> Studies are underway to validate UMB's candidate vaccine against *A. baumannii* in animal challenge models

<u>Diagnostic:</u> UMB's point-of-care diagnostic platform is in advanced development, based on detection of serum antibodies by lateral flow assay. The diagnostic product will be capable of detecting multiple pathogens (e.g, *Staph aureus*) and the addition of *A. baumannii* detection to the platform is expected to be straightforward.