

Identification of Immunogenic *Coxiella burnetii* Proteins

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ABSTRACT

Coxiella burnetii is a gram-negative obligate intracellular bacterium and the causative agent of Q-fever in humans. The acute phase of Q-fever is generally characterized by self limiting flu-like symptoms which commonly go undiagnosed. However, certain individuals can develop chronic infections leading to endocarditis and reproductive disorders with significant mortality. Reproductive losses also adversely impact the economic health of livestock operations. *Coxiella* has a wide host range from vertebrates to invertebrates and may establish infection with a dose of <10 organisms. The biphasic development cycle of *Coxiella* results in environmentally stable dormant forms that are easily transmitted via aerosols with exposure to infected livestock the primary route for transmission to humans. Based upon *C. burnetii*'s potential use as a bioterrorism agent, the United States Center for Disease Control (CDC) has classified it as a category B select agent. An effective whole cell killed vaccine exists but produces a very severe inflammatory/necrotizing reaction and is not approved for use in the United States. A need exists to develop a subunit vaccine that induces a protective immune response against *C. burnetii* and minimizes the deleterious inflammatory/necrotizing response. We probed the proteome of *C. burnetii* to identify immunogenic proteins that may be suitable as subunit vaccine candidates. *C. burnetii* whole cell extracts were separated by 2-dimensional electrophoresis (2-DE), Western blotted, and probed with immune sera from guinea pigs immunized with whole cell killed vaccine. The immunoproteome of *C. burnetii* consisted of 55 immunogenic spots on 2-DE gels. Liquid chromatography-tandem mass spectrometry (LC-MS/MS) analysis of 24 immunogenic spots identified 12 unique proteins with some proteins occurring in multiple spots.