DIARECT
Part of BBI Solutions

Anaplasma phagocytophilum Antigens

Human Granulocytic Anaplasmosis (HGA) was first recognized in the United States (Chen *et al.* 1994) and is the most common tick transmitted disease after Borreliosis. Causative agent of this emerging zoonosis is the rickettsial species *Anaplasma (A.) phagocytophilum*, a Gram-negative obligate intracellular pathogen infecting mammalian hosts worldwide. It is endemic in 42 countries with an overall case fatality of 5% (Atifi *et al.* 2015). Pathogenesis of HGA is an issue of global concern as the number of cases is continuously increasing due to global warming, increases in recreational outdoor activities and worldwide trade (Atifi *et al.* 2015; Wang *et al.* 2013). In certain parts of Asia patients are even considered to develop more frequently a serious form of the disease concomitant with an increased fatality rate (Wang *et al.* 2013).

Manifestation of HGA includes mostly non-specific flulike symptoms. Therefore patients are often initially misdiagnosed with a mild viral infection. Five percent of the patients develop severe life-threatening complications and a delay in treatment may result in severe illness and even death (Atifi *et al.* 2015).

A. phagocytophilum has a complex life cycle and develops within ticks typically belonging to the *Ixodes persulcatus* complex. It requires evasion of the immune system in order to persist in the mammalian host. *A. phagocytophilum* invades and replicates within neutrophils by employing an array of mechanisms to subvert their bactericidal activity. Concurrent infection of *A. phagocytophilum* with other tick-borne pathogens, transmitted by the same vector, have been reported (Atifi *et al.* 2015).

The immunodominant major surface protein 5 (Msp5) has been used for diagnosis of *Anaplasma* in mammals since several years (Alleman *et al.* 2006; Palmer *et al.* 1994). During biological transmission, the 20 kDa protein is expressed in the salivary glands of infected ticks (Knowles *et al.* 1996). Visser *et al.* (1992) suggested that it is an important protein in the *Anaplasma* life cyle.

Ordering Information		
45600	*Anaplasma phagocytophilum* Msp5	0.1 mg
45601		1.0 mg
45800	*Anaplasma phagocytophilum* OmpA	0.1 mg
45801		1.0 mg
45500	*Anaplasma phagocytophilum* p44	0.1 mg
45501		1.0 mg

Commonly recognized by antibodies in HGA patient sera is also the p44 protein (Ijdo *et al.* 1998). It is a member of the outer membrane protein superfamily (OMP1/ Msp2/ p44), which are regarded important virulence factors of *Anaplasma* pathogens (Chávez *et al.* 2012; Park *et al.* 2003). The protein is thought to allow the bacterium to adhere to the host cell and avoid host immune surveillance (Ijdo *et al.* 1998; Wang *et al.* 2013). Presently it is a very well-known serodiagnostic protein (Gaowa *et al.* 2014).

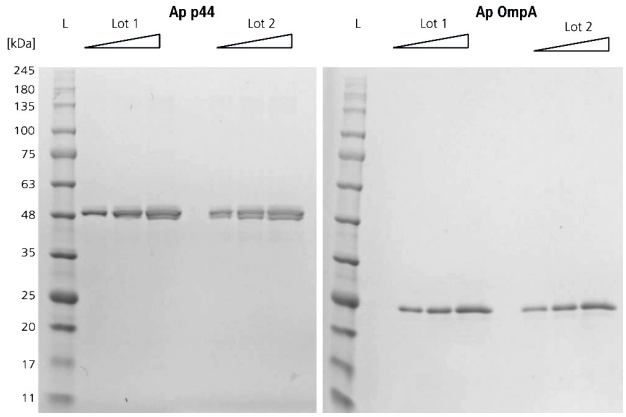

Figure: SDS-PAGE of two independent lots of A. phagocytophilum p44 and OmpA. The molecular weight of protein standards included in the size ladder (L) are indicated on the left.

The major outer membrane protein A (OmpA) is a peptidoglycan-binding lipoprotein promoting endocytosis of the bacterial cells. OmpA is critical for entry and infection of mammalian host cells (Ojogun *et al.* 2012).

DIARECT's *A. phagocytophilum* antigens Msp5, p44 and OmpA are produced in the baculovirus/insect cell expression system and *E. coli*, respectively.

References:
Alleman *et al.* (2006) Vet Clin Pathol. 35 (4): 418-425
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Chávez *et al.* (2012) PLoS One. 7 (4): e36012
Chen *et al.* (1994) J Clin Microbiol. 32 (3): 589-595
Gaowa *et al.* (2014) Emerg Infect Dis. 20 (3): 508-509
Ijdo *et al.* (1998) Infect Immun. 66 (7): 3264-3269
Knowles *et al.* (1996) J Clin Microbiol. 34 (9): 2225-2230
Ojogun *et al.* (2012) Infect Immun. 80 (11): 3748-3760
Palmer *et al.* (1994) J Clin Microbiol. 42 (11): 5381-5384
Park *et al.* (2003) Infect Immun. 71 (7): 4018-4025
Visser *et al.* (1992) Infect Immun. 60 (12): 5139-5144
Wang *et al.* (2013) PLoS One. 8 (10): e78189

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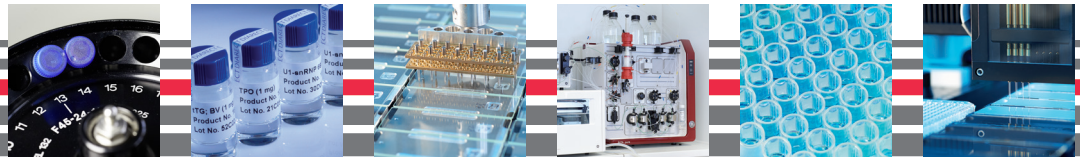

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