

**INNOVECTIS**

Ein Unternehmen der
Johann Wolfgang Goethe-Universität
Frankfurt am Main

Technology Offer

Novel Diagnostic Test for *B. bacilliformis* Infection (Carrion's Disease)

Benefits

- Diagnostic test feasible on site
- Early detection of infection

Project Status

- 14 immunoreactive proteins identified
- Experiments proving seroreactivity, sensitivity and specificity
- Existing prototype for ELISA

Patents and Publications

- PCT patent application: [WO2022180041A1](#) filed on 22.Feb.2022 by Johann Wolfgang Goethe-University Frankfurt and Universidad Peruana Cayetano Heredia
- Dichter et al., 2021. Identification of immunodominant *Bartonella bacilliformis* proteins: a combined *in-silico* and serology approach. [PMID: 35544109](#).

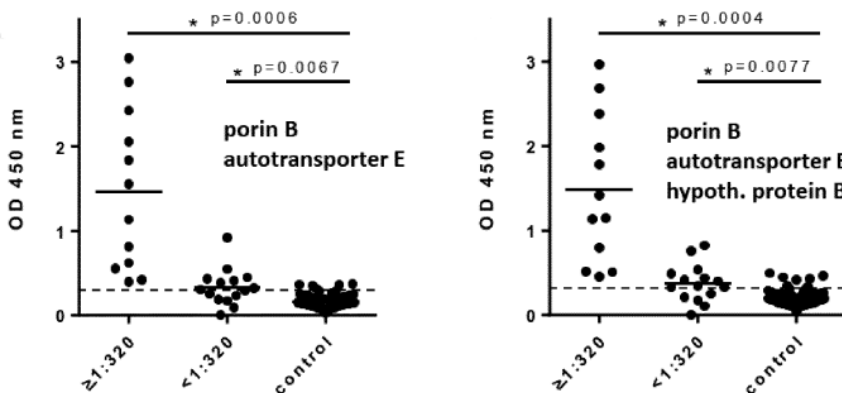
Offer

- Technology can be licensed or assigned
- Collaborations for further development welcome

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Scientists from Goethe-University Frankfurt am Main (Germany) identified immunodominant proteins of *Bartonella bacilliformis*. These findings open the door to the development of immunological detection assays for the diagnosis of an *B. bacilliformis* infection. A total of 14 immunoreactive proteins were systematically identified by a hybrid approach using reverse vaccinology and heterologous genomic *B. bacilliformis* expression libraries. Seroreactivity of the identified proteins was evaluated by line blots followed by ELISA.



Analysis of most reactive antigen combinations using ELISA. Sera were categorized into three groups: high ($\geq 1:320$) and low ($< 1:320$) anti-*B. bacilliformis* IFA-titer from patients suffering from *B. bacilliformis* infection and control sera. Respective P values between sample categories are given (* $p < 0.05$). Antigen composition: porin B, autotransporter E (left), porin B, autotransporter E, hypothetical protein B (right).

Carrion's disease is a result of infections with *B. bacilliformis* in humans. It is primarily found in the Andean regions of South America and is transmitted via sand flies (*Lutzomyia spp.*). Initial symptoms of a *B. bacilliformis* infection are often non-specific, therefore the infection is often left unrecognized. The biphasic disease is characterized by an initial hemolytic fever (Oroya fever) with case-fatality rates as high as 90 % in untreated patients, followed by a chronic phase resulting in angiogenic skin lesions.

However, when *B. bacilliformis* infection is diagnosed early, rapid antibiotic treatment lowers case-mortality significantly. Therefore, survival is crucially dependent on early detection methods, which are currently widely unavailable. PCR diagnostics is not feasible on site and might fail to identify mild and subclinical cases. The presented antigens enable the development of sensitive immunological detection assays to be used in laboratories to confirm an infection based on a specific serological result.

Local outbreaks of the disease disproportionately affect children and young adults. Several hundred cases of Carrion's disease are recorded annually in Peru, but outbreaks can easily exceed 10,000 cases, as data from the year 2004 attested.

Facing increasing numbers of tourists in the Andean region and a foreseeable migration of the sand fly to Europe, early *B. bacilliformis* detection methods are urgently needed beyond the population of the affected regions.

The Frankfurt University team would look forward to cooperate with commercial partners to transfer the invention towards industry and market exploitation.