

**INNOVECTIS**Ein Unternehmen der  
Johann Wolfgang Goethe-Universität  
Frankfurt am Main**Technology Offer**

# Novel Treatment for Carrion's Disease

## Benefits

Base for:

- Protein vaccine development
- mRNA vaccine development

## Project Status

- 14 immunoreactive proteins identified
- Experiments proving seroreactivity, sensitivity and specificity

## 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](#).

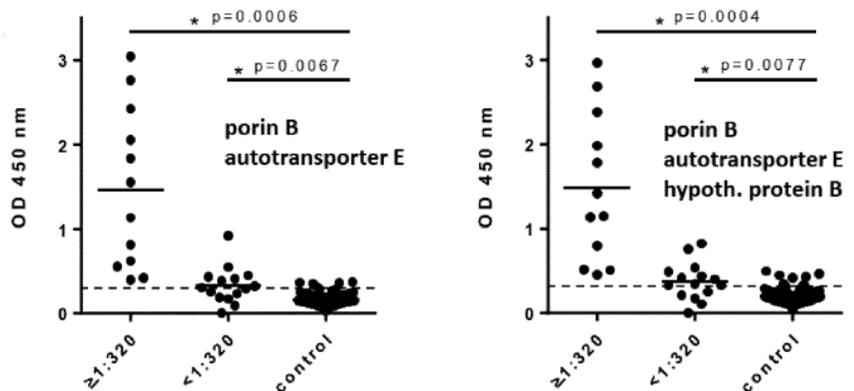
## Offer

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

## INNOVECTIS

Gesellschaft für Innovationsdienstleistungen mbH  
Altenhöferallee 3  
60438 Frankfurt am Main, Germany  
Tel +49 69 25 61 632-0  
[timo.smit@innovectis.de](mailto:timo.smit@innovectis.de)

Scientists from Goethe-University Frankfurt am Main (Germany) identified immunodominant proteins of *Bartonella bacilliformis*. These findings open the door to the development of protein and mRNA vaccines against Carrion's disease. A total of 14 immunoreactive proteins were systematically identified by a hybrid approach using reverse vaccinology and heterologous genomic *B. bacilliformis* expression libraries. Two different *B. bacilliformis* strains (KC583 and KC584) were compared to exclude strain specific results. 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 such as fever, headache and pain in the limbs are often non-specific, therefore 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. 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, effective vaccines 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.