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Collaborative German-ILRI Research to Discover New Diagnostic Tools for Contagious Bovine Pleuropneumonia, the Most Devastating Cattle Disease in Africa

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Abstract

Contagious Bovine Pleuropneumonia (CBPP) is an acute pneumonia of cattle caused by the bacterial pathogen *Mycoplasma mycoides* ssp. *mycoides* small colony type (MmmSC). The African Union considers CBPP as the most important cattle disease in Africa after eradication of Rinderpest. CBPP severely affects cattle stocks in Africa and consequently a large proportion of the livestock-dependent population. While the disease has been eradicated in most parts of the developed world it is still present in all countries of sub-Saharan Africa. After initially successful control measures in the 1960s CBPP has been spreading due to a lack of money, fragmentation of veterinary services, uncontrolled cattle movement, poor vaccine efficacy, and poor sensitivity of current diagnostic tests. The current diagnostics are only able to detect CBPP during the acute phase of the disease and cannot detect chronically infected animals, which are responsible for perpetuation and for introduction of CBPP in previously uninfected herds. A diagnostic test able to detect chronically infected animals would be a key tool in controlling CBPP. By having such a test, stakeholders would be able to test their cattle stock for CBPP, separate infected animals, and ensure that only CBPP-free animals are traded. This would not only help to secure a constant income from trade, but also increase livestock productivity. In addition, improved diagnostic tests would be highly relevant for the European Union in case CBPP is re-introduced into livestock of member states. In order to develop new diagnostic tools and vaccines suitable MmmSC immunogenic proteins must be identified. To this end, MmmSC whole cell proteins were separated by two-dimensional (2D) PAGE, and sera collected from infected zebu cattle were pooled and used in Western immunoblot. Immunogenic proteins were then identified by mass spectrometry. Further a peptide spot array analysis was used to detect immunogenic epitopes of membrane-associated lipoproteins, which were previously recognised by in-silico analysis of the genome sequence of *Mycoplasma mycoides* ssp. *mycoides* PG1. The combination of both methods allowed the identification of several immunogenic MmmSC proteins for potential use in advanced diagnostics. These proteins will now be further analysed for their potential as diagnostic antigens.

Keywords: CBPP, control, diagnostic