Characterization of pathogen-specific antibodies recognizing the causative agents of American & European foulbrood

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American and European foulbrood (AFB & EFB) are devastating bacterial brood diseases of Apis mellifera, which cause colony and economic losses worldwide. Disease diagnosis is conducted via visual inspection, which has to be confirmed in the laboratory.

The aim of the project is to develop a fast and sensitive field test kit (lateral flow device; LFD) to diagnose and distinguish between EFB, AFB and two AFB-genotypes (ERIC I and ERIC II) in one device. Since LFDs are based on detection of antigens, we first confirmed that pathogen-, and genotype-specific antigens exist. Therefore, we immunized mice, rats and rabbits with the causative agents of the diseases (EFB: Melissococcus plutonius; AFB: ERIC I and ERIC II of Paenibacillus larvae). Using ELISA and Western blot analysis we identified specific antigens for each pathogen. Until now we have established monoclonal antibodies (mAb) specific for ERIC I, recognizing a ~90 kDa antigen and specific for ERIC II, recognizing a ~120 kDa antigen. Currently, we are establishing a specific mAb against Melissococcus plutonius. Using the established mAb and mass spectroscopy specific antigens can unequivocally be identified.

Applying mAb and purified antigens, a highly sensitive LFD based on multicolored silver-nano-plates for multiplexed diagnostic will be established.

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