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## Pathogenesis of *P. larvae* - 20 years of research on an important but understudied bacterial pathogen

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American foulbrood (AFB) is one of the most important and devastating infectious diseases of the Western honey bee *Apis mellifera*. It is caused by the gram-positive, spore-forming bacterium *Paenibacillus larvae*, which not only kills the brood of a colony but also the entire colony as the disease progresses. Since *P. larvae* is highly infectious and contagious, the disease spreads very easily within a colony and between colonies. Therefore, AFB is listed as a notifiable animal disease in many countries.

The species *P. larvae* is divided into several, so-called ERIC-genotypes, which also differ phenotypically. Only two of these genotypes, ERIC I and ERIC II, are currently driving the global AFB-outbreak situation. *P. larvae* ERIC I and ERIC II differ in their suite of expressed virulence factors resulting in variations in pathogenesis and virulence differences. Over the past two decades, we have intensively studied the species- and genotype-specific virulence factors of *P. larvae*, thereby deepening our understanding of the molecular pathogenesis of AFB. We have identified a chitin-degrading protein as key virulence factor of the species *P. larvae*, toxins and an S-layer protein as genotype-specific virulence factors, and unravelled the role of secondary metabolites during biotrophic and necrotrophic growth of *P. larvae* in the host. One practical result of this basic research is the recently completed development of a highly specific point-of-care immunoassay for *P. larvae* diagnosis.

### Keywords

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### Professional Status of the submitter, who is also the speaker

Professor

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