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Christina Nielsen-Leroux, Laurent Consentino

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Title Mechanisms involved in the acquisition of host iron ferritin by opportunistic pathogen

Bacillus cereus

Laurent Consentino & Christina Nielsen-Ieroux

INRA, UMR 1319 MICALIS & AgroParisTech, 78350 Jouy-en-Josas, France

Iron acquisition is essential for pathogenic Bacteria. In host, iron is not free : it's bound to proteins like transferrin or ferritin used for storage and homeostasis, or included inside hemoproteins. In order to remove this iron, Bacteria developed several systems including secreted molecules (siderophore) with high affinity for iron, or surface proteins. In *Bacillus cereus* (opportunistic pathogen for insect and human), we have demonstrated that both surface protein IIsA and siderophore bacillibactin are involved in iron acquisition of exogenous Mammalian ferritin, and are important for infection (Segond *et al*, 2014, Plos Pathogen). In this project, we aim i) to assess the importance of ferritin sources in iron acquisition efficiency. We will focus on insect ferritin, in order to test the hypothesis that IIsA is better adapted to an invertebrate ferritin (mostly extracellular) rather than vertebrate ferritin. In another part, we'll investigate ii) the importance of siderophore binding protein FeuA in virulence of *Bacillus cereus* during host infection. To better understand we'll use *Galleria mellonella* as insect model. Finally, iii) *in vivo* trials will be run to determine a time-related and/or tissue specific expression of bacillibactin and IIsA in the insect, by using reporter genes and microscopic observations. This project will provide molecular and mechanistic insights during host infection, and new fallouts about bioavailability of ferritin iron contained in insect floors for industrial applications.