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Brucella Vesicles: Tiny Packages with Major Impact

Inhalt

The evolution of *Brucella* spp. was directly shaped by livestock domestication. Zoonotic transmission occurs through contact with infected animals and consumption of unpasteurized milk and dairy products as well as raw meat. Membrane vesicles (MVs) are small, cell-derived particles that transport proteins, lipids, and nucleic acids between cellular compartments or between individual cells. For *Brucella*, MVs are potential vehicles for the delivery of effector proteins or bacterial RNAs that could be involved in host manipulation.

In this project, we focus on MV production and extraction from *B. microti* and *B. suis*, followed by MV characterization using microscopy and proteomic analyses. In axenic *Brucella* cultures, starvation stress led to increased MV production. Using nanoparticle tracking analysis, fluorescence and transmission electron microscopy, a gravity-column based extraction yielded MVs more consistent and reproducible than ultracentrifugation. The MV proteome was analyzed by LC-MS. In an initial experiment, a subset of proteins was identified that was significantly enriched in MVs compared to the cellular fraction.

Our current data indicate that MV production by *Brucella* is elevated under conditions found in phagosomes and that the protein composition of MVs differs from their mother cells. In the future, we will address the potential RNA cargo of MVs that could induce silencing of target host RNA and interfere with gene expression to promote *Brucella* survival.

Keywords

Brucella spp., membrane vesicles, proteome, bacterial RNA

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Yes, I am a Junior Scientist.

Autor: SCHEFFLER, Dominique (Department 1 –Infectious Diseases, Robert Koch Institute, Berlin, Germany)

Co-Autoren: AL DAHOUK, Sascha (Department 1 –Infectious Diseases, Robert Koch Institute, Berlin, Germany); UFERMANN, Christoph-Martin (Department 1 –Infectious Diseases, Robert Koch Institute, Berlin, Germany)

Vortragende(r): SCHEFFLER, Dominique (Department 1 –Infectious Diseases, Robert Koch Institute, Berlin, Germany)

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