

Publication

3D correlative electron microscopy reveals continuity of Brucella -containing vacuoles with the endoplasmic reticulum

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 4398935

Author(s) Sedzicki, Jaroslaw; Tschon, Therese; Low, Shyan Huey; Willemart, Kevin; Goldie, Kenneth N.; Letesson, Jean-Jacques; Stahlberg, Henning; Dehio, Christoph

Author(s) at UniBasel [Stahlberg, Henning](#) ; [Goldie, Kenneth](#) ;

Year 2018

Title 3D correlative electron microscopy reveals continuity of Brucella -containing vacuoles with the endoplasmic reticulum

Journal Journal of cell science

Volume 131

Number 4

Pages / Article-Number jcs.210799

Keywords CLEM; Correlative light and electron microscopy; Endoplasmic reticulum; FIB/SEM tomography; Replicative Brucella-containing vacuole; Sec61; rBCV

Mesh terms Animals; Brucella abortus, ultrastructure; Brucella melitensis, ultrastructure; Cytoplasm, microbiology; Endoplasmic Reticulum, ultrastructure; HeLa Cells; Host-Pathogen Interactions, genetics; Humans; Mice; Microscopy, Electron, Scanning; Trophoblasts, ultrastructure; Type IV Secretion Systems, ultrastructure; Vacuoles, ultrastructure

Entry of the facultative intracellular pathogen; Brucella; into host cells results in the formation of endosomal; Brucella; -containing vacuoles (eBCVs) that initially traffic along the endocytic pathway. eBCV acidification triggers the expression of a type IV secretion system that translocates bacterial effector proteins into host cells. This interferes with lysosomal fusion of eBCVs and supports their maturation to replicative; Brucella; -containing vacuoles (rBCVs). Bacteria replicate in rBCVs to large numbers, eventually occupying most of the cytoplasmic volume. As rBCV membranes tightly wrap each individual bacterium, they are constantly being expanded and remodeled during exponential bacterial growth. rBCVs are known to carry endoplasmic reticulum (ER) markers; however, the relationship of the vacuole to the genuine ER has remained elusive. Here, we have reconstructed the 3-dimensional ultrastructure of rBCVs and associated ER by correlative structured illumination microscopy (SIM) and focused ion beam/scanning electron microscopic tomography (FIB/SEM). Studying; B. abortus; -infected HeLa cells and trophoblasts derived from; B. melitensis; -infected mice, we demonstrate that rBCVs are complex and interconnected compartments that are continuous with neighboring ER cisternae, thus supporting a model that rBCVs are extensions of genuine ER.

Publisher Company of Biologists

ISSN/ISBN 0021-9533 ; 1477-9137

edoc-URL <https://edoc.unibas.ch/62259/>

Full Text on edoc No;

Digital Object Identifier DOI 10.1242/jcs.210799

PubMed ID <http://www.ncbi.nlm.nih.gov/pubmed/29361547>

ISI-Number WOS:000426356000012

Document type (ISI) Journal Article