

# Segmentation et analyse de bactéries symbiotiques à partir d'images tridimensionnelles de bactériocytes acquises par Microscopie électronique par balayage de bloc (SBEM)

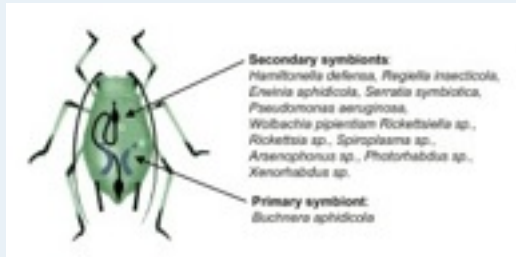
David ROUSSEAU, Béatrice BURDIN, plateforme Ctmu, Lyon, France.

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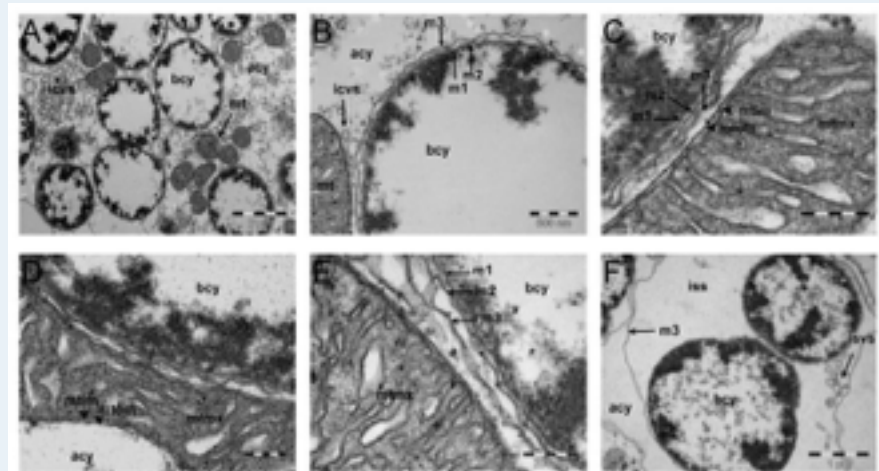
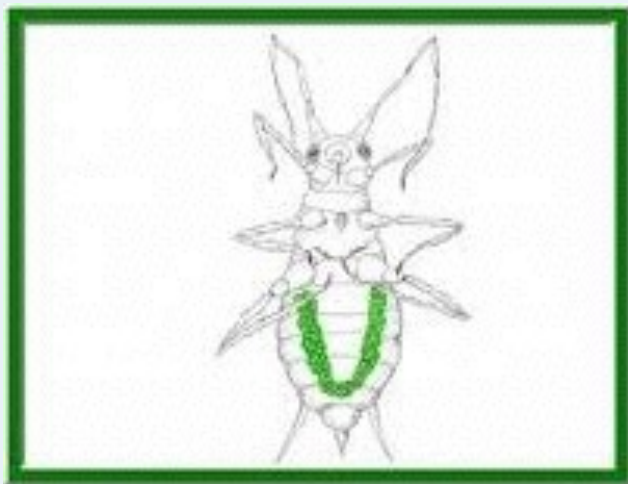
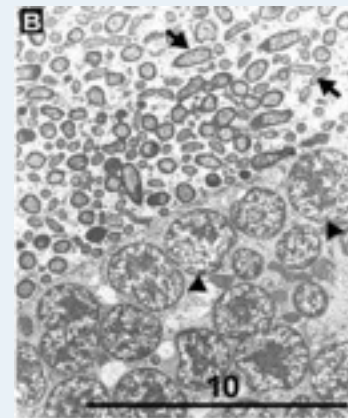
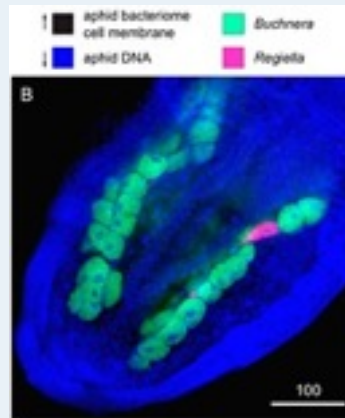
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# Le bactériocyte (la symbiose) du puceron



the aphid Room (Mandrioli blog)



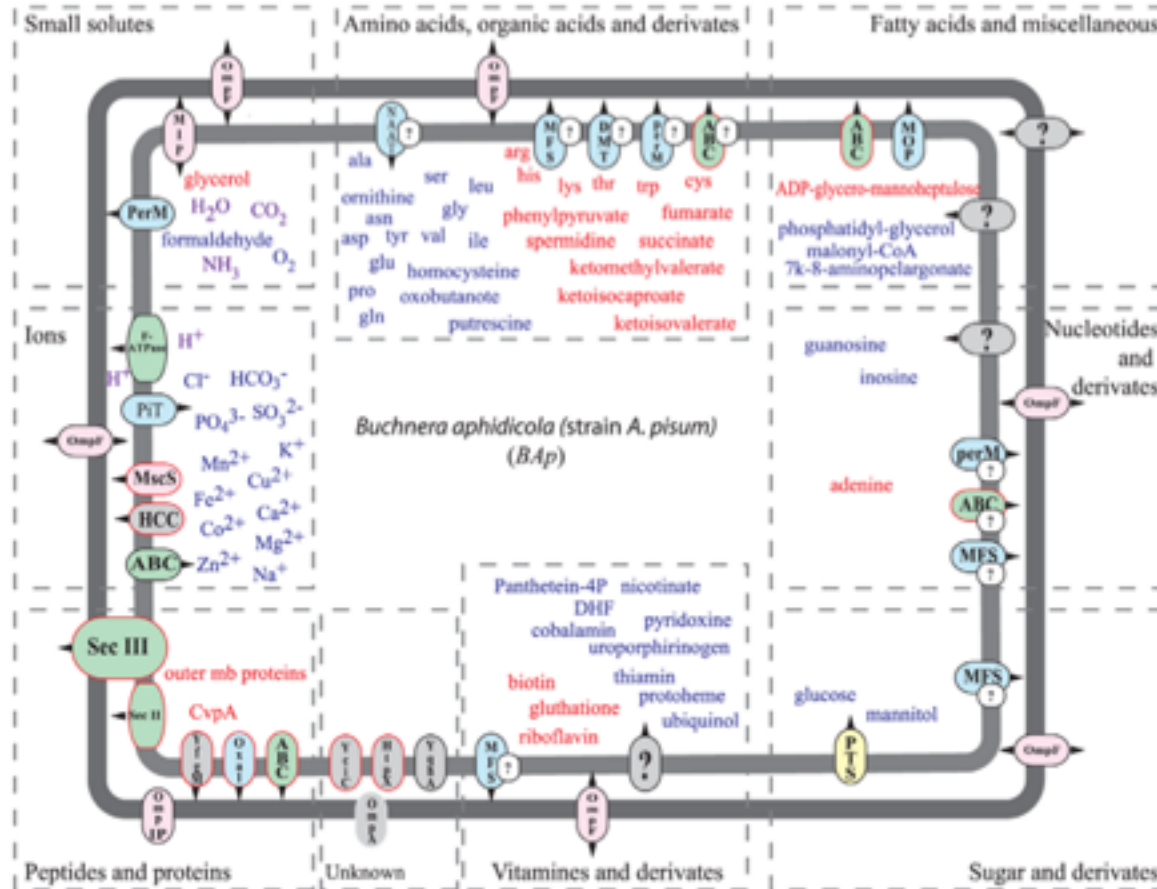
**Figure 3. Structural analysis of bacterial (*Buchnera*) and symbiosomal membranes in the pea aphid.** A: low magnification view of a bacteriocyte cell showing *Buchnera* cells, numerous mitochondria and the vesicular system within host-cell cytoplasm; B: enlarged view of *Buchnera* and mitochondria, showing the three membranes of the *Buchnera* symbiosome; C: higher magnification view of membrane organization, with the inner/outer double membrane of a mitochondrion (with matrix and cristae), and the triple membrane surrounding *Buchnera*; D: another view of *Buchnera* and adjacent mitochondrion multiple membranes; E: highest magnification view of membrane organization, showing the m1/m2/m3 triple membrane delineating *Buchnera*. All intermembrane distances (see Results) were measured at the scales indicated with Olympus AnalySIS software; F: lower magnification view of older maternal bacteriocytes. In all figures, the following abbreviations are used: *bcy*: *Buchnera* cytoplasm, *acy*: aphid bacteriocyte cytoplasm, *mt*: mitochondria, *mtmx*: mitochondrial matrix, *mtom*: mitochondrial outer membrane, *mti*: *Buchnera* inner membrane, *mt2*: *Buchnera* outer membrane, *ms*: symbiosomal membrane surrounding the *Buchnera* cells, *Nu*: nucleus, *ssm*: symbiosome (symbiosomal vesicle), *iss*: intrasymbiosomal space (intracellular to *Buchnera*), *lvs*: intracytoplasmic vesicle.

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# Transports moléculaires & Symbiose

Reappraisal of the Transport System of *Buchnera*



**Figure 2. Schematics of transport capabilities in *BAp*.** Input (blue) and output (red) compounds, predicted with the metabolic network analysis, are presented on the figure with their corresponding putative transporter families (dotted rectangles). Transporters are coloured according to their class: primary active transporters (green), secondary transporter (blue), group translocators (yellow), channels (pink), unknown (grey). Conserved transporters in the four *Buchnera* strains/species are outlined with red boxes. Small encircled question mark indicates that the corresponding transporter is an hypothetical candidate showing low sequence identity with the well annotated homologous reference in TCDB and/or for which the transported substrate was not known with a high accuracy for the orthologous reference sequence in TCDB (see table 1).  
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# L'analyse SBEM (3View) dans le contexte

Analyse de la vATPase (cible d'une toxine peptidique) dans le bactériocyte de puceron.

La vATPase est en masse le premier exprimeur du bactériocyte de puceron

**Quelle est son organisation topologique et son importance fonctionnelle dans cette cellule ?**

1: **anticorps** (anti-peptide), OK; 2: **localisation** subcellulaire IF  $\approx$ OK; 3: **bioessai** fonctionnel de survie sous pression toxique (PA1b): test resazurine; 4: **patch-clamp** de bactériocyte et effet de PA1b (in & out); 5: organisation **génomique** et méta-analyse transcriptomique et protéomique de la vATPase chez le puceron (vs drosophile & moustique).

6: Organisation et « quantification » ultrastructurale des membranes dans le BC

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Elodie Caremoli, Céline Brochier-Armanet, Christophe Chouabe,  
Entomotox (Corinne Lamis, ElectroPhy contrôle: Sf9)

# Christel Génoud @ FMI

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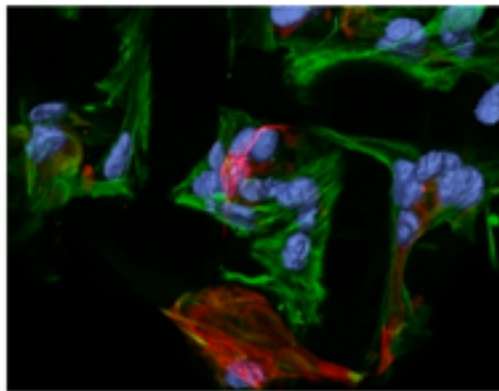
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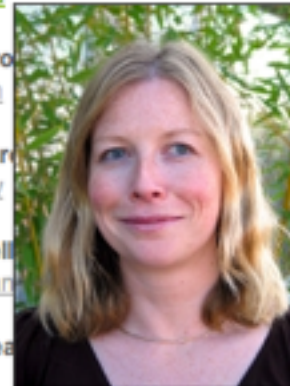
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Consultant

[Patrick Schwarz](#)



# Microscopie électronique par balayage de bloc

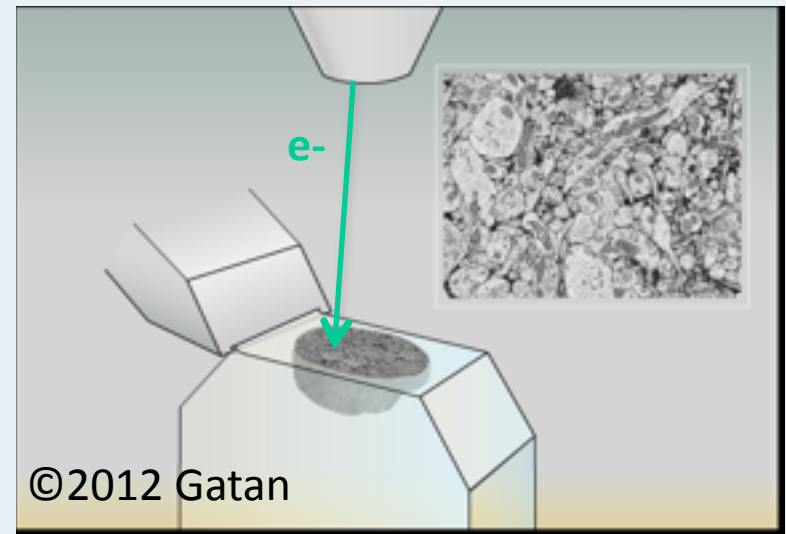
## Génération d'images 3D haute résolution

Utile sur les structures 3D complexes (tissus nerveux, cerveau...)

Voxel : 10x10x80 nm

120Mo par coupe

1000 coupes par image 3D



**Imagerie très récente, 5 appareils en Europe.**

**Permet approche multi-échelles en biologie**

**Un défi en terme de stockage et temps de traitement**

# Interactions pluridisciplinaires

