

Technical University of Denmark



## Scanning Electron Microscopy for Understanding the Role of Morphology for Pathogenicity

Mateiu, Ramona Valentina; Jønsson, R.; Krogfelt, A.; Mojsoska, B.; Jenssen, H.; Wagner, Jakob Birkedal

*Publication date:*  
2016

*Document Version*  
Peer reviewed version

[Link back to DTU Orbit](#)

*Citation (APA):*

Mateiu, R. V., Jønsson, R., Krogfelt, A., Mojsoska, B., Jenssen, H., & Wagner, J. B. (2016). Scanning Electron Microscopy for Understanding the Role of Morphology for Pathogenicity. Abstract from Antimicrobial Activity and Defense Strategies at the Mucosal Surface, Albufeira, Portugal.

## DTU Library

Technical Information Center of Denmark

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## Scanning Electron Microscopy for Understanding the Role of Morphology for Pathogenicity

**R.V. Mateiu<sup>a\*</sup>, R. Jønsson<sup>b</sup>, K. A. Krogfelt<sup>b</sup>, B. Mojsoska<sup>c</sup>, H. Jenssen<sup>c</sup>, J.B. Wagner<sup>a</sup>**

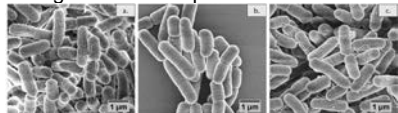
*a, Center for Electron Nanoscopy, Technical University of Denmark, Fysikvej, building 307, 2800, Kgs.Lyngby, Denmark*

*b, Department of Microbiology and Infection Control, Statens Serum Institut, Copenhagen, 2300, Kbh.S, Denmark*

*c, Department of Science, Systems and Models, Roskilde University, 4000, Roskilde, Denmark*

A good understanding of the pathogen behaviour is a priori for designing new drug paradigms that can surpass the function of current available medicine. Here, we present two cases, which highlights the capabilities of the scanning electron microscope (SEM) for advanced characterization of pathogens in favourable and hostile environments.

First, we present a good practice protocol that allows for imaging fimbria on an Enteroaggregative *E.coli*<sup>1</sup>. The SEM has a large depth of focus and a fairly large field of view. This, along with the fact that the electron micrograph is a true representation of the surface makes the SEM a complementary technique, which can be used to confirm and strengthen the multiplex PCR studies of aggregative adherence fimbriae.



**Figure 1.** Micrographs of wild type *E.coli* showing fimbriae (a), a fimbrial mutant (b), and the complemented mutant with its native fimbriae (c).

Second, we present time laps SEM morphology studies of *E.coli* exposed to two different antimicrobial peptoids. These micrographs corroborate that the antimicrobial peptoids studied target the *E.coli* membrane and inhibits metabolic processes by targeting intracellular structures. This second study shows that SEM can be used as a standalone technique for elucidation of the specific mechanism of action of antimicrobial compounds.



**Figure 2.** *E.coli* morphology before (a) and after challenging with peptoid 1 (b) and peptoid 2 (c).

### References

1. R. Jønsson, C. Struve, N. Boisen, R.V. Mateiu, A.E. Santiago, H. Jenssen, J.P. Nataro and K.A. Krogfelt, *Infection and Immunity*, 2015, **84(4)**, 1396-1405.
2. R.V. Mateiu, B. Mojsoska, H. Jenssen and J.B.Wagner, *Proceedings of Microscopy Conference, Goettingen*, 2015.