Bacterial nanoscopy - Insights from high-speed and time-lapse atomic force microscopy on the life and death of bacteria

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Abstract

Atomic force microscopy (AFM) is a unique tool for studying nanoscale structure of biological samples. Its ability to image cells in physiological environments has lead to numerous insights into the structure of bacterial surfaces [*1*]. Recent developments in AFM technology such as high speed AFM [*2*] makes it possible to go beyond the static characterization, and allows for investigating cellular processes with nanometer resolution. Especially the processes by which cell wall active antibiotics kill cells are of great interest [*3*]. In our work we study rapid as well as long term reactions of bacteria to antibiotic stresses using a combination of high-speed and time lapse AFM. In this presentation I will discuss how AFM can contribute to microbiology and present new technologies that will enable a broader adoption of nanoscale nanoscopy.

References

[1] Y. F. Dufrêne, *J. Bacteriol.,* **184** (2002) 5205–5213.

[2] T. Ando *et al.*, *Proc. Natl. Acad. Sci. U. S. A.,* **98** (2001) 12468–72.

[3] G. E. Fantner, R. J. Barbero, D. S. Gray, A. M. Belcher, *Nat. Nanotechnol.* **5**, (2010) 280–5.

Figures:

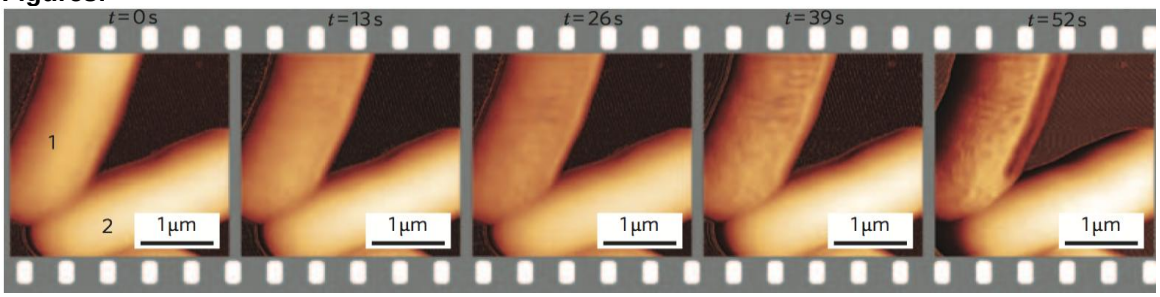

Figure 1: Real time observation of the effect of the antimicrobial peptide CM15 on E.Coli imaged with high speed AFM