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JPK reports the exploration of living cells using nanoscale and single molecule techniques through the application of scanning probe microscopy in the group of Yves Dufrêne at the Catholic University of Louvain, Belgium.

Berlin, 16th June 2015: JPK Instruments, a world-leading manufacturer of nanoanalytic instrumentation for research in life sciences and soft matter, reports on the use of their NanoWizard® 3 AFM system at the Université catholique de Louvain where it is used by the nanobio team to look at the nanoscopy of living cells.

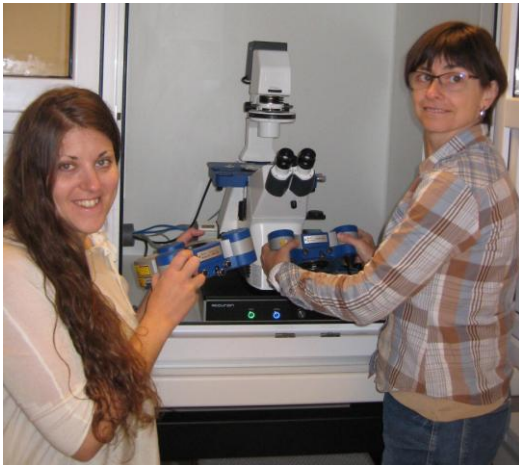
Dr Yves Dufrêne is a senior research fellow who is leading the Nanobio Team at UCL, Université catholique de Louvain. His research is at the cross-roads of nanotechnology and microbiology where the goal is to gain insight into the nanometer-scale surface architecture and molecular interactions of microbes. Two main topics are: understanding the spatial organization of the cell wall and deciphering the molecular mechanisms of cell adhesion. The general strategy involves combining novel AFM modalities for probing bacterial cell surfaces (combined AFM-fluorescence imaging of live cells, high-speed imaging of cell surface structure, quantitative multiparametric imaging of cell surface properties, advanced single molecule and single-cell force spectroscopy measurements) with genetic and biophysical methods to characterize a range of organisms of biotechnological or biomedical importance. These nanoscale analyses will shed new light into the structure-function relationships of microbial cell surfaces.

Looking more deeply at his work, Dr Dufrene says "the completion of our multidisciplinary research requires a novel, state-of-the-art AFM for the nanoscale analysis of live cells hence our choice of the NanoWizard® from JPK Instruments. This is equipped with a series of advanced capabilities that are essential for the project. First, the combination of AFM with a high-quality inverted optical microscope will allow us to optically guide AFM analyses (selection of a cell of interest, followed by targeted AFM measurements), therefore improving dramatically the throughput and quality of single-cell analyses. In addition, this AFM-optical microscopy platform will make it possible to directly correlate AFM topographic images with fluorescence images and to prepare living cell probes for single-cell force spectroscopy (SCFS) measurements. Secondly, the new high-speed module will complement traditional topographic imaging of bacterial cell surfaces by providing a more dynamic view of the cell surface (cell surface organization, relaxation and turnover; cell wall remodelling in response to drugs). We believe this

project is a unique opportunity to push the limits of high-speed AFM in microbiology. Third, an advanced single-molecule force spectroscopy (SMFS) package will enable us to image and manipulate, at high resolution, single cell surface constituents. This package will include the force-clamp mode, which will provide novel insights into the adhesive and mechanical properties of the adhesins. Fourth, the newly developed multiparametric imaging mode (also named quantitative imaging, QI™) will allow us to dramatically increase the spatiotemporal resolution of SMFS-based imaging, and to correlate the localization of single cell surface constituents with local changes in adhesion and elasticity. Fifth, the unique cell adhesion force module (CellHesion™ module) will guarantee reliable, state-of-the art single-cell force spectroscopy (SCFS) measurements, and will permit, for the first time, long-range z-spectroscopy (up to 100 µm), thereby enabling to unravel molecular interactions that were not accessible before.”

For more details about JPK's NanoWizard® AFM and its applications for the bio & nano sciences, please contact JPK in the USA on (408) 807 8878 and in Germany on +49 30726243 500. Alternatively, please visit the web site: www.jpk.com or see more on Facebook: www.jpk.com/facebook and on You Tube: <http://www.youtube.com/jpkinstruments>.

Attachment



Cécile Formosa & Sylvie Derclaye of the Dufrêne Group at the Université catholique de Louvain with the NanoWizard® AFM from JPK

About JPK Instruments

JPK Instruments AG is a world-leading manufacturer of nanoanalytic instruments - particularly atomic force microscope (AFM) systems and optical tweezers - for a broad range of applications reaching from soft matter physics to nano-optics, from surface chemistry to cell and molecular biology. From its earliest days applying atomic force microscope (AFM) technology, JPK has recognized the opportunities provided by nanotechnology for transforming life sciences and soft matter research. This focus has driven JPK's success in uniting the worlds of nanotechnology tools and life science

applications by offering cutting-edge technology and unique applications expertise. Headquartered in Berlin and with direct operations in Dresden, Cambridge (UK), Singapore, Tokyo, Shanghai (China), Paris (France) and Carpinteria (USA), JPK maintains a global network of distributors and support centers and provides on the spot applications and service support to an ever-growing community of researchers.

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