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JPK reports on the use of the NanoTracker™ Optical Tweezers system at Norway's NTNU Trondheim.

Berlin, 14th January 2014: JPK Instruments, a world-leading manufacturer of nanoanalytic instrumentation for research in life sciences and soft matter, reports on how the NanoTracker™ Optical Tweezers system is being applied in the study of biomacromolecules at NTNU in Trondheim.

The Norwegian University of Science and Technology at Trondheim is Norway's second largest university. Dr Marit Sletmoen is an associate professor in the Department of Physics. She specialises in the study of biological polymers, biophysics and medical technology.

Dr Sletmoen started working in the field of force probes through an interest in polysaccharides, including the biosynthesis of alginate. Beginning with AFM-based dynamic force spectroscopy, her research interests since have broadened. One reason for this is the growing understanding for the importance of carbohydrates for the control of normal and pathological processes through their interaction with other biomacromolecules. Details concerning how the carbohydrates exert effects are often unknown and this has led to it becoming a large part of her group's research efforts. These have focused on the study of O-linked glycosylation of proteins. This is the most abundant form of glycosylation found in higher eukaryotes. In general, glycoproteins are considered to act as receptors for complementary binding proteins, typically lectins. Using AFM and now also Optical Tweezers (OT), the group have studied the interaction between mucins and the lectin SBA. Currently, they are also investigating the interaction between carbohydrate antigens located on mucins and the lectin MGL. In addition to the study of carbohydrate protein interactions, the recognition of carbohydrates by complementary carbohydrates is also studied. A growing body of evidence documents that such interactions are biologically relevant so OT and AFM are being used to document their existence and quantify their strength.

Dr Sletmoen talks about her motivations to apply the NanoTracker™ Optical Tweezers system: "Some of the challenges faced when studying carbohydrate interactions are related to their inherent low strength and multivalency. These challenges have hampered the progress in the emerging field of glycomics, and this field is therefore expected to benefit from the application of new methodologies. The low force range combined with

the high spatial and force resolution offered by the optical tweezers makes them a powerful tool when addressing these questions.”

Continuing, she said, “My introduction to the force probes was through the atomic force microscope. When realizing that my work evolved in a direction where the low force range and high resolution provided by optical tweezers would be useful I contacted Professor Lene Oddershede, the group leader for the optical tweezers lab at the Niels Bohr Institute at the University of Copenhagen. Through a stay in her group, I got introduced to a home-built optical tweezers setup. After the stay, I started to look for possibilities to establish this technique in the lab. Alongside with the use of these force probes, we today also use fluorescence microscopy, including TIRF, as well as lithographic techniques. A benefit of the JPK’s NanoTracker™ system that was important to us when choosing this set-up is that you can quickly get started with your optical tweezers studies, since no instrument building or adjustments are needed. Furthermore, the software is user friendly and flexible, and together with the dual beam set-up, it allows for many types of studies. We have also enjoyed the quick and competent response we get from the JPK service team whenever we need them!”

For more details about JPK’s NanoTracker™ and applications for the bio & nano sciences, please contact JPK on +49 30533112070, 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:



NTNU associate professor, Marit Sletmoen, with her JPK NanoTracker™ Optical Tweezers system.

For a high resolution copy of the image, either right click to download or contact Jezz Leckenby at Talking Science.

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 and Paris (France), 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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