Nanoscale dynamics of protein-DNA complexes as revealed with high-speed AFM

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High-speed atomic force microscopy (HS-AFM) is an advanced technique with numerous applications in biology, particularly in molecular biophysics. Developed as a time-lapse AFM technique for direct imaging fully hydrated biological molecules, HS-AFM is currently capable of visualizing the dynamics of biological molecules and their complexes at a video-data acquisition rate. Spatial resolution at the nanometer level is another important characteristic of HS-AFM. This presentation focuses on examples of primarily protein-DNA complexes to illustrate the high temporal and spatial resolution capabilities of HS-AFM that have resulted in novel models and/or the functional mechanisms of these biological systems.

Biography

Yuri L Lyubchenko is a Professor of Pharmaceutical Sciences at the University of Nebraska Medical Center, USA. His research focuses on understanding fundamental mechanisms underlying health and disease, which is a key for developing new and more effective diagnostics and medications. This primary basic research allows him not only to identify new drug targets for small molecule drugs, it also leads to development of the nanotools and methods to discover novel approaches for diagnostic, treatment and disease prevention and to more rapidly determine their efficacy at the molecular level.