

Imaging, measuring and manipulating living matter with nano-sensors and -actuators

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Abstract: Living matter is composed of a large number of biologic 'nano-machines', hence many diseases have their roots at the nanoscale! Since it has been recognized early in the history of nanotechnology that medicine could be a prime target for application, a significant number of promising medical projects are in an advanced experimental stage. Tools such as, for example, the scanning force microscope (SFM), while providing us with the 'eyes' for imaging biological matter from the mm to the μm and, ultimately, nm scale, it also provides us with the 'fingers' to measure and manipulate biological matter at the level of single molecules, organelles and cells. Evidently, the prospects of this unique nano-sensor and -actuator in fundamental research and for practical applications in biology and medicine are only limited by our imagination. The biomedical potential of such nano-sensors and -actuators will be illustrated by examples that include a molecular transport machine, single-cell biomechanics, and an arthroscopic SFM. .

