ZERNIKE INSTITUTE COLLOQUIUM

Thursday, December 1st, 2011

16:00h, Lecture Hall: 5111.0080 **Coffee and cakes from 15:30h**

Biomolecular Nanostructures for Sensing, Machinery and Nanocircuitry

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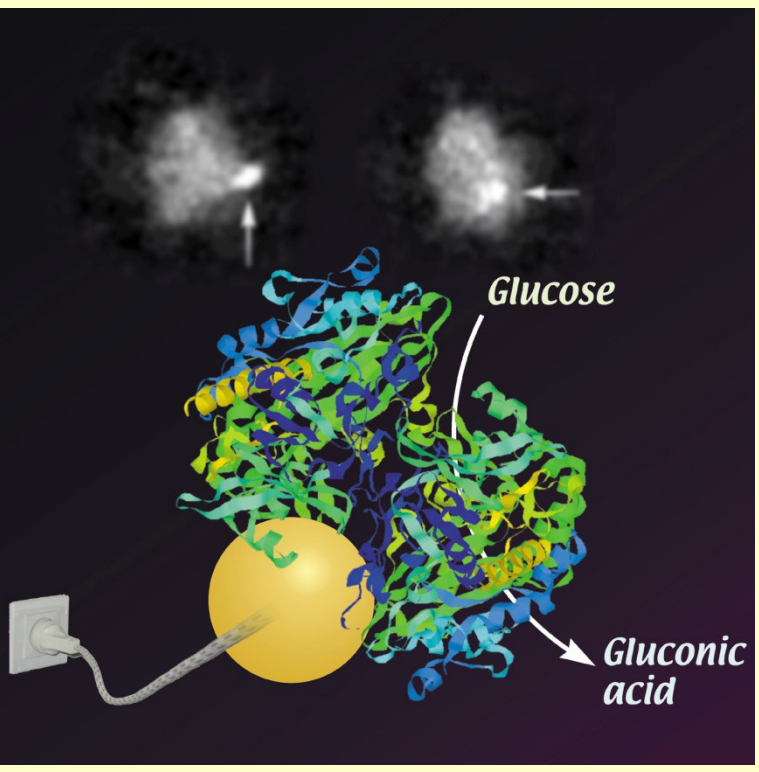
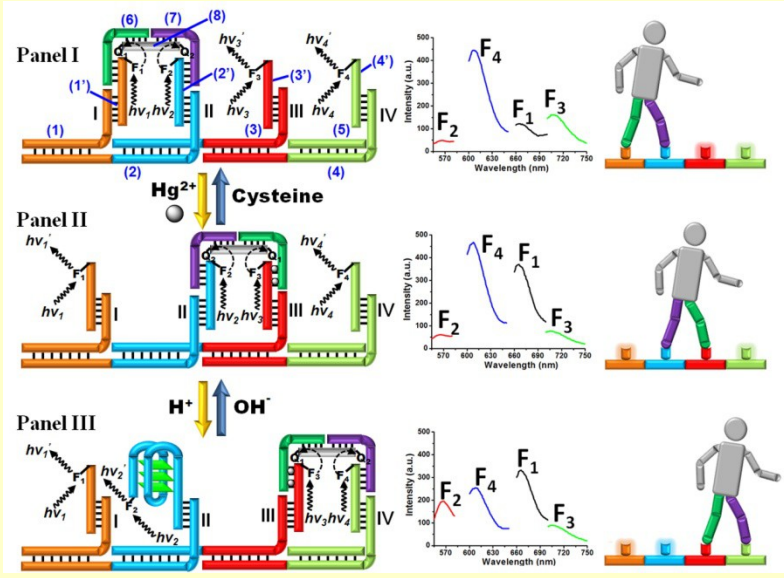
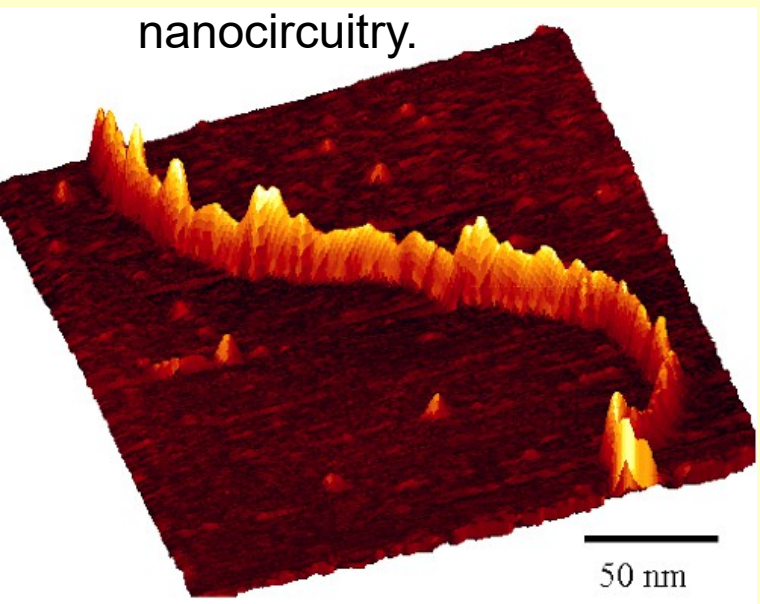


The synthesis of biomolecule/nanoparticle hybrid systems or the self-assembly of biomolecular nano-structures provide materials of new emerging functionalities and properties. The developments in the area of nanobiotechnology will be discussed by addressing the following topics:

(i) The electrical contacting of redox enzymes with electrodes by means of implanted metal nanoparticles, and the application of the systems for electrical biosensor, biofuel cells and new biocatalytic applications. Also, the use of functionalized semiconductor quantum dots for biosensing using fluorescence resonance energy transfer, chemiluminescence resonance energy transfer and photoelectrochemical readout signals.

(ii) The use of the information encoded in nucleic acid structures to self-assemble into functional nanostructures. This will be exemplified with self-organized DNA nanostructures acting as machines (tweezers, walkers, steppers and programmed catenane machineries), the self-assembly of nucleic acids into nanotubes of controlled diameters, the programmed positioning of proteins on DNA nanostructures for the activation of enzyme cascades, and the use of biomolecular templates for growing nanocircuitry.





(iii) The tailoring of DNA replication/recycling machines for amplified sensing of DNA, and aptamer-substrate complexes. The use of DNA molecular machines as potential alternatives for PCR will be discussed.

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