Single-biomolecule circuits with carbon nanotube wiring

JOHN CORONEUS, Departments of Molecular Biology and Biochemistry, and Physics and Astronomy, University of California Irvine, Irvine, CA 92697, BRETT R. GOLDSMITH, VAIKUNTH KHALAP, ALEXANDER KANE, GREGORY A. WEISS, PHILIP G. COLLINS — Because of their size and chemistry, carbon nanotubes offer a unique opportunity to couple solid-state electronics with individual proteins or other biomolecules. This talk will describe our success covalently attaching single proteins to functioning, nanotube-based electronic devices. Because the nanotubes are sensitive, one-dimensional conductors, their electrical properties are greatly altered by this attachment, even when only one or two proteins are bound. The single-molecule circuits which result allow the dynamics of molecules to be directly observed without ensemble averaging. This work is partly supported by NSF grant EF-0404057.