



# SECOND INTERNATIONAL NANOTECHNOLOGY CONFERENCE ON COMMUNICATIONS AND COOPERATION

## Abstract

### **Biomedical Nanotechnologies**

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The National Institutes of Health support nanotechnology research to promote the development and application of these emerging technologies toward gaining a better understanding of disease mechanisms and developing improved diagnostic and therapeutic approaches. New research tools are already providing methods to study cells at a higher level of precision, including single molecule tracking and manipulation in live cells, to reveal basic molecular and cellular mechanisms. Nanotechnology also offers potential paths to improve conventional medical diagnostic tests and treatments, and to develop capabilities substantially surpassing those that are available today, to diagnose and treat diseases that take a tremendous toll on humanity. By combining the deeper understanding of the underlying biology with knowledge gained by applying early generation nanotechnologies to improve “conventional” medicine, we anticipate generating brand new concepts and approaches that will enable effectively targeted medical interventions. Some of these will incorporate the ability to measure and manipulate (both move and modify) individual molecules or cohorts of molecules in living cell and tissues with high precision. Gaining these abilities will benefit not only medicine, but also other fields of nanotechnology applications as our studies reveal design principles that have evolved and been tested in nature for millennia in finely tuned, robust, and diverse living systems. Achieving these goals in a responsible manner incorporates efforts to understand and control the interaction of nanomaterials with biological systems, and to engage a wide range of stakeholders in planning for the safe and effective development and use of the emerging approaches