Nanotechnology in Early Detection of Cancer

August 30-31, 2001

Meeting Summary

Nanotechnology is defined as the creation of functional materials, devices and systems through control of matter at the scale of 1 to 100 nanometers, and exploitation of novel properties and phenomena at the same scale. Nanotechnology has been touted as an impetus for the "Next Industrial Revolution" by the National Nanotechnology Initiative. One potential application highlighted in above Initiative is the detection of emerging diseases as a means for shifting focus from patient care towards early detection and prevention.

The Cancer Biomarkers Research Group from the Division of Cancer Prevention organized a two-day workshop, along with the National Institute of Standards and Technology (NIST), entitled "***Nanotechnology in Early Detection of Cancer***" in an effort to bring together specialists and experts from academia, industry and government institutions. The goal of the workshop was to discuss the state of the art and explore the potential utility of nanotechnology for early detection and prevention of cancer. The Workshop was held at the NIST campuses on August the 30-31 of 2001 and was chaired by Dr. Lee Hood and Dr. George Whitesides.

It was evident from the Workshop that nanotechnology has the potential to make significant contributions to prevention and detection in addition to diagnosis and treatment. It was felt that nanotechnology offers important new tools for detection as present and existing technologies have or are reaching their limits. It was stressed that nanotechnology provided the means to provide direct readout of genomic and proteomic information both at the single molecule and single cell level. Its utility in analyzing and characterizing extremely limiting samples was also discussed. Four distinct nanao-applications deemed promising for early detection and prevention were:

- Nanostructures,
- Nanoprobes,
- Nanosources and
- Nanomaterials.

The Workshop also stressed a need for expanding NCI programs to encourage research on and support funding for early cancer detection.