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Dr. Srivastava is Chief of the Cancer Biomarkers Research Group in the Division of Cancer Prevention, National Cancer Institute. Dr. Srivastava received his PhD. Degree in biological science from Banaras Hindu University in 1977. Subsequently, he received his M.S. degree in Computer Science from the Virginia Commonwealth University in 1987 and a MPH degree from the Johns Hopkins University in 1997. He did postdoctoral work at the University Of Osaka, Japan; the University of California at San Francisco; and the University of Arizona, Tucson. He joined the National Cancer Institute in 1988. Since 1990, he has served as program director in the Division of Cancer Prevention and focused his responsibility in developing and managing programs in molecular diagnostics with primary emphasis on cancer screening, early detection, risk assessment and informatics.

Dr. Srivastava has received several honors and awards and is a member of a number of scientific committees. In 1995, he was elected to the American Joint Committee on Cancer (AJCC) which is responsible for developing staging criteria for cancers for worldwide use and currently serves on the AJCC Executive Committee. He has received several NIH Merit Awards. In 1999, he also received the NIH Director's Award for his extraordinary scientific leadership in furthering development of biomarkers and surrogate endpoint in clinical trials. He conceptualized and initiated a Gordon Conference on *New Frontiers in Cancer detection and Diagnosis* (2002) and chaired and coordinated the meeting in 2003.

In 2000, Dr. Srivastava developed and implemented a novel approach to collaborative clinical research on cancer biomarkers through the establishment of the Early Detection research Network (EDRN), a flagship program at the National Cancer Institute, National Institutes of Health. The network has more than 45 institutions, 300 investigators and involves several federal agencies in the USA. Under his leadership the network has begun translating biomarkers into clinical tests for early detection and diagnosis, risk assessment, and prognosis. In collaboration with NASA (Jet Propulsion Laboratory) he has played a key role in conceptualizing and implementing informatics infrastructure for the EDRN, a model collaboration being followed elsewhere.

Dr. Srivastava has played a pivotal role in the development of the a Bethesda Guidelines for diagnosing hereditary non-polyposis colorectal cancer and in the development of a International Criteria@ for screening microsatellite instability in cancer patients. He has published more than 160 research papers, review articles and commentaries in peer reviewed journals. Recently, he edited a book on AInformatics in Proteomics@ published by Francis and Taylor, New York and has been appointed to serve as an Associate Member of a newly launched American Association for Cancer Research Journal *Cancer Prevention Research* for a four-year term.

Nanotechnology in Cancer Diagnosis: Promises and Challenges

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Nanotechnology has the potential to make significant contributions to cancer prevention, detection, diagnosis and treatment. Tools are important and integral parts for early detection and nanotechnology can provide novel tools and complement existing ones. This technology offers opportunities in multiple platforms for parallel applications, miniaturization, integration and automation. For example, nanotechnology could be extremely useful in the area of biomarker research. It could provide successful strategies for real time and direct read out of genomic and proteomic information at the single molecule and single cell level. Additionally, it would allow for multiparametric analysis using relatively small sample volumes. Nanotechnology could help provide additional sensitivity in assays through analysis of single cells and extremely limiting amounts of samples.

There are a number of devices already at preliminary stages of development. Four specific nanotechnology applications that could impact on biomarker research for early detection are: (1) Nanostructures such as pores, (2) Nanoprobes such as scanning tunnel microscopy, (3) Nanosources such as laser induced fluorescence and (4) Nanomaterials such as super-paramagnetics and quantum dots.

Nanotechnology could have a profound influence on cancer prevention efforts since they offer innovative tools for understanding the cell as well as the differences between normal and abnormal cells. This technology could provide insights into the mechanism of transformation, which is fundamental in designing preventive strategies. Further, it provides novel observation modalities, that are non-damaging, into the cellular machinery. They allow for the analysis of such parameters as cellular mechanics, morphology and cytoskeleton that have been hard to achieve using conventional technology.

The Speaker will present examples of few promises and challenge of nanotechnologies that should be pursued in the future. For diagnostic applications, we must develop measurements and standards that will guide and expedite the development of new nanotechnologies. We should also develop benchmark measurements that will be critical for understanding the performance of nano-devices and nanoscale phenomena. These include nano-structured materials, nano-diagnostics, and nano-fabrication.