

Editorial

First International Symposium on Recent Advances in Environmental Health Research

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Recent developments in biomedical sciences and environmental medicine have significantly improved our understanding of risk factors associated with human diseases and health disparities. Although poor access to health care, genetic, cultural, behavioral, and socio-economic factors have been linked to disease status, environmental determinants including physical, chemical, and biological factors have also been shown to play a significant role in human health. Environmental health problems are increasingly taking center stages. Environmentally-related illnesses including infectious diseases, and chronic conditions such as cancer, are continually inflicting new health burdens. As these challenges emerge in new and more complicated forms, it is essential that we keep pace with the scientific understanding that is critical in defining strategies for sound environmental health decision-making.

In its summary recommendations for improving the scientific basis for environmental decision-making, the National Academy of Science pointed out that “90% of voters believe that the environment plays a significant role in health...yet environmental science and environmental health communities are too frequently independent of one another, funded by different agencies and consisting of different researchers. If these disciplines fail to push ahead collectively with further research and prevention, the many burdens of environmentally-influenced illness imposed upon our society may become even heavier”. In response to this call for action, Jackson State University (JSU) hosted the “*First International Symposium on Recent Advances in Environmental Health Research*” at the Marriott Hotel in Jackson, Mississippi, from September 19 through September 22, 2004. This important event was that first World Congress held in Jackson, MS, USA, on important issues related to environmental quality and human health. Its overarching objective was to promote interdisciplinary discussions and international scientific collaborations, as well as to advance the participants’ understanding of local, regional, and global environmental issues as they relate to the quality of life and human health.

In an attempt to contribute global solutions to these environmental challenges, scientists around the world, have been more and more involved in bioenvironmental research, studying the toxic mechanisms of action of various environmental agents, developing new approaches for detecting or remedying environmental damage, identifying and characterizing genes involved in the manifestation of environmentally-related diseases, and providing the public and policy makers with scientific tools that are critical for environmental health decision-making. Therefore, the “*First International Symposium on Recent Advances in Environmental Health Research*” served as a strong forum for environmental and biomedical scientists-biologists, chemists, toxicologists, public health scientists, engineers, and policy makers interested in bringing about substantial contributions to addressing global environmental, and sustainable development issues, to communicate the latest advances in scientific research and new developments on critical environmental and human health topics including the following:

1. ***New Frontiers in Environmental Health Research:*** The causes of most human diseases have been attributed to the complex interactions between genetic factors and environmental exposures. Hence, control and prevention measures highly rely on the understanding of the cause and effect relationships between these factors and disease development. In recent years, new areas of research such as toxicogenomics, proteomics, and functional genomics have emerged, with the aim of understanding molecular mechanisms of health and disease. Also, the recent advances in the molecular biology of the cell cycle regulation have given new life to our understanding of cancer in particular, and the idea that defects of regulation in cancer cells may partially explain successes that have been achieved in cancer chemotherapy. Specific areas of symposium research presentations included gene expression studies, proteomics, gene-environment interactions, functional genomics, biomarkers of effect, sensitivity and effect, signal transduction and gene activation; and molecular targets of disease chemotherapy.

2. **Environmental Toxicology and Health Risk Assessment:** Growing public awareness of the potential risk to humans from toxic chemicals in the environment has generated demand for new and improved methods for toxicity assessment and rational means for estimating health risk. Many environmental agents such as metal ions, polycyclic aromatic hydrocarbons, pesticides/herbicides, UV-light, food additives, and viruses are known to induce various types of illnesses including cancer in humans. Several symposium presentations dealt with research elucidating the cellular and molecular mechanisms by which these environmental agents induce toxicity, mutagenesis, and carcinogenesis, as well as research on hazard assessment of exposure to physical, chemical and biological agents; dose-response evaluation and model development; exposure assessment analysis; and health risk characterization; and management.
3. **Emerging Topics in Computational Biology, and Environmental Modeling:** Using of computational methods and procedures to investigate environmental and biological phenomena has made remarkable progresses. This field includes analysis of human genome data, prediction of DNA and protein structure and function, design of biomaterials and therapeutic agents, studies into small molecule-biomacromolecule interactions, and other related computational method development. Therefore, several symposium presentations dealt with the computational analysis of the physical and chemical properties of several environmental compounds, as well as on quantitative structure activity relationship (QSAR) studies for developing predictive toxicology models associated with exposure to these compounds.
4. **Health Disparities and Environmental Security:** In recent years health disparities and biological and chemical terrorism have emerged as major issues in public safety and homeland security. With recent advances in laboratory technologies, it is often possible to measure specific genetic variations as risk factors for specific types of disease. Equally important is the evaluation of the role of modifier factors such as environmental exposures or other genes that may exacerbate the genetic risk leading to differences in disease susceptibility among individuals. Since the events of September 11, 2001 regarding the attacks on the World Trade Center and the Pentagon, and the subsequent anthrax attacks on several people, our collective thinking with regard to our vulnerability to terrorism has completely changed. The specific areas of research presentations included the following: health disparities and cancer; health disparities and heart disease; health disparities and infectious diseases; and bioterrorism/chemical terrorism.
5. **Medical Geology and Human Health:** Recent concerns over health-related issues arising from exposure to environmental substances have raised substantial interest in a new field termed “medical geology”. In fact, naturally-occurring toxic metals such as arsenic, cadmium, lead, and mercury are now known to cause serious public health problems in several areas of the world. Likewise, the geographical distributions of several infectious diseases such as malaria, meningitis, and schistosomiasis, have been linked to intrinsic climatic and environmental factors. Research on this topic dealt with disease ecology, toxicology, pathology and/or epidemiology with regard to the emerging subject of medical geology.
6. **Natural Resources Damage Assessment and Management:** Several environmental influences including natural and anthropogenic factors have been linked to ecosystem vulnerability. Monitoring and assessment data are therefore needed for science-based decision-making with regard to environmental management. Papers for presentation on this topic included those related to: a) conceptual modeling for ecological risk assessment, b) assessment of the physical, chemical, and biological characteristics of specific ecosystems, c) applications of GIS and remote sensing technology to environmental assessment and management, and d) bioindicators for environmental management.

The symposium attracted more than 300 participants from 21 countries representing all five continents, and more than 150 scientific presentations across the disciplines of environmental health and biomedical sciences. As stated above, the scientific program was composed of six plenary sessions where oral/platform presentations were given by more than 40 invited speakers. In addition, there were two poster sessions – one for faculty and professional scientists, and one for students – with more than 100 abstracts. The submitted full length manuscripts were peer-reviewed, and selected for publication by experts in their respective fields. The accepted papers are being published in two volumes as special issues of the International Journal of Environmental Research and Public Health.

We wish to extend special thanks to Dr. Sidney McNairy, Associate Director of the National Center for Research Resources at the National Institutes of Health for his vision and commitment to providing resources for the support of the RCMI Program activities including the RCMI-Center for Environmental Health at Jackson State University, and for serving as the First Distinguished Speaker for the Honorary Biomedical and Health Information Lecture Series” at the symposium. He made a distinguished lecture on the issue of human environment and health disparities, and pointed out the critical role that institutions like Jackson State University should play in addressing these issues. Thanks are also extended to all our conference presenters, session chairs, and keynote speakers, and especially congressman James E. Clyburn of South Carolina who spoke very elegantly of the critical issue of environmental justice. We are also grateful to all members of the planning and implementation committees for their significant contributions to the successful organization of the conference. Many thanks to Mrs. Zelma Leflore and her students for providing the technical assistance with the technology needed for platform presentations.

Special thanks are extended to Dr. David Potter (Mississippi Commissioner of Higher Education), Dr. Ronald Mason, Jr. (President), Dr. Felix Okojie (Vice President for Research Development, and Federal Relations), Dr. Velvelyn Foster (Interim Provost and Vice-President for Academic Affairs), and Dr. Mary Myles (Director of Title III Program) for their administrative support. We would like to acknowledge the authors for their involvement and cooperation, and for their outstanding contributions to advancing science and sound decision-making in the critical area of environmental health sciences. Special thanks are also extended to all the peer-reviewers who took time off their busy schedules to carefully and critically review each of the manuscripts.

On behalf of the entire organizing committee, the greatest acknowledgments go to our major symposium sponsors including the U.S. Department of Education Title III-Strengthening the Environmental Science Ph.D. Program at JSU, National Institutes of Health RCMI-Center for Environmental Health, JSU Office of Research Development and Federal Relations, and U.S. Environmental Protection Agency. The contribution of the National Library of Medicine (NLM) to the successful organization of the pre-symposium workshop on the “NLM’s Toxicology Network and Environmental Health Information Databases” is gratefully acknowledged.
