

# Biomarkers *of* ENVIRONMENTALLY ASSOCIATED DISEASE

Technologies, Concepts,  
and Perspectives



Samuel H. Wilson  
William A. Suk



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*Technologies, Concepts, and Perspectives*

Samuel H. Wilson, M.D.  
William A. Suk, Ph.D., M.P.H.



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A CRC Press Company

Boca Raton London New York Washington, D.C.

## Library of Congress Cataloging-in-Publication Data

Biomarkers of environmentally associated disease : technologies, concepts, and perspectives / [edited by] Samuel H. Wilson, William A. Suk.

p. cm.

Includes bibliographical references and index.

ISBN 156670-596-7

1. Environmentally induced diseases—Diagnosis. 2. Environmentally induced diseases—Molecular aspects. 3. Biochemical markers. 4. Tumor markers. I. Wilson, Samuel H., 1939- II. Suk, William A. (William Alfred)

RB152.5 .B54 2002

616.9'8—dc21

2002016076

CIP

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International Standard Book Number 156670-596-7

Library of Congress Card Number 2002016076

Printed in the United States of America 1 2 3 4 5 6 7 8 9 0

Printed on acid-free paper

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## *Acknowledgments*

We wish to thank Ms. Charle League for her editorial management and Dr. Miriam Sander for her editorial assistance. This project was supported, in part, by the National Institute of Environmental Health Sciences, National Institutes of Health.

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## Editors

**Samuel H. Wilson, M.D.**, is deputy director of the National Institute of Environmental Health Sciences (NIEHS), an institute of National Institutes of Health (NIH). Dr. Wilson came to NIEHS in this capacity in 1996, where he has worked to foster basic biomedical research and to promote disease prevention research. He has helped develop NIEHS' programs in genetic susceptibility, functional genomics, children's health, risk/exposure assessment, and minority institutions' research. Dr. Wilson has strengthened partnerships between NIEHS and other federal agencies concerned with environmental health. He has also worked with the Institute of Medicine to develop broad-based discussions on issues relevant to environmental health, research, and medicine.

Dr. Wilson received his graduate and postdoctoral training in medicine and biochemistry at Harvard Medical School and the NIH. He began his career as a Principal Investigator in 1970 at the National Cancer Institute, NIH, in the Laboratory of Biochemistry. In November 1991, Dr. Wilson moved to the University of Texas Medical Branch to found the Sealy Center for Molecular Science. This large center is dedicated to interdisciplinary research in the environmental health sciences and, in particular, to the study of DNA repair and genomic stability.

Dr. Wilson's recent activities include membership on the Biochemistry Study Section at NIH and numerous other federal agency advisory groups. He has served as a scientific advisor to several private foundations involved in biomedical research. He was chair of the 2001 Mammalian DNA Repair Gordon Research Conference. He is a member of the editorial boards of the *Journal of Biological Chemistry*, *DNA Repair*, *Annual Reviews*, and *Environmental Health Perspectives*.

Dr. Wilson has had a sustained interest in eukaryotic DNA metabolism. Over the past 10 years, Dr. Wilson and his associates focused their efforts on DNA polymerase  $\beta$  and the mammalian base excision repair pathway. In the 1970s, Dr. Wilson helped establish that mammalian cells contain multiple DNA polymerases, and in the mid-1980s his laboratory was first to clone the DNA polymerase  $\beta$  gene. To assign a cellular role to DNA polymerase  $\beta$ , Dr. Wilson's laboratory constructed DNA polymerase  $\beta$  "knock-out" cell lines from a transgenic mouse strain. These cell lines, devoid of DNA polymerase  $\beta$ , are deficient in base excision repair and exhibit genomic instability.

Dr. Wilson and his collaborators have reported numerous DNA-protein co-crystal structures of DNA polymerases  $\beta$  interacting with its substrates (DNA and dNTP). His group and collaborators have solved the solution structure of the enzyme by nuclear magnetic resonance. Together, this work has improved our understanding of mechanisms of DNA synthesis and DNA repair. Dr. Wilson and his colleagues have also studied the regulation of the DNA polymerase  $\beta$  gene and found that expression of this gene in mammalian cells is a regulated, adaptive process responsive to certain types of environmental stress. Dr. Wilson has authored and co-authored 250 scientific publications and has been editor of four reference volumes.

**William Suk, Ph.D., M.P.H.**, is currently director, Office of Program Development, Division of Extramural Research and Training, National Institute of Environmental Health Sciences (NIEHS), an institute of the National Institutes of Health (NIH). A primary aspect of his position has been the assessment of national and international efforts in biomedical research and its potential applications in determining adverse effects on human health resulting from exposure to environmental agents. He is responsible for designing, developing, and managing national and international programs that focus on those areas of research pertinent to the Institute's mission in experimental and molecular biology and population-based studies. To do so effectively, Dr. Suk has maintained extensive contacts with the academic and industrial scientific communities; intramural programs of the Institute as well as extramural and intramural programs of other institutes at NIH; and scientists and administrators of federal, state, professional, and private organizations, nationally and internationally.

Dr. Suk has also served as director of the NIEHS Superfund Hazardous Substances Basic Research and Training Program since it was established by Congress as part of the reauthorization of the Superfund in 1986. The goal of this university-based program is to support a wide range of research that addresses public health concerns arising from the release of hazardous substances and hazardous wastes into the environment. To this end, NIEHS sponsors coordinated multicomponent, interdisciplinary research programs that link basic biomedical research with related ecologic, hydrogeologic, and engineering studies.

Dr. Suk has had a sustained interest in linking exposures with disease etiologies and in developing research and prevention strategies to reduce risk to environmentally induced diseases and disorders. In so doing, he has helped develop NIEHS' program in children's health, genetic susceptibility, molecular medicine, risk/exposure assessment, minority institutions' research, and research on health issues related to Central and Eastern Europe, the U.S.-Mexico border environment, and the Pacific Basin.

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