

NWRI Expert Panel for the California Department of Public Health

CV for Proposed Expert Panel Member:

- Richard J. Bull, Ph.D.

CURRICULUM VITAE

Richard J. Bull, Ph.D.

December, 2008

PERSONAL DATA:

Current Title: Consulting Toxicologist
MoBull Consulting
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Professor Emeritus,
Pharmacology and Toxicology
Washington State University
Pullman, WA

Place of Birth: Stillwater, Oklahoma

EDUCATION:

| | <u>Major</u> | <u>Degree</u> | <u>Year</u> |
|---|--------------|---------------|-------------|
| <u>Graduate:</u> Department of Pharmacology University of California San Francisco Medical Center San Francisco, California | Pharmacology | Ph.D. | 1971 |
| <u>Undergraduate:</u> College of Pharmacy University of Washington Seattle, Washington | Pharmacy | B.S. | 1964 |

EXPERIENCE:

1964-65 U.S. Public Health Service, Division of Hospitals, Baltimore, Maryland
Duties: Resident in Hospital Pharmacy

1965-67 U.S. Public Health Service, Northeast Marine Health Science Lab., Narragansett,
Rhode Island
Duties: Chemist, Isolated and purified paralytic shellfish poison
(saxitoxin) from the siphons of the Alaskan Butter Clam.

1967-70 Department of Pharmacology, University of California, San Francisco Medical
Center, San Francisco, California
Duties: Graduate student in pharmacology

Title of doctoral dissertation: "Saxitoxin, tetrodotoxin and excitation in cerebral cortex slices."

- 1970-77 Health Effects Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio
Duties: Research Pharmacologist/Toxicologist. Principle area of research in the area of central nervous system and cardiovascular toxicology of heavy metals and their derivatives.
- 1977-81 Chief, Toxicological Assessment Branch, HERL, U.S. Environmental Protection Agency, Cincinnati, Ohio
Duties: Direction of research designed to define the hazards associated with chemicals found in water. Position involved the direction of 28 permanent in-house professionals and technical staff and a sizable extramural program working in carcinogenesis, mutagenesis, development and target organ toxicology.
- 1981-84 Director, Toxicology and Microbiology Division, Health Effects Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, Ohio.
Duties: Administrative and technical direction of a multidisciplinary research program. Principle program areas involved the definition of chemical and microbiological hazards associated with water. Research interests include determining mechanisms involved in chemically-induced disease and the importance of mechanisms in risk assessment. Size of the program was 90 FTE and 12 million dollars including extramural projects.
- 1984-94 Professor/Scientist of Pharmacology/Toxicology, College of Pharmacy, Washington State University, Pullman, Washington
Duties: Teaching of Pharmacology/Toxicology to professional students and graduate students. Research interests include mechanisms involved in the induction of hepatic tumors by halogenated hydrocarbons and haloacetic acids.
- 1990-92 Chair, Pharmacology/Toxicology Graduate Program, Washington State University.
- 1994-2000 Senior Staff Scientist, Battelle Pacific Northwest Laboratory, Richland, WA
Duties: Develop and manage a research program in health risk assessment in support of Department of Energy's problems with hazardous waste sites and other public concerns over chemical hazards. Direct research interests in the toxicology of drinking water disinfectant by-products in humans and experimental animals and halogenated solvents and their metabolites.
- 2000-present Consulting Toxicologist, MoBull Consulting, Kennewick, WA.
Duties: Conduct studies of chemical problems encountered in water for water utilities domestic and internationally, federal, state and local governments. Special emphasis on chemicals found in drinking water. Also provide expert advice on regulation of chemicals in water and provide direction to research programs being developed by utilities to address their long-term plans for development and treatment of waters from varying sources. A particular interest is in potable reuse of municipal wastewater.
- 2000-2002 Adjunct Professor Department of Environmental Science and Regional Planning, Washington State U. Tri-Cities Campus
Duties: Conduct research on risk assessment at low doses of environmental contaminants. Particular interests include low-LET radiation, by-products of the disinfection of drinking water, and halogenated solvents.

1994- present Adjunct Professor of Pharmacology and Toxicology at College of Pharmacy at Washington State University, Pullman, WA.

MEMBERSHIP IN SCIENTIFIC, PROFESSIONAL, AND SCHOLARLY SOCIETIES:

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|---|-----------------|
| American Association for the Advancement of Science | 1967 to 2004 |
| Sigma Xi | 1969 to 1994 |
| American Society for Pharmacology and Experimental Therapeutics | 1976 to 2002 |
| Society of Toxicology | 1978 to present |
| Pacific Northwest Association of Toxicologists | 1985 to present |
| American Water Works Association | 1990 to present |
| International Society for the Study of Xenobiotics | 1992 to present |

PROFESSIONAL RECOGNITION:

Awards:

1979 EPA Scientific Achievement Award for research efforts directed at detecting delays in brain development produced by perinatal Pb exposure.

1984 EPA Scientific Achievement Award for research documenting the formation of mutagenic chemicals from chlorination of humic acids.

Distinguished Service Medal, U.S. Public Health Service, May 30, 1985.

Offices:

President, Pacific Northwest Association of Toxicologists. 1988-1989.
Councilor, Carcinogenesis Specialty Section of the Society of Toxicology (1995-7 and 2003-5)
Nominating Committee, Society of Toxicology (1996-7)
Membership Committee, Society of Toxicology (1997-1999)
Chair, Membership Committee, Society of Toxicology (2000-2001)

Invited Presentations:

"Toxicology Research: Its application to the setting of drinking water standards. 16th Water Quality Conference, University of Illinois.
"Effect of lead on the biochemical development of the rat cerebral cortex." Temple University, College of Medicine. Department of Pharmacology. November 1978.
"Lead's effects on morphologic and biochemical development of the nervous system." University of Medicine and Dentistry of New Jersey. Department of Pharmacology. November 1979.
"Bioassay Techniques for Evaluating the Possible Carcinogenicity of Adsorber Effluents" at Conference on Practical Application of Adsorption Techniques (Including GAC). Reston, Virginia. 1979.
"Health Effects of Alternate Disinfectants and their Reaction Products" at 1979 Annual Meeting of the American Water Works Association San Francisco, California. June 24-29, 1979.
"Is Drinking Water a Significant Source of Human Exposure to Chemical Carcinogens and Mutagens?" at Second Symposium on the Application of Short-Term Bioassays to the Fractionation and Analysis of Complex Environmental Mixtures. Williamsburg, VA. March 4-7, 1980.
"Toxicological effects of drinking water disinfectants that are alternatives to chlorine." Miami University, Department of Zoology. March 1980.
"Reactions of chlorine with humic acid to produce carcinogenic and mutagenic chemicals." Temple University, College of Medicine. Department of Pharmacology. October 1981.

- "Toxicological Problems Associated with Alternate Methods of Disinfection" 1981 Annual Conference of the American Water Works Association St. Louis, MO. June 7-11, 1981.
- "Toxicological Evaluation of Risks Associated with the Potable Reuse of Wastewater" at Water Reuse Symposium II held August 23-28, 1981. Washington, D.C.
- "Experimental Methods for Evaluating the Health Risks Associated with Organic Chemicals in Drinking Water" at 12th Annual Symposium on the Analytical Chemistry of Pollutants April 14-16, 1982 - Amsterdam.
- "The Effects of Lead on the Developing CNS of the Rat" International Conference on the Neurotoxicology of Selected Chemicals. Lead Neurotoxicity Symposium. September 20-21, 1982. Chicago, Illinois.
- "Toxicology of by-products of reactions between chlorine compounds with organic materials in water." University of Medicine and Dentistry of New Jersey. Department of Pharmacology. December 10, 1982.
- "Carcinogenic and mutagenic chemicals produced by reaction of chlorine with organic chemicals present in drinking water." Purdue University, School of Pharmacy. February 4, 1983.
- "In Vivo production of by-products of chlorine that possess carcinogenic and mutagenic properties." Washington State University, College of Veterinary Medicine. June 16, 1983.
- "Toxicology of Natural and Man-Made Toxicants in Drinking Water" at 14th Conference on Environmental Toxicology, Dayton, OH. November 5-17, 1983.
- "Health Effects Problems Anticipated with the Use of Chloramination for Disinfection of Drinking Water. American Water Works Association Annual Conference. Dallas, Texas, June 10-14, 1984.
- "Toxicological Data on Selected Hazardous Chemicals and Possible Extrapolation to Man." Working paper for Workshop "Approaches for evaluating human health hazards from drinking water" sponsored by the International Agency for Research on Cancer, WHO. Lyon, France. December 11-14, 1984.
- "Advantages and Disadvantages of Concentrate Studies to Define Health Hazards Associated with Potable Reuse of Waste Water." American Chemical Society, Environmental Chemistry Division in Philadelphia, Pennsylvania, August 26-31, 1984.
- "Characterization of the carcinogenic and mutagenic chemicals produced by chlorine in vivo and in vitro." Rutgers University, College of Pharmacy, Piscataway, N.J. February 8, 1984.
- "Identification of carcinogenic and mutagenic chemicals that arise from the chlorination of drinking water." Department of Energy, Battelle Pacific Northwest Laboratory Symposium on Health and Environmental Research on Complex Mixtures. October 21-24, 1985.
- "Carcinogenic and Mutagenic Properties of Chemicals in Drinking Water." International Symposium on Organic Micropollutants in Drinking Water and Health. Amsterdam, The Netherlands, June 11-14, 1985.
- "Identification of Carcinogenic and Mutagenic Chemicals That Arise From the Chlorination of Drinking Water." Symposium on Health and Environmental Research on Complex Mixtures. Richland, Washington, October 21-24, 1985.
- "The Ames Test and Other Toxicological Tests: Are They the Non-Specific Organic Parameters of the Future?" American Water Works Association Annual Conference in Dallas, Texas, June 10-14, 1985.
- "Future needs for regulatory positions on reuse," Preconference Seminar for AWWA Meeting. Denver, CO, June 22, 1986.
- "Toxicological hazards arising from the chlorination of humic acids." Water Research Center, Washington State University. Spring, 1986.
- "Use of Experimental Animals in Government and Industry." VPA 454 Guest Lecturer. Spring, 1986.
- "Health Effects Evaluations: Additives to Drinking Water," Preconference Seminar for AWWA Meeting. Kansas City, MO, June 14, 1987.
- "Relative Hazards Organic Chemicals in Drinking Water" AWWA Regulatory Roundtable Session, Kansas City, MO, June 17, 1987.
- "Mechanisms of Carcinogenesis: Importance to Quantitative Risk Assessment." Invited speaker at Third Annual Conference of the Association of State Drinking Water Administrators, Charleston, SC, Feb. 22-25, 1988.

- "Assessing Impacts of Hazardous Waste on Human Health" Conference on Hazardous Waste Outlook for the '90's: Regulation, Treatment Technology and Risk Assessment and Perception. Spokane, WA, May 23 and 24, 1988.
- "Introduction to the Risk Assessment Process" Symposium on Hazardous Waste in a Local Community: What Happens When its Processed? Ritzville, WA. Dec. 10, 1988.
- "Health Risks Associated with Hazardous Waste" Town Meeting, Lind. WA. February 13, 1989.
- "Health Risk Assessment" Cooperative Extension In Service Education Program. March 7, 1989.
- "Dichloroacetate and trichloroacetate as examples of major drinking water contaminants that are carcinogenic but not mutagenic." RIVM/KIWA Workshop, Genotoxicity of drinking water: Significance and future approach, Bilthoven, The Netherlands, May 10 & 11, 1989.
- 21st International Conference on Environmental Systems, San Francisco, CA, July 16, 1991. "Thyroid Effects of Iodine and Iodide in Potable Water" Sponsored by Society of Automotive Engineers, Inc.
- "Hazard Identification and Risk Assessment in Drinking Water". Drinking Water and Health in the Year 2000, September 12, 1991, Washington, D.C.
- "Key Health Issues with Alternate Disinfectants" Second International Symposium "Chlorine Dioxide: Drinking Water Applications. Cosponsored by CMA/AWWARF/USEPA. Houston TX, May 7-8, 1992.
- "The Role of Dichloroacetate in the Hepatocarcinogenicity of Trichloroethylene" Conference on Applications of Advances in Toxicology to Risk Assessment" Wright Patterson Air Force Base, Dayton, OH, May 19-21, 1992.
- "Risk Assessment for Chemical Contaminants" Symposium conducted at the American Water Works Association Annual Meeting, Vancouver, BC June 21, 1992.
- "Why Risk Estimates Vary" Lake Roosevelt Forum. July 22, 1992.
- "Toxicology of Disinfectants and Disinfectant By-Products" First International Conference on the Safety of Water Disinfection August 31 - Sept. 3, 1992 Sponsored by ILSI Health and Environmental Sciences Institute.
- "Haloacetates and Bromate: By-Products that may Critically Affect Drinking Water Disinfection." Fifth National Conference on Drinking Water. Winnipeg, Manitoba Sept 15, 1992
- "Chemical Risk Assessment Issues for By-Products of Drinking Water Disinfection" Presented at the Annual ILSI-Health and Environmental Sciences Institute Symposium in Nassau, Bahamas Jan 25-27, 1993.
- "Toxicology of Drinking Water Disinfectant By-Products" Presented at the Water Research Center Symposium on Drinking Water Disinfection, Medmanham, U.K. February 2-3, 1993
- "Water Contamination from Agricultural Processes: Physical, Chemical, and Microbial Risks" presented at Second Asian Conference on Food Safety, September 18-23, 1994. Sponsored by the International Life Sciences Institute.
- "Toxicology of Disinfectants and Disinfectant By-Products" presented at ILSI Symposium on Current Issues on Drinking Water Quality, Seoul, Korea September 15, 1994.
- "Toxicology of Water Contaminants" presented at conference on "Water Quality for the Food Technologist" Sidney, Australia, September 27, 1994. Sponsored by ILSI-Australasia and CSIRO.
- "Water Chlorination: Essential Process or Cancer Hazard?" Symposium organized and conducted at the Annual Society of Toxicology Meeting, Baltimore, MD, 1995
- "Carcinogenic Properties of Brominated Haloacetates" Presented at ILSI/HESI sponsored workshop in Chapel Hill, NC Oct. 23-25, 1995.
- "Role of Science in Judgments Made about Complex Environmental Exposures" Symposium on Research Frontiers and Challenges in the Environmental Sciences. AMSIE'97. Seattle, WA Feb. 13-18, 1997.
- "Carcinogenic Hazards and Risks from Drinking Water Disinfection. Second International Symposium on the Safety of Water Disinfection. Miami FL November 15-17, 1999
- "Future Directions in the Use of Mode of Action Information in Assessing Cancer Risks from Trichloroethylene (TCE). Workshop on Integration of Mechanistic, Toxicological, and Epidemiological Data into the EPA's Trichloroethylene Cancer Assessment. 39th Annual Meeting of the Society of Toxicology, Philadelphia, PA, March 23, 2000.

- "NDMA: A New Ballgame with Disinfection By-Products?" Early Bird Session for the Annual Water Quality Technology Conference, Seattle, WA 11/12/02
- Are There Significant Health Effects Associated with the Use of Chemical Disinfection of Drinking Water?" Workshop on research needs with disinfection by-products in Melbourne, Australia 10/29-31/01
- "Chemicals of Concern for Water: The Status of Research Assessing the Risk of Current Disinfection Practice" Keynote Speaker at the AWA-IWA conference Sydney, Australia 6/4-5/03
- "Are Organic Nitrogen-Containing Disinfection By-Products Potential Causes for Bladder Cancer and Reproductive Effects?" Annual Meeting of the American Water Works Association, Anaheim, CA, 6/18/03
- "Monitoring Water Quality: Chemical Contaminants" CDC Water Reuse Workshop Atlanta, GA, 3/13 & 14/03

MEMBERSHIPS ON NATIONAL ADVISORY COMMITTEES AND BOARDS:

- Advisor to NRC Committee on Lead in the Human Environment, 1977
- Interregulatory Agency Task Force on Neurotoxicology, 1976
- Drinking Water Research Committee (EPA), 1977-1984
- Chemical Testing and Assessment Research Committee (EPA), 1977-1981
- Program Advisory Group, National Center for Toxicological Research, 1978-1981
- TSCA Section 4 Workgroup (EPA), 1977-1980
- Primary Drinking Water Standards Workgroup (EPA), 1977-1984
- Member of Advisory Group to Denver Water Board on Potable Reuse of Wastewater, 1982 to 1995
- EPA Scientific Review Panel, 1978-1989
- Interagency Collaborative Group on Environmental Carcinogenesis, 1977-1982
- Workgroup on Health Effects of Space Station Wastewater Reuse and Atmosphere Recycling - National Aeronautics and Space Administration, 1985
- Member National Research Council Subcommittee on Drinking Water Disinfectants (USEPA), 1986-1987
- Member National Research Council Committee on Recycling, Reuse and Conservation of Water (U.S. Army), 1986
- Co-Chair of Space Station Water Quality Conference sponsored by NASA, July 1-2, 1986
- Member, National Research Council Committee on National Water Quality Assessment Program (USGS), 1987
- Chair, National Sanitation Foundation Health Effects Task Group for Drinking Water Additives, 1985 - 1989
- Member, National Research Council Subcommittee on Guidelines for Recommending Spacecraft Maximum Contaminant Levels, (Committee on Toxicology), 1989 - 1999.
- Chair, National Research Council Subcommittee on Water Quality in Space Station Freedom, Nov. 1, 1989-92.
- Drinking Water Committee of the Science Advisory Board of the U.S. Environmental Protection Agency, Nov. 1989 to 1994.
- IARC Working Group on the Evaluation of the carcinogenic Risk of Chemicals to Humans: Chlorination of Drinking Water, Nov. 1989 thru 1990
- Drinking Water and Health in the Year 2000. Breckenridge Workshop conducted in Summer of 1991. University of Arizona Superfund Grant Advisory Committee. 1991-1992
- Member, National Research Council Committee on the Viability of Augmenting Potable Water Supplies with Reclaimed Water., 1996-8
- Member, Science Advisory Panel for the Santa Ana River Water and Health Study. Orange County CA. 1997- 2003
- Chair, Drinking Water Committee of the U.S. Environmental Protection Agency's Science Advisory Board, 1997-2001
- Author and member of, International Program in Chemical Safety (WHO) consultation on Disinfection By-Products 1998-9

Member, EPA Subcommittee reviewing the proposed new Cancer Risk Assessment Guidelines of the Environmental Protection Agency 1999-2000
Chair, National Research Council Committee on Copper in Drinking Water. 1999-2000
Member and Coordinator, Science Advisory Panel for the National University of Singapore project on Potable Reuse of Wastewater.
Member, Joint Committee of EPA Science Advisory Board and Science Advisory Panel for review of Endocrine Disruptor Screening and Testing Advisory Committee Report to the Agency, 1998-9
Member of the Science Advisory Panel for the Medical University of South Carolina on the Environmental Management Science Program Project, 1999-2004.
Co-Chair of Chloroform Risk Assessment Subcommittee of the EPA Science Advisory Board 1999-2000.
Member, Research Strategies Advisory Committee of EPA Science Advisory Board 1999-2003
Chair, National Research Council Subcommittee on Assessing Toxicological Risks to Deployed Military Personnel 2002-2003.
Member, Science Advisory Panel for the Orange County Groundwater Replenishment System Project under the auspices of the National Water Research Institute. 2003-present.
Member, Independent Advisory Panel for the San Diego Water Reuse Project under the auspices of the National Water Research Institute. 2004-present.
Member, Science Advisory Panel for the Monterey Water Reuse Project under the auspices of the National Water Research Institute. 2006-

CONFERENCE ORGANIZATION AND EDITING:

International Symposium on Health Effects of Drinking Water Disinfectants and Disinfectant By-Products. April 21-24, 1981. Published in Environmental Health Perspectives 46, 1-241, 1982.
Fourth Conference on Water Chlorination: Environmental Impact and Health Effects Organization and Editing of Session on Toxicology. October 18-23, 1981. Published by Ann Arbor Science, 1983.
Fifth Conference on Water Chlorination: Environmental Impact and Health Effects. Organization and editing of papers presented in sessions on Health Effects and Risk Assessment. (Co-editor with Dr. Robert L. Jolley et al. on overall Proceedings) June 3-8, 1984.
Symposium "Water Chlorination: Essential Process or Cancer Hazard?" 34th Annual meeting of The Society of Toxicology, Baltimore, MD, 1995.
Roundtable Session: Should carcinogenesis data from transgenic animals be applied to safety assessment, if so, how? 36th Annual meeting of the Society of Toxicology, Cincinnati, OH, March 9-13, 1997
Bromate Health Research Strategy Workshop. AwwaRF sponsored workshop held at Miami University, Feb. 11-13, 2005. Co-chaired with Joseph A. Cotruvo (proceedings published in a special issue of Toxicology)

PEER REVIEW ACTIVITIES:

Toxicology (Editorial board 1994 - present)
Journal of Toxicology and Environmental Health (Editorial Board, 1994 - 2000)
Biochemical Pharmacology
Toxicology and Applied Pharmacology
Fundamental and Applied Toxicology (Editorial Board 1986-94)
Chemical Research in Toxicology
CRC Critical Reviews in Toxicology
Environmental Science & Technology (American Chemical Soc.)
Journal of American Waterworks Association (Editorial Board 1986-92)
Food and Chemical Toxicology
NeuroToxicology
Life Sciences

Toxicology Letters

INTERNATIONAL ACTIVITIES:

- Member of Consultation on Selection of Organic Substances for Inclusion in WHO Guidelines for Drinking Water Quality, 18-20 March 1980. Leidschendam, The Netherlands.
- Technical Advisor to WHO Work-Group on Quantification of Selected Health-Related Organic Compounds for WHO Guidelines for Drinking Water Quality. 19-25 November 1980, Ottawa, Canada.
- Preparation of working paper for International Agency for Research on Cancer (IARC-WHO) workshop on "Approaches for evaluating human health hazards from drinking water" to be held in Lyon, France, December 11-14, 1984.
- Organizing committee for International Symposium on Organic Micropollutants in Drinking Water and Health. Amsterdam, The Netherlands, June 11-14, 1985.
- IARC working Group on the Evaluation of the Carcinogenic Risk of chemicals to Humans: Chlorination of Drinking Water, Lyon, France, June 12-19, 1990.
- WHO Working Group on Developing Standards for Organic Contaminants in Drinking Water. Summer of 1991.
- Water Research Center of the United Kingdom Seminar on the Health Effects of Disinfectant By-Products. Feb. 2-3, 1993
- International Programme on Chemical Safety: Environmental Health Criteria for Disinfectants and Disinfectant By-Products. August 1998. Principal Author with R. Pegram, G. Amy and G. Craun as coauthors.
- Commonwealth CRC for Water Quality and Treatment. Disinfection Byproducts and Health Effects Workshop. Melbourne, Australia, October 29-31, 2001.
- Technical Advisor on Health Canada Workshop Held to Identify Critical Endpoints for Assessment of Health Risks Related to Trihalomethanes (THMS) in Drinking Water. Ottawa, September 18-19, 2002
- IARC Working Group on the Evaluation of Carcinogenic Risks To Humans Vol. 84 "Some Drinking Water Disinfectants and Contaminants, including Arsenic. Lyon Oct. 12-22, 2002.
- CRCWQT/AWWARF Disinfection Byproduct Collaborative Research Planning Workshop, Brisbane, Australia, 7/25-26/05

APPOINTMENTS

- Adjunct Associate Professor, Ohio State University, College of Medicine, Department of Pharmacology, Columbus, Ohio
- Adjunct Professor, Miami University, Department of Zoology, Oxford, Ohio
- Adjunct Professor, Pharmacology/Toxicology, College of Pharmacy, Washington State University.

THESIS AND DISSERTATION COMMITTEES

Major Advisor to the following graduate students at Washington State University.

- Mark A. Nelson, Ph.D.** (1989) The Importance of DNA Strand Breaks to the Hepatocarcinogenic Effects of Trichloroethylene.
- Idalia M. Sanchez M.S.** (1989) Characterization of Hepatotoxic Effects of Halogenated Acetic Acids in B6C3F1 Mice.
- Jeffrey L. Larson, Ph.D.** (1990) Mechanism of Trichloroethylene Hepatocarcinogenesis: The role of Dichloroacetate and Trichloroacetate.
- Karla D. Thrall, Ph.D.** (1990) Formation of Organic By-Products Following Consumption of Iodine Disinfected Drinking Water.
- Todd T. Sherer, Ph.D.** (1991) Changes in Thyroid Hormone Receptor mRNA Expression and the Effects of Thyroid Hormone in the Developing Rat Cerebellum.

- Michael V. Templin, Ph.D.** (1993) Dichloroacetate as the Active Metabolite in Trichloroethylene Hepatocarcinogenesis.
- Russell J. Eyre, Ph.D.** (1994) Species Differences in the Formation of Reactive Intermediates from the Metabolism of Trichloroethylene by the Cysteine-S-Conjugate/ β -Lyase Pathway.
- Eric Austin, Ph.D.** (1997) The Role of Oxidative Stress to the Hepatotoxicity of Haloacetates.
- Anja J. Stauber, Ph.D.** (1997) Mechanisms of Hepatic Tumor Induction by Dichloroacetate and Trichloroacetate Differ: Effects on Cell Division, Cell Survival and Clonal Expansion in the Liver of B6C3F1 Mice.
- Junko Kato-Weinstein, Ph.D.** (1999) Factors Involved in the Hepatic Effects of Brominated and Chlorinated Haloacetates in B6C3F1 Mice.
- Alberto Gonzalez-Leon, Ph.D.** (1999) Modification of Haloacetate Metabolism in Rodents by Pretreatment in Drinking Water.
- James L. Merdink, Ph.D.** (1999) Formation of Dichloroacetate from Trichloroacetate. Implications to the Risk Assessment of Trichloroethylene.
- Melissa K. Lingohr Smith, Ph.D.** (2000) Dichloroacetate Modulates Glycogen Metabolism and Insulin Signaling Proteins *In Vivo* and *In Vitro*.

GRANT and CONTRACT FUNDING:

(principal investigator, R. Bull unless otherwise noted)

| <u>Title</u> | <u>Source</u> | <u>Budget Direct Costs</u> | <u>Time Period</u> |
|--|---------------------------------------|--------------------------------|------------------------|
| Ethanol-Induced in Trichloroethylene Toxicity | U.S. Air Force (17%) AFOSR-86-0284 | \$227,024 | 08/15/86 08/14/89 |
| Importance of Hepatic Peroxisome Proliferation in Carcinogenic Responses to Environmental Chemicals and Complex Mixtures | Battelle | \$18,722 | 01/01/87 12/31/88 |
| Differential Pharmacokinetics and Toxicology of Iodine and Iodide | NASA (16%) NAG 9-226 | \$188,747 | 05/15/87 12/15/90 |
| Chlorinated Acetic Acid Hepato-carcinogenesis | NIEHS 1 RO1 ESO4648-01 | \$257,309 | 09/01/88 08/31/91 |
| Application of Pharmacokinetic Analyses and Dosimetry to Species Differences in Sensitivity to Toxic Substances R. Bull, P.I., W. Hayton, D. Sylvester, D. Springer, Co.-P.I. | EPA CR-81216-01-0 | \$1,145,182 | 11/01/88 12/31/92 |
| Differential Effects of Iodine and Iodide on Thyroid Function on Thyroid Function | NASA NAG-9-545 | \$245,368 | 10/1/91 9/30/93 |
| Small mammals as dosimeter of toxic substances J.G. Hallett, P.I., M.A. O'Connell, R.J. Bull, Co-P.I. | EPA | \$315,827 | 10/01/91 09/30/94 |
| Relationship of Dichloroacetate (DCA) and Trichloroacetate (TCA)-Induced Hepatic Tumors with Induction of Peroxisomes. | AWWARF (701) | \$255,000 | 4/1/92 3/31/95 |

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| R.J. Bull, P.I., D.K. Stevens, Co.-P.I. | | | |
| Utilization of Chemical and Cellular Kinetics to Improve the Accuracy of Risk Assessments. I. Physiologically Based Pharmacokinetic Modeling of Chlorinated Alkenes and their Metabolites. R.J. Bull, P.I., D.K. Stevens, Co.-P.I. | EPA CR 819283 | \$155,000 | 10/1/91 9/30/94 |
| Hepatic Toxicity and Carcinogenicity of Haloacetates R.J. Bull, P.I., D.K. Stevens, Co.-P.I. | NIEHS (RO1-ESO4648) | \$448,983 | 4/1/92 12/31/96 |
| Utilization of Chemical and Cellular Kinetics to Improve the Accuracy Risk Assessment. II. Comparative metabolism of Chlorinated Solvents. R.J. Bull, P.I. | EPA CR 820614 | \$206,000 | 8/1/92 6/30/95 |
| Hepatocarcinogenic effects of haloacetates commonly found as by-products of drinking water disinfection. R.J. Bull, P.I. | PA CR 819562 | \$248,000 | 10/1/92 3/31/96 |
| Comparative kinetics of chloral hydrate and its metabolites in rats and humans R.J. Bull, P.I., D.K. Stevens & L. Robison, Co.-P.I. | EPA CR822577 | \$235,000 | 8/19/94 8/18/96 |
| Mechanisms Involved in Trichloroethylene Induced Liver Cancer R.J. Bull, P.I. | Department of Energy Competitive funding EM Science Program | \$1,800,000 | 9/1/96 6/30/00 |
| Using Mode of Action to Assess Health Risks from Mixtures of Chemical and Physical Agents R.J. Bull, P.I. | SERDP CU-1073 | \$1,400,000 | 6/13/97 6/12/00 |
| Sensitivity to Radiation-Induced Cancer in Hemochromatosis. Initial PI, now Co-PI with James Morris, PNNL | Department of Energy Low-Dose Program | \$414,000 | 9/99 – 9/01 |
| Optimizing the Scientific, Regulatory and Societal Impact of the DOE Low Dose Radiation Research Program supplement Antone Brooks, PI, R.J. Bull, Co.-PI | Department of Energy Low-Dose Program | \$1,300,000 | 9/00-5/03 |
| Projects awarded to MoBull | | | |
| Risk Based Prioritization of Disinfection By-Products R.J. Bull, PI, David Reckhow, Co.-P.I. | Awwa Research Foundation No. 2869 | \$350,000 | 1/03-12/05 |

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| Bromate Health Research Strategy Workshop J.A. Cotruvo, PI, RJ Bull Co-PIs | Awwa Research Foundation No. | \$75,000 | 6/04-12/05 |
| Low Dose Risks from Bromate: The Relationship between Drinking Water Concentrations and the Actual Dose to Susceptible Organs in Rats and Humans J.A. Cotruvo & RJ Bull, Co-PIs | Awwa Research Foundation No. 4042 | \$400,000 ca. \$40,000 to MoBull | 3/07-12/10 |
| Identifying Health Effects Concerns of the Water Reuse Industry and Prioritizing Research Needs for Nomination of Chemicals for Research to Appropriate National and International Agencies J.A. Cotruvo and RJ Bull, Co.-PIs | WaterReuse Foundation No. 06-004 | 175,000 | 6/07-5/09 |
| Methods Development for Disinfection By-Products Associated with Cancer Subcontract from University of Alberta | Awwa Research Foundation No. 4089 | \$400,000 ca \$30,000 to MoBull | 1/08-12/09 |

PUBLICATIONS:

Refereed:

- Cummins, J.T. and Bull, R.J. (1971) Spectrophotometric measurements of metabolic responses in isolated rat brain cortex. Biochem. Biophys. Acta **245**, 29.
- Bull, R.J. and Trevor, A.J. (1972) Saxitoxin, tetrodotoxin and the cation flux and metabolism of isolated cerebral tissues. J. Neurochem. **19**, 999.
- Bull, R.J. and Trevor, A.J. (1972) Sodium and the flux of calcium ions in electrically-stimulated cerebral tissue. J. Neurochem. **19**, 1011.
- Bull, R.J. and Lutkenhoff, S.D. (1973) Early changes in respiration, aerobic glycolysis and cellular NAD (P)H in slices of rat cerebral cortex exposed to elevated concentrations of potassium. J. Neurochem. **21**, 913.
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PAPERS, POSTERS, AND PRESENTATIONS:

Dr. Bull has been active in a number of professional societies and presented papers and abstracts at their annual meetings. If a record of such activity is required a listing of these activities can be provided.

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