Health Implications of Perchlorate Ingestion

Summary of a National Research Council Review of other studies

SCAG WPTF Presentation of February 10, 2005

Health Implications Of Perchlorate Ingestion

Committee to Assess the Health
Implications of Perchlorate
Ingestion, Board on Environmental
Studies and Toxicology, Division on
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Health Implications Of Perchlorate Ingestion:

Health Implications of Perchlorate Ingestion National Research Council, Division on Earth and Life Studies, Board on Environmental Studies and Toxicology, Committee to Assess the Health Implications of Perchlorate Ingestion, 2005-05-18 Perchlorate a powerful oxidant used in solid rocket fuels by the military and aerospace industry has been detected in public drinking water supplies of over 11 million people at concentrations of at least 4 parts per billion ppb High doses of perchlorate can decrease thyroid hormone production by inhibiting the uptake of iodide by the thyroid Thyroid hormones are critical for normal growth and development of the central nervous system of fetuses and infants This report evaluates the potential health effects of perchlorate and the scientific underpinnings of the 2002 draft risk assessment issued by the U S Environmental Protection Agency EPA The report finds that the body can compensate for iodide deficiency and that iodide uptake would likely have to be reduced by at least 75% for months or longer for adverse health effects such as hypothryroidism to occur The report recommends using clinical studies of iodide uptake in humans as the basis for determining a reference dose rather than using studies of adverse health effects in rats that serve as EPA s basis The report suggests that daily ingestion of 0 0007 milligrams of perchlorate per kilograms of body weight an amount more than 20 times the reference dose proposed by EPA should not threaten the health of even the most sensitive populations Implications of Perchlorate Ingestion Committee to Assess the Health Implications of Perchlorate Ingestion, Board on Environmental Studies and Toxicology, Division on Earth and Life Studies, National Research Council, 2005-04-18 Perchloratea a powerful oxidant used in solid rocket fuels by the military and aerospace industrya has been detected in public drinking water supplies of over 11 million people at concentrations of at least 4 parts per billion ppb High doses of perchlorate can decrease thyroid hormone production by inhibiting the uptake of iodide by the thyroid Thyroid hormones are critical for normal growth and development of the central nervous system of fetuses and infants This report evaluates the potential health effects of perchlorate and the scientific underpinnings of the 2002 draft risk assessment issued by the U S Environmental Protection Agency EPA The report finds that the body can compensate for iodide deficiency and that iodide uptake would likely have to be reduced by at least 75% for months or longer for adverse health effects such as hypothryroidism to occur The report recommends using clinical studies of iodide uptake in humans as the basis for determining a reference dose rather than using studies of adverse health effects in rats that serve as EPAa s basis The report suggests that daily ingestion of 0 0007 milligrams of perchlorate per kilograms of body weighta an amount more than 20 times the reference dose proposed by EPAa should not threaten the health of even the most sensitive populations

Toxicological Profile for Perchlorates ,2005 **Risk Assessment for Chemicals in Drinking Water** Robert A. Howd,Anna M. Fan,2007-11-09 A comprehensive reference on state of the art risk assessment methodologies for drinking water Risk Assessment for Chemicals in Drinking Water discusses the major steps and goals in risk assessments and suggests

ways to improve the methodologies and accuracy while consolidating up to date information on the current principles and practices in one authoritative reference After an enlightening overview of risk assessment practices and regulatory guidelines it Includes descriptions of the use of variability analysis exposure analysis physiologically based pharmacokinetics and modeling for both cancer and non cancer endpoints Describes the practices of major organizations including the U S EPA Health Canada World Health Organization and California Office of Environmental Health Hazard Assessment Includes complete chapters on risk assessment for essential nutrients arsenic chloroform and perchlorate Explains how to address susceptible sub populations including the elderly and infants and children in risk assessments Covers the potential of using genomic and proteomic screens Addresses recent advances emerging issues and future challenges With contributions and perspectives from leading scientists this is the definitive resource for health and environmental scientists toxicologists risk assessors and managers regulators consultants and other professionals responsible for the safety of drinking water

Perchlorate Kathleen Sellers, Katherine Weeks, William R. Alsop, Stephen R. Clough, Marilyn Hoyt, Barbara Pugh, Joseph Robb, 2006-08-30 The development of analytical methods for identifying widespread perchlorate contamination brought about an explosion of research into the environmental problems and their potential solutions along with a corresponding increase in the availability of information Unlike reference works that focus on only a few aspects of this contaminant Perchlorate Environmental Problems and Solutions offers a comprehensive single source of information on perchlorate contamination in the environment Summarizing the state of the science and developments in engineering the book describes Common sources of perchlorate Its behavior in the environment Methods for analyzing perchlorate in environmental samples Potential risks to human health and the environment Regulatory standards and criteria Techniques for remediating environmental contamination The authors illustrate these points with case studies of perchlorate contamination in soil groundwater and surface water These case studies provide perspective on issues commonly faced by scientists engineers and managers of perchlorate impacted sites Organized to follow the logical sequence of identifying and solving contamination problems the book provides the foundation necessary to understand perchlorate s occurrence environmental behavior regulatory status Perchlorate Baohua Gu, John D. Coates, 2006-07-02 Perchlorate is a widespread environmentally and remediation persistent contaminant recently discovered in U S groundwater and drinking water supplies This book summarizes the most current knowledge and understandings of the extent and potential sources of perchlorate contamination its behavior exposure pathways in the environment toxicology and risk assessment and recent advances in treatment technologies for removing perchlorate Its natural occurrence and its unique isotopic signature between natural and anthropogenic sources and novel detection techniques are discussed A description of the perchlorate chemistry microbiology biochemistry genetics geochemical occurrences and environmental forensics toxicology and risk assessment to engineering solutions and policy is provided Also included are remediation technologies and monitoring tools for cleaning up contaminated sites including

bioremediation selective and regenerable ion exchange modified granular activated carbon and catalyzed destruction **Environmental Health Perspectives** ,2010 Ballistic Missile Defense System (BMDS) ,2007 **Scientific Review** of the Proposed Risk Assessment Bulletin from the Office of Management and Budget National Research Council, Division on Earth and Life Studies, Board on Environmental Studies and Toxicology, Committee to Review the OMB Risk Assessment Bulletin, 2007-04-16 Risk assessments are often used by the federal government to estimate the risk the public may face from such things as exposure to a chemical or the potential failure of an engineered structure and they underlie many regulatory decisions Last January the White House Office of Management and Budget OMB issued a draft bulletin for all federal agencies which included a new definition of risk assessment and proposed standards aimed at improving federal risk assessments This National Research Council report written at the request of OMB evaluates the draft bulletin and supports its overall goals of improving the quality of risk assessments However the report concludes that the draft bulletin is fundamentally flawed from a scientific and technical standpoint and should be withdrawn Problems include an overly broad definition of risk assessment in conflict with long established concepts and practices and an overly narrow definition of adverse health effects one that considers only clinically apparent effects to be adverse ignoring other biological changes that could lead to health effects The report also criticizes the draft bulletin for focusing mainly on human health risk assessments while neglecting assessments of technology and engineered structures Haschek and Rousseaux's Handbook of Toxicologic Pathology Wanda M Haschek, Colin G. Rousseaux, Matthew A. Wallig, Brad Bolon, Ricardo Ochoa, 2013-05-01 Haschek and Rousseaux s Handbook of Toxicologic Pathology is a key reference on the integration of structure and functional changes in tissues associated with the response to pharmaceuticals chemicals and biologics The 3e has been expanded by a full volume and covers aspects of safety assessment not discussed in the 2e Completely revised with many new chapters it remains the most authoritative reference on toxicologic pathology for scientists and researchers studying and making decisions on drugs biologics medical devices and other chemicals including agrochemicals and environmental contaminants New topics include safety assessment the drug life cycle risk assessment communication and management carcinogenicity assessment pharmacology and pharmacokinetics biomarkers in toxicologic pathology quality assurance peer review agrochemicals nanotechnology food and toxicologic pathology the environment and toxicologic pathology and more Provides new chapters and in depth discussion of timely topics in the area of toxicologic pathology and broadens the scope of the audience to include toxicologists and pathologists working in a variety of settings Offers high quality and trusted content in a multi contributed work written by leading international authorities in all areas of toxicologic pathology Features hundreds of full color images in both the print and electronic versions of the book to highlight difficult concepts with clear illustrations Drinking Water Quality and Contaminants Guidebook Joseph Cotruvo, 2018-09-18 K347191 BCC Drinking water quality is a sensitive issue and the public is constantly barraged by contaminant reports now

routinely at parts per trillion Protection from microbial disease risks from drinking water must always be predominant trace chemicals usually fall farther down the scale of possible health risks but even negligible detections raise public concerns Drinking Water Quality and Contaminants Guidebook presents information and guidance on drinking water guality and regulatory issues reflecting experiences and judgments from the author's more than 43 years of extensive experience It contains digested comprehensive information on important chemical microbial and radionuclide water contaminants and discussions of several drinking water related policy issues Information is presented for long standing regulated contaminants and chemicals of emerging concern in understandable terms for professionals and non experts alike Dossiers contain readily accessed information on sources physical and chemical properties toxicity analytical methodology water treatment technology regulations and health advisories and also include World Health Organization Guidelines Aesthetic and acceptance factors such as water hardness and salinity that influence public perceptions of drinking water quality are also addressed Features Compiles and interprets essential information on numerous key chemical microbial and radionuclide water contaminants Provides standardized entries for each contaminant including occurrence health analytical water treatment regulations and World Health Organization guidance and recommendations with source citations Examines many water related topics including fracking potable water reuse desalination boil water notices bottled water foodborne and waterborne disease and public perceptions about public drinking water quality Provides essential information and the basis for management of many long standing contaminants such as lead mercury disinfection by products E coli and also emerging issues such as legionella glyphosate BPA and more Toxicity-Pathway-Based Risk Assessment National Research Council, Division on Earth and Life Studies, Board on Environmental Studies and Toxicology, Standing Committee on Risk Analysis Issues and Reviews, 2010-07-07 In 2007 the National Research Council envisioned a new paradigm in which biologically important perturbations in key toxicity pathways would be evaluated with new methods in molecular biology bioinformatics computational toxicology and a comprehensive array of in vitro tests based primarily on human biology Although some considered the vision too optimistic with respect to the promise of the new science no one can deny that a revolution in toxicity testing is under way New approaches are being developed and data are being generated As a result the U S Environmental Protection Agency EPA expects a large influx of data that will need to be evaluated EPA also is faced with tens of thousands of chemicals on which toxicity information is incomplete and emerging chemicals and substances that will need risk assessment and possible regulation Therefore the agency asked the National Research Council to convene a symposium to stimulate discussion on the application of the new approaches and data in risk assessment The symposium was held on May 11 13 2009 in Washington DC and included presentations and discussion sessions on pathway based approaches for hazard identification applications of new approaches to mode of action analyses the challenges to and opportunities for risk assessment in the changing paradigm and future directions Safe Drinking Water Act (SDWA) David C. Trimble, 2011

Under 1996 amendments to the SDWA every 5 years the EPA is to determine for at least five contaminants such as chemicals whether regulation is warranted considering those that present the greatest public health concern Since 1996 EPA had not recommended any new contaminants for regulation until Feb 2011 when it reversed its controversial 2008 preliminary decision to not regulate perchlorate an ingredient in rocket fuel and other products This report 1 evaluates the extent to which EPA s implementation of the 1996 amendments has helped assure the public of safe drinking water and 2 reviews the process and scientific analyses used to develop the 2008 regulatory determination on perchlorate Illus A print on demand Hayes' Principles and Methods of Toxicology, Sixth Edition A. Wallace Hayes, Claire L. Kruger, 2014-10-10 Hayes Principles and Methods of Toxicology has long been established as a reliable reference to the concepts methodologies and assessments integral to toxicology The new sixth edition has been revised and updated while maintaining the same high standards that have made this volume a benchmark resource in the field With new authors and new chapters that address the advances and developments since the fifth edition the book presents everything toxicologists and students need to know to understand hazards and mechanisms of toxicity enabling them to better assess risk The book begins with the four basic principles of toxicology dose matters people differ everything transforms and timing is crucial The contributors discuss various agents of toxicity including foodborne solvents crop protection chemicals radiation and plant and animal toxins They examine various methods for defining and measuring toxicity in a host of areas including genetics carcinogenicity toxicity in major body systems and the environment This new edition contains an expanded glossary reflecting significant changes in the field New topics in this edition include The importance of dose response Systems toxicology Food safety The humane use and care of animals Neurotoxicology The comprehensive coverage and clear writing style make this volume an invaluable text for students and a one stop reference for professionals Thyroid Toxicity Javier Del Pino, Maria Jesus Diaz, Maria Teresa Frejo, 2016-03-22 Thyroid hormones are involved in numerous physiological processes as regulators of metabolism bone remodeling cardiac function and mental status Moreover thyroid hormones are of special importance in fetal development more particularly in the development of the brain Thus maintenance of normal thyroid functioning is essential for psychological biochemical immunological endocrinal and physiological well being of the body as well as normal growth and development Understanding how the thyroid gland is affected by adverse factors can help clinicians to handle emergency situations or apply preventive care measures to patients Thyroid Toxicity is a comprehensive monograph on thyroid toxicology It gathers all information about the toxic effects of different kinds of factors hormonal radiation and chemical that affect the thyroid system The ebook gives a brief introduction to the thyroid system and answers several important questions about the topic such as the biochemical mechanisms through which various compounds for example pesticides food additives etc induce toxicity on the thyroid gland how endocrine disruption alters the physiology of the human body and brain as well as how radiation harms the thyroid gland Thyroid Toxicity is the definitive reference for any medical officer endocrinologist

or toxicologist seeking knowledge on thyroid gland toxicology The Food Safety Hazard Guidebook Richard Lawley, Laurie Curtis, Judy Davis, 2012 Food safety is important and consumers have a right to expect that those who supply the food that they buy have taken every care to manufacture products that will do them no harm Those with a responsibility for the regulation of the global food industry recognise this principle and legislate accordingly and the business of managing and regulating the safety of the food supply chain has come a long way in the last 25 years or so Prompted by the emergence of new food safety hazards such as the bacterial pathogens Listeria monocytogenes and E coli O157 powerful new techniques for evaluating and managing the risks presented by these threats have been developed For example hazard analysis critical control point or HACCP has now become the food safety management system of choice worldwide Although the food safety management tools are now widely available they are still virtually useless unless they are supported by adequate and accurate information HACCP does not work unless its practitioners have access to enough data and scientific knowledge to enable them to understand hazards and how to control them effectively The Food Safety Hazard Guidebook is an attempt to address the problem of accessing the available information by distilling the key facts about a wide range of individual food safety hazards into a single text The result is a guidebook rather than an encyclopaedia which acts as a portal for the immense and ever expanding body of scientific knowledge that exists for food safety It is an easy to use information resource for anyone with a professional interest in the safety of the food supply The book is easy to navigate and presents concise and carefully researched factual information on a wide range of biological and chemical hazards in a clear format that is designed to support risk analysis exercises and HACCP studies It covers a broad range of established and emerging food safety hazards and includes details of authoritative sources of further information many web based for those seeking to examine a topic in greater depth The section on food allergens is a particularly valuable component of the book the chapters on fish toxins are also useful and unusual in a book of this kind and bacterial pathogens are comprehensively covered One of the most important features of the book is the wide scope of the content and the highly structured format designed to help the reader find information guickly Other key benefits to the reader are The wide range of biological and chemical hazards covered in a single book Written specifically with food industry professionals in mind Easy to navigate and accessible for the non expert Clear and concise presentation of factual information presented in a format that lends itself to use in risk assessment exercises Inclusion of references and web links to reliable sources of further information on each chapter specifically designed for practical use by a professional readership Ecotoxicology, Ecological Risk Assessment and Multiple Stressors Gerassimos Arapis, Nadezhda Goncharova, Philippe Baveye, 2006-01-12 The science of ecotoxicology and the practice of ecological risk assessment are evolving rapidly Ecotoxicology as a subject area came into prominence in the 1960s after the publication of Rachel Carson's book on the impact of pesticides on the environment. The rise of public and scientific concern for the effects of chemical pollutants on the environment in the 1960s and 1970s led to the development of

the discipline of ecotoxicology a science that takes into account the effects of chemicals in the context of ecology Until the early 1980s in spite of public concern and interest among scientists the assessment of ecological risks associated with natural or synthetic pollutants was not considered a priority issue by most government However as the years passed a better understanding of the importance of ecotoxicology emerged and with it in some countries the progressive formalization of an ecological risk assessment process Ecological risk assessment is a conceptual tool for organizing and analyzing data and information to evaluate the likelihood that one or more stressors are causing or will cause adverse ecological effects Ecological risk assessment allows risk managers to consider available scientific information when selecting a course of action in addition to other factors that may affect their decision e g social legal political or economic Ecological risk assessment includes three phases problem formulation analysis and risk characterization **Emerging Contaminants and Environmental Management at Department of Defense Installations** United States. Congress. House. Committee on Armed Services. Readiness Subcommittee, 2008 **Principles and Methods of Toxicology** A. Wallace Hayes, 2007-09-25 Founded on the paradox that all things are poisons and the difference between poison and remedy is quantity the determination of safe dosage forms the base and focus of modern toxicology In order to make a sound determination there must be a working knowledge of the biologic mechanisms involved and of the methods employed to define these mechanis

Endocrine-Disrupting Chemicals, 2021-08-27 Advances in Pharmacology series highlights new advances in the field with this new volume presenting interesting chapters Each chapter is written by an international board of authors Provides the authority and expertise of leading contributors from an international board of authors Presents the latest release in Advances in Pharmacology series Updated release includes the latest information on Endocrine Disrupting Chemicals

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