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PERKINS TURNER

*Possible Health Effects of Exposure to Residential Electric and
Magnetic Fields* Springer Science & Business Media

This report was prepared by the Office of Technology Assessment of the United States Congress to review the health effects of high-voltage transmission lines. For about two decades, there has been some concern about the health effects of electric and magnetic fields produced by transmission lines. Recent studies have heightened this concern. Health effects research is still preliminary and inconclusive, but a growing number of studies suggest that under certain circumstances even relatively weak

electric and magnetic fields can produce biologic changes. This report discusses the present state of knowledge on the health effects of low-frequency electric and magnetic fields and describes current U. S. funding levels and research programs. Also, the report provides information on regulatory activity, including existing and proposed field exposure standards.

Exposure to Static and Low Frequency Electromagnetic Fields, Biological Effects and Health Consequences (0-100 KHz) National Academies

This book gives an overview of the epidemiological methods used to research the effects of electromagnetic fields (EMFs) on human health. The first part of the book introduces epidemiological concepts and principles, providing appropriate examples and tips for practical usage. The second part details the state of scientific

knowledge for some controversial issues in EMF research, while the third part considers how novelty, the steep increase of radiofrequency (RF) EMF exposure from wireless communications, and other challenges affect risk assessment today.

Practical Radiation Protection in Healthcare Birkhäuser

Electromagnetic Field, Health and Environment mirrors the image of the EHE'07 conference which attracted people investigating the phenomenon of interaction of electromagnetic field and biological objects. This book tries to enlighten the problem with the use of scientifically founded facts kept within methodological discipline. The particular targets of the book can be briefly summarized as reviewing, presenting and discussing innovations in computer modeling, measurement and simulation of bioelectromagnetic phenomena, analyzing physical and biological aspects of bioelectromagnetic phenomena, and discussing environmental safety and policy issues as well as relevant international standards. The book is divided into five chapters of which the first three chapters deal with the electromagnetic field in combination with environment, health and biology respectively. The fourth chapter focuses on computer simulation in bioelectromagnetics, whereas the fifth chapter sees to the electromagnetic field in policy and standards. An additional three contributions are included: the first contribution shows the brief essay on Heinrich Rudolf Hertz in which the occasion of his birth 150 years ago is celebrated. The second summarizes the long-lasting research in magnetic stimulation and bioimaging and the third one considers some theoretical aspects of electromagnetic field.

Electromagnetic Fields and Radiation Prentice Hall

This much anticipated Third Edition provides a comprehensive presentation of the global burden and patterns of cancer occurrence, along with new developments in our understanding of cancer causation and prevention. Special attention is given to epidemiologic approaches that incorporate molecular biomarkers based on genomic and other emerging technologies, providing new insights into the role of genetic predisposition and gene-environment interactions in cancer induction. In addition, new chapters are included on social class disparities in cancer incidence and mortality, the role of obesity and physical inactivity in cancer etiology, the potential effects of electromagnetic fields and radiofrequency radiation, and the principles of cancer chemoprevention. The textbook is organized into five sections: Basic Concepts; The Magnitude of Cancer; The Causes of Cancer; Cancer by Tissue of Origin; Cancer Prevention and Control. In this new edition, Drs. David Schottenfeld and Joseph F. Fraumeni, Jr. have enlisted three distinguished Associate Editors: Drs. Jonathan Samet of Johns Hopkins University, Graham Colditz of Harvard University and Alice Whittemore of Stanford University. *Cancer Epidemiology and Prevention* The Minerva Group, Inc. Reporting new results, this book covers the subject of biological effects of EMF in its entirety. Experimental verification of the theoretical results is given when at all possible, and the book is expected to open new areas of research, providing material for university course creation.

Bioeffects and Therapeutic Applications of Electromagnetic Energy iUniverse

First edition published in 2002. Second edition published in 2008.

Overpowered Springer Science & Business Media

We live in a world of waves. The Earth shakes to its foundations, the seas and oceans tremble incessantly, sounds reverberate through land, sea, and air. Beneath the skin, our brains and bodies are awash with waves of their own, and the Universe is filled by a vast spectrum of electromagnetic radiation, of which visible light is the narrowest sliver. Casting the net even wider, there are mechanical waves, quantum wave phenomena, and the now clearly detected gravitational waves. Look closer and deeper and more kinds of waves appear, down to the most fundamental level of reality. This Very Short Introduction looks at all the main kinds of wave, their sources, effects, and uses. Mike Goldsmith discusses how wave motion results in a range of phenomena, from reflection, diffraction, interference, and polarization in the case of light waves to beats and echoes for sound. All waves, however different, share many of the same features, and, as Goldsmith shows, for all their complexities many of their behaviours are fundamentally simple. ABOUT THE SERIES: The Very Short Introductions series from Oxford University Press contains hundreds of titles in almost every subject area. These pocket-sized books are the perfect way to get ahead in a new subject quickly. Our expert authors combine facts, analysis, perspective, new ideas, and enthusiasm to make interesting and challenging topics highly readable.

Inventory of Federal Energy-related Environment and Safety Research for FY 1977 IOS Press

This book is an educational resource of evolving scientific knowledge in the area of bioelectromagnetics that may serve the interests of students and decision-makers, as well as society as a whole. It is distinguished by extensive descriptions of

fundamental biophysical concepts and their relevance to human health. Reflecting the transdisciplinary approach from several different intellectual streams including physics, biology, epidemiology, medicine, environment, risk science, and engineering, the book is quite a venture into the battling studies to assess the latest research on health effects and biomedical applications of EM energy. This new edition of the book particularly looks at the potential threats from the emerging 5G wireless networks, which will deploy large numbers of low-powered smartphones, notebooks, tablets, radio access networks, and other transmitters. Features Introduces necessary biophysical principles of EM fields in the context of their interaction with living systems. Strengthens understanding of cutting-edge research on several major areas in the broad area of bioelectromagnetics. Presents safety standards and guidelines for human exposure to EM fields. Discusses techniques that have been developed to ensure adequate EM-thermal dosimetry required for both health effects and biomedical applications. Provides insight into the determinants of EM health risk assessment and public concerns. Includes extensive reference list at the end of each chapter to enhance further study. Riadh Habash is a special appointment professor and McLaughlin Research Chair in Electromagnetic Fields and Health at the University of Ottawa, Canada. He has been the recipient of many awards, including the National Wighton Fellowship Award, and has authored or co-authored over 90 research articles, six books, and five book chapters. His most recent books are Green Engineering in 2017 and Professional Practice in 2019 (CRC Press), with the remaining previous books targeting the area of

bioelectromagnetics.

Biological and Medical Aspects of Electromagnetic Fields, Fourth Edition Oxford University Press

This book reevaluates the health risks of ionizing radiation in light of data that have become available since the 1980 report on this subject was published. The data include new, much more reliable dose estimates for the A-bomb survivors, the results of an additional 14 years of follow-up of the survivors for cancer mortality, recent results of follow-up studies of persons irradiated for medical purposes, and results of relevant experiments with laboratory animals and cultured cells. It analyzes the data in terms of risk estimates for specific organs in relation to dose and time after exposure, and compares radiation effects between Japanese and Western populations.

Biological Effects of Radiofrequency Radiation Elsevier

The amount of hazardous waste in the United States has been estimated at 275 million metric tons in licensed sites alone. Is the health of Americans at risk from exposure to this toxic material? This volume, the first of several on environmental epidemiology, reviews the available evidence and makes recommendations for filling gaps in data and improving health assessments. The book explores: Whether researchers can infer health hazards from available data. The results of substantial state and federal programs on hazardous waste dangers. The book presents the results of studies of hazardous wastes in the air, water, soil, and food and examines the potential of biological markers in health risk assessment. The data and recommendations in this volume will be of immediate use to toxicologists, environmental health professionals, epidemiologists, and other biologists.

Electromagnetic Fields in Biological Systems DIANE Publishing

This book is dedicated to various aspects of electromagnetic wave theory and its applications in science and technology. The covered topics include the fundamental physics of electromagnetic waves, theory of electromagnetic wave propagation and scattering, methods of computational analysis, material characterization, electromagnetic properties of plasma, analysis and applications of periodic structures and waveguide components, and finally, the biological effects and medical applications of electromagnetic fields.

Electromagnetic Field, Health and Environment Springer Science & Business Media

Can the electric and magnetic fields (EMF) to which people are routinely exposed cause health effects? This volume assesses the data and draws conclusions about the consequences of human exposure to EMF. The committee examines what is known about three kinds of health effects associated with EMF: cancer, primarily childhood leukemia; reproduction and development; and neurobiological effects. This book provides a detailed discussion of hazard identification, dose-response assessment, exposure assessment, and risk characterization for each. Possible Health Effects of Exposure to Residential Electric and Magnetic Fields also discusses the tools available to measure exposure, common types of exposures, and what is known about the effects of exposure. The committee looks at correlations between EMF exposure and carcinogenesis, mutagenesis, neurobehavioral effects, reproductive and developmental effects, effects on melatonin and other neurochemicals, and effects on bone healing and stimulated cell growth.

Inventory of Federal Energy-related Environment and Safety Research for ... CRC Press

The North Atlantic Treaty Organization (NATO) has sponsored research and personnel safety standards development for exposure to Radiofrequency Radiation (RFR) for over twenty years. The Aerospace Medical Panel of the Advisory Group For Aerospace Research and Development (AGARD) sponsored Lecture Series No. 78 Radiation Hazards,¹ in 1975, in the Netherlands, Germany, and Norway, on the subject of Radiation Hazards to provide a review and critical analysis of the available information and concepts. In the same year, Research Study Group 2 on Protection of Personnel Against Non-Ionizing Electromagnetic Radiation (Panel VIII of AC/243 Defence Research Group, NATO) proposed a revision to Standardization Agreement (STANAG) 2345. The intent of the proposal was to revise the ST ANAG to incorporate frequency-dependent-RFR safety guidelines. These changes are documented in the NATO STANAG 2345 (MED), Control and Recording of Personnel Exposure to Radiofrequency Radiation,² promulgated in 1979. Research Study Group 2 (RSG2) of NATO Defense Research Group Panel VIII (AC1243) was organized, in 1981, to study and contribute technical information concerning the protection of military personnel from the effects of radiofrequency electromagnetic radiation. A workshop at the Royal Air Force Institute of Aviation Medicine, Royal Aircraft Establishment, Farnborough, U. K. was held to develop and/or compile sufficient knowledge on the long-term effects of pulsed RFR to maintain safe procedures and to minimize unnecessary operational constraints.

BioElectroMagnetics IOS Press

Focussing on engineering aspects of RF/Microwave interaction with biological tissues This book discusses the advancement in bio-electromagnetics pertaining to this important issue of electromagnetic field-bio interaction vis-a-vis the emission of electromagnetic radiations from mobile phones and their biological fallout. Divided into six chapters, it discusses basic issues in Electromagnetic Field-Biointeraction, dosimetry, instrumentation, and methods of measurement of specific absorption rate, criteria and magnitude of safe exposure and measurements of field in an open (unobstructed) environment.

Waves: A Very Short Introduction CRC Press

Written by practitioners experienced in the field, 'Practical Radiation Protection in Healthcare' provides a practical guide for medical physicists and others involved with radiation protection in the healthcare environment.

Biological Effects and Medical Applications of Electromagnetic Energy Oxford University Press

Hypo- or hypersecretion, alteration in storage, release, catabolism, and post-translational processing of neuropeptides are associated with the etiology of many diseases affecting the central nervous system (CNS). Various peptides native to the brain and the spinal cord, as well as various synthetic peptides, peptide analogues and peptidomimetics developed as their agonists or antagonists could be useful in the treatment of these CNS maladies. However, peptides face a formidable obstacle in reaching the intended site of action due to the existence of the blood-brain barrier (BBB), a vital element in the regulation of the internal environment of the brain and the spinal cord. After

reviews on the role and neuropharmaceutical potential of peptides, properties of the BBB in the context of peptide transport in the CNS and potential transport mechanisms to cross the BBB, this volume discusses the development, present state-of-the-art and future trends of various strategies to overcome this major obstacle to peptide pharmacotherapy involving the CNS. Chapters are devoted to cover invasive approaches that circumvent the BBB by direct administration into the brain or the spinal cord and by transiently opening the tight junctions of or permeabilizing the endothelial cells separating the systemic circulation from the interstitial fluid of the CNS. Subsequently, physiologically based strategies that utilize biological carriers to gain access to the CNS are discussed in detail, followed by methods encompassing prodrug and chemical delivery/targeting strategies, which aim at altering the properties of the peptide to enhance BBB transport, and drug delivery strategies based on peptide vectors. Finally, a comparative evaluation on the present status and perspectives of the techniques is presented.

Epidemiology of Electromagnetic Fields Springer Science & Business Media

Spanning static fields to terahertz waves, this volume explores the range of consequences electromagnetic fields have on the human body. Topics discussed include essential interactions and field coupling phenomena; electric field interactions in cells, focusing on ultrashort, pulsed high-intensity fields; dosimetry or coupling of ELF fields into biological systems; and the historical developments and recent trends in numerical dosimetry. It also discusses mobile communication devices and the dosimetry of RF radiation into the human body, exposure and dosimetry

associated with MRI and spectroscopy, and available data on the interaction of terahertz radiation with biological tissues, cells, organelles, and molecules.

Radio Frequency and Microwave Effects on Biological Tissues CRC Press

The two volumes of this new edition of the Handbook cover the basic biological, medical, physical, and electrical engineering principles. They also include experimental results concerning how electric and magnetic fields affect biological systems—both as potential hazards to health and potential tools for medical treatment and scientific research. They also include material on the relationship between the science and the regulatory processes concerning human exposure to the fields. Like its predecessors, this edition is intended to be useful as a reference book but also for introducing the reader to bioelectromagnetics or some of its aspects. FEATURES • New topics include coverage of electromagnetic effects in the terahertz region, effects on plants, and explicitly applying feedback concepts to the analysis of biological electromagnetic effects • Expanded coverage of electromagnetic brain stimulation, characterization and modeling of epithelial wounds, and recent lab experiments on at all frequencies • Section on background for setting standards and precautionary principle • Discussion of recent epidemiological, laboratory, and theoretical results; including: WHO IARC syntheses of epidemiological results on both high and low frequency fields, IITRI lab study of cancer in mice exposed to cell phone-like radiation, and other RF studies • All chapters updated by internationally acknowledged experts in the field

Biological Effects of Electromagnetic Fields Oxford University

Press, USA

People are immersed in electromagnetic fields from such sources as power lines, domestic appliances, mobile phones, and even electrical storms. All living beings sense electric fields, but the physical origins of the phenomenon are still unclear.

Magnetobiology considers the effects of electromagnetic fields on living organisms. It provides a comprehensive review of relevant experimental data and theoretical concepts, and discusses all major modern hypotheses on the physical nature of magnetobiological effects. It also highlights some problems that have yet to be solved and points out new avenues for research. Why do some people feel unwell during a lightning storm? Why is there a correlation between the level of electromagnetic background and the incidence of cancer? Why do so many medical centers use electromagnetic exposures to treat a wide variety of disorders in humans? The international scientific community is extremely interested in a theory of magnetobiology and the answers to these and other questions, as evidenced by the growing number of research associations in the United States, Europe, and other parts of the world. The World Health Organization (WHO) has named electromagnetic contamination in occupational and residential areas as a stress factor for human beings. This book stands out among recent texts on magnetobiology because it draws on a strong foundation of empirical and theoretical evidence to explain the various effects of magnetic fields on the human body. It contains the first comprehensive collection of experimental data bearing physical information, frequency and amplitude/power spectra, and original research data on how electromagnetic fields interfere with ions

and molecules inside the proteins of living organisms. -

Introduction is written so that it will be understandable to a wide scientific community regardless of their specialisation - First comprehensive collection of experimental data bearing physical information, frequency and amplitude/power spectra - Original theoretical research data on the interference of ions and molecules inside proteins - Appendix covers physical questions most relevant for magnetobiology. In particular there is an original exposition of the magnetic resonance basic principles *Biological and Medical Aspects of Electromagnetic Fields* National Academies Press

This reference explores the sources, characteristics, bioeffects, and health hazards of extremely low-frequency (ELF) fields and radio frequency radiation (RFR), analyzing current research as well as the latest epidemiological studies to assess potential risks associated with exposure and to develop effective safety guidelines. Compiles reports and investigations from four decades of study on the effect of nonionizing electromagnetic fields and radiation on human health Summarizing modern engineering approaches to control exposure, *Electromagnetic Fields and Radiation* discusses: EM interaction mechanisms in biological systems Explorations into the impact of EM fields on free radicals, cells, tissues, organs, whole organisms, and the population Regulatory standards in the United States, Canada, Europe, and Asia Pacific Evaluation of incident fields from various EM sources Measurement surveys for various sites including power lines, substations, mobile systems, cellular base stations, broadcast antennas, traffic radar devices, heating equipment, and other sources Dosimetry techniques for the determination of

internal EM fields Conclusions reached by the Food and Drug Administration, World Health Organization, and other institutions