Environmental Health Criteria 109

Summary report on the evaluation of short-term tests for carcinogens

Please note that the layout and pagination of this web version are not identical with the printed version.

World Health Organization

INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY

ENVIRONMENTAL HEALTH CRITERIA 109

SUMMARY REPORT ON THE EVALUATION OF SHORT-TERM TESTS FOR CARCINOGENS (COLLABORATIVE STUDY ON *IN VIVO* TESTS)

This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the United Nations Environment Programme, the International Labour Organisation, or the World Health Organization.

Published under the joint sponsorship of
the United Nations Environment Programme,
the International Labour Organisation,
and the World Health Organization

World Health Orgnization
Geneva, 1990

The International Programme on Chemical Safety (IPCS) is a joint venture of the United Nations Environment Programme, the International Labour Organisation, and the World Health Organization. The main objective of the IPCS is to carry out and disseminate evaluations of the effects of chemicals on human health and the quality of the environment. Supporting activities include the development of epidemiological, experimental laboratory, and risk-assessment methods that could produce internationally comparable results, and the development of manpower in the field of toxicology. Other activities carried out by the IPCS include the development of know-how for coping with chemical accidents, coordination of laboratory testing and epidemiological studies, and promotion of research on the mechanisms of the biological action of chemicals.

WHO Library Cataloguing in Publication Data

Summary report on the evaluation of short-term tests for carcinogens : (collaborative study on *in vivo* tests).

(Environmental health criteria ; 109)

1.Carcinogens - analysis 2.Mutagens - analysis
3.Mutagenicity tests 4. Evaluation studies I.Series

ISBN 92 4 157109 8 (NLM Classification: QZ 202)
ISSN 0250-863X

CONTENTS

ETUDE COLLECTIVE POUR L'EVALUATION ET LA VALIDATION DES EPREUVES DE COURTE DUREE RELATIVES AUX CANCEROGENES

ESTUDIO EN COLABORACION SOBRE EVALUACION Y COMPROBACION DE PRUEBAS A CORTO PLAZO PARA SUSTANCIAS CARCINOGENAS

PARTICIPANTS IN THE COLLABORATIVE STUDY

Dr I. Adler, Mammalian Genetics Institute, Association for Radiation and Environmental Research, Neuherberg, Federal Republic of Germany
Dr R. Albanese, Pharmaceuticals Division, Imperial Chemical Industries PLC, Macclesfield, Cheshire, England
Dr J.W. Allen, Genetic Toxicology Division, US Environmental Protection Agency, Research Triangle Park, North Carolina, USA
Dr J.A. Allen, Department of Mutagenesis and Cell Biology, Huntingdon Research Centre Ltd., Huntingdon, Cambridge-shire, England
Dr O. Andersen, Odense University, Institute of Community Health, Department of Environmental Medicine, Odense, Denmark
Dr D. Anderson, British Industrial Biological Research Association, Carshalton, Surrey, United Kingdom
Dr J. Arany, Institut d'Hygiène et d'Epidémiologie, Brussels, Belgium
Dr J. Ashby, Central Toxicology Laboratory, Imperial Chemi-cal Industries PLC, Macclesfield, Cheshire, United Kingdom
Dr R.A. Baan, Medical Biological Laboratory TNO, Rijswijk, Netherlands
Dr P. Bannasch, Cytopathology Department, Institute of Experimental Pathology, German Cancer Research Centre, Heidelberg, Federal Republic of Germany
Dr G.C. Becking, International Programme on Chemical Safety, World Health Organization, Research Triangle Park, North Carolina, USA
Dr B. Beije, Department of Genetic and Cellular Toxicology, Wallenberg Laboratory, Stockholm University, Stockholm, Sweden
Dr J. Benes, Institute of Nuclear Biology and Radiochemis-try, Prague, Czechoslovakia
Dr E. Bermudez, Department of Genetic Toxicology, Chemical Industry Institute of Toxicology, Research Triangle Park, North Carolina, USA
Dr H.C. Birnboim, Department of Experimental Oncology, Ottawa Regional Cancer Centre, Ottawa, Ontario, Canada
Dr J.B. Bishop, Cellular and Genetic Toxicology Branch, Toxicology Research and Testing Program, National Insti-tute of Environmental Health Sciences, Research Triangle Park, North Carolina, USA
Dr D.H. Blakey, Mutagenesis Section, Environmental Health Centre, Department of National Health and Welfare, Tunney's Pasture, Ottawa, Ontario, Canada
Dr R. Braum, Central Institute for Genetics and for Research on Cultivated Plants, Academy of Science of the German Democratic Republic, Gatersleben, German Democratic Republic
Dr G. Bronzetti, National Research Council, Institute of Mutagenesis and Differentiation, Pisa, Italy
Dr B.E. Butterworth, Chemical Industry Institute of Toxi-cology, Research Triangle Park, North Carolina, USA

Dr P.S. Chauhan, Bio-Medical Group, Bhabha Atomic Research Centre, Bombay, India
Dr I. Chouroulinkov, Unité de Cancérogénèse Expérimentale et de Toxicologie Génétique (E.R. 304) I.R.S.C.-C.N.R.S., Villejuif, France
Dr M.G. Clare, Shell Research Ltd, Sittingbourne, Kent, United Kingdom
Dr R.D. Combes, School of Biological Sciences, Portsmouth Polytechnic, Portsmouth, United Kingdom
Dr C. Coton, Mammalian Genetics Laboratory, Department of Biology, European Nuclear Centre, Mol, Belgium
Dr R. Crebelli, Higher Institute of Health, Viale Regina Elena, Rome, Italy
Dr B.J. Dean, Upchurch, Sittingbourne, Kent, United Kingdom
Dr G.M. Decad, Department of Materials Toxicology, IBM Corporation, San Jose, California, USA
Dr F.J. de Serres, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, USA
Dr D.J. Doolittle, Toxicology Research, Bowman Gray Technical Center, R.J. Reynolds Co., Winston-Salem, North Carolina, USA
Dr U.H. Ehling, Mammalian Genetics Institute, Association for Radiation and Environmental Research, Neuherberg, Federal Republic of Germany
Dr B.M. Elliott, Genetic Toxicology Section, Imperial Chemical Industries PLC, Macclesfield, Cheshire, United Kingdom
Dr R. Fahrig, Fraunhofer Institute for Research on Toxicology and Aerosols, Hannover, Federal Republic of Germany
Dr R. Forster, Life Science Research, Rome Toxicology Centre, Pomezia, Rome, Italy
Dr K. Fujikawa, Drug Safety Evaluation Laboratories, Central Research Division, Takeda Chemical Industries Ltd, Osaka, Japan
Dr C. Furihata, Department of Molecular Oncology, Institute of Medical Science, University of Tokyo, Tokyo, Japan
Dr S.M. Galloway, Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania, USA
Dr W.M. Generoso, Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA
Dr H.P. Glauert, McArdle Laboratory for Cancer Research, University of Wisconsin, Madison, Wisconsin, USA
Dr U. Graf, Toxicology Institute, Zurich Federal Polytechnic and University, Zurich, Switzerland
Dr B.L. Harper, Division of Environmental Toxicology, University of Texas Medical Branch, Galveston, Texas, USA
Dr G.G. Hatch, Toxicology Division, Northrop Services Inc., Environmental Sciences, Research Triangle Park, North Carolina, USA
Dr M. Hayashi, Biological Safety Research Centre, National Institute of Hygienic Sciences, Tokyo 158, Japan
Dr R.M. Hicks, School of Pathology, Middlesex Hospital Medical School, London, United Kingdom

Dr J.M. Hunt, Department of Pathology and Laboratory Medicine, University of Texas Medical School, Houston, Texas, USA
Dr N. Inui, Biological Research Centre, Japan Tobacco Inc., Kanagawa, Japan
Dr M. Ishidate, Jr., Biological Safety Research Centre, National Institute of Hygienic Sciences, Tokyo, Japan
Dr V.I. Ivanov, Institute of Medical Genetics, Academy of

Medical Sciences, Moscow, USSR
Dr J.C. Jensen, National Food Institute, Institute of Toxicology, Copenhagen, Denmark
Dr D. Jenssen, Department of Genetic Toxicology, Wallenberg Laboratory, University of Stockholm, Stockholm, Sweden
Dr B.J. Kilbey, Institute of Animal Genetics, University of Edinburgh, Edinburgh, United Kingdom
Dr I. Kimber, Central Toxicology Laboratory, Imperial Chemical Industries PLC, Macclesfield, Cheshire, United Kingdom
Dr U. Kliesch, Mammalian Genetics Institute, Association for Radiation and Environmental Research, Neuherberg, Federal Republic of Germany
Dr A.D. Kligerman, Environmental Health Research and Testing Inc., Research Triangle Park, North Carolina, USA
Dr D. Kornbrust, Merck Sharp & Dohme Research Laboratories, Department of Safety Assessment, West Point, Pennsylvania, USA
Dr C. Lasne, Unité de Cancérogénèse Expérimentale et de Toxicologie Génétique (ER-304) I.R.S.C.-C.N.R.S., Villejuif, France
Dr A. Léonard, Mammalian Genetics Laboratory, Department of Biology, European Nuclear Centre, Mol, Belgium
Dr C.A. Luke, Medical Department, Brookhaven National Laboratory, Upton, New York, USA
Dr J.T. MacGregor, US Department of Agriculture, Western Regional Research Center, Berkeley, California, USA
Dr A.M. Malashenko, Scientific Research Laboratory of Experimental Biological Models of the Academy of Medical Sciences of the USSR, Moscow Region, USSR
Dr C. Malaveille, International Agency for Research on Cancer, Lyon, France
Dr B.H. Margolin, Biometry and Risk Assessment Program, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, USA
Dr D. McGregor, Developmental Toxicology, Inveresk Research International Ltd, Musselburgh, United Kingdom
Dr A.L. Meyer, Shell Research Ltd, Sittingbourne, Kent, United Kingdom
Dr J.C. Mirsalis, Cellular and Genetic Toxicology Department, SRI International, Menlo Park, California, USA
Dr N. Nashed, Johann Wolfgang Goethe-Universität, Frankfurt am Main, Federal Republic of Germany
Dr S.B. Neal, Toxicology Division, Lilly Research Laboratory, Greenfield, Indiana, USA

Dr A. Neuhäuser-Klaus, Mammalian Genetics Institute, Association for Radiation and Environmental Research, Neuherberg, Federal Republic of Germany
Dr D.A. Pagano, Cellular and Genetic Toxicology Branch, Toxicology Research and Testing Program, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, USA
Dr F. Palitti, Evolutionary Genetics Centre of the National Research Council, Genetics and Molecular Biology Department, University City, Rome, Italy
Dr S. Parodi, Chemical Carcinogenesis Laboratory, National Cancer Research Institute, Genoa, Italy
Dr M. Pereira, Health Effects Research Laboratory, US Environmental Protection Agency, Cincinnati, Ohio, USA
Dr J. Pot-Deprun, Unité de Cancérogénèse Expérimentale et Toxicologie Génétique (ER-304) I.R.S.C.- C.N.R.S. Laboratoires de Recherche Appliquée sur le Cancer,

Villejuif, France
Dr G.S. Probst, Toxicology Division, Lilly Research Laboratories, Greenfield, Indiana, USA
Dr C. Ramel, Wallenberg Laboratory, University of Stockholm, Stockholm, Sweden
Dr K. Randerath, Baylor College of Medicine, Department of Pharmacology, Houston, Texas, USA
Dr H.S. Rosenkranz, Department of Environmental Health Sciences, Case Western Reserve University, Cleveland, Ohio, USA
Dr P. Russo, National Cancer Research Institute, Genoa, Italy
Dr M.F. Salamone, Moe-Biohazard Laboratory, Rexdale, Ontario, Canada
Dr C.B. Salocks, Department of Materials Toxicology, IBM Corporation, San Jose, California, USA
Dr J. Schöneich, Central Institute for Genetics and for Research on Cultivated Plants, Academy of Science of the German Democratic Republic, Gatersleben, German Democratic Republic
Dr A.G. Searle, Medical Research Council Radiobiology Unit, Harwell, Didcot, United Kingdom
Dr G.A Sega, Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA
Dr M.D. Shelby, Cellular and Genetic Toxicology Branch, Toxicology Research and Testing Program, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, USA
Dr H. Shibuya, Laboratory of Genetic Toxicology, Hatano Research Institute, Food and Drug Safety Center, Kanagawa, Japan
Dr T. Shibuya, Laboratory of Genetics, Hatano Research Institute, Food and Drug Safety Center, Kanagawa, Japan
Dr R.H. Stevens, Radiation Research Laboratory, Department of Radiation, University of Iowa, Iowa, USA
Dr G.D. Stoner, Department of Pathology, Medical College of Ohio, Toledo, Ohio, USA

Dr J.A. Styles, Central Toxicology Laboratory, Imperial Chemical Industries PLC, Macclesfield, Cheshire, United Kingdom
Dr K.E. Suter, Preclinical Research, Toxicology Department, Sandoz Limited, Basel, Switzerland
Dr A. D. Tates, Department of Radiation Genetics and Chemical Mutagenesis, State University of Leiden, Leiden, Netherlands
Dr R.R. Tice, Medical Department, Brookhaven National