



CONTENTS

Asterisks * preceding page numbers refer to studies using human-derived material.

Perspectives in Cancer Research

- 4217 **The Multistep Nature of Cancer Development.** Emmanuel Farber.

BASIC SCIENCES

- 4224 **Glutathione Metabolism as a Determinant of Therapeutic Efficacy: A Review.** Bradley A. Arrick and Carl F. Nathan.
- 4233 **Clotrimazole, an Inhibitor of Epidermal Benzo(a)pyrene Metabolism and DNA Binding and Carcinogenicity of the Hydrocarbon.** Hasan Mukhtar, Benjamin J. Del Tito, Jr., Mukul Das, Evan P. Cherniack, Andrew D. Cherniack and David R. Bickers.
- *4241 **Cellular Discriminants for a Biological Classification of Human Colon Carcinoma.** B. Drewinko, L. Y. Yang, A. Leibovitz, B. Barlogie, D. Lutz, B. Jansson, J. J. Stragand and J. M. Trujillo.
- *4254 **In Vivo Dosimetry of 4-Aminobiphenyl in Rats via a Cysteine Adduct in Hemoglobin.** Laura C. Green, Paul L. Skipper, Robert J. Turesky, Matthew S. Bryant and Steven R. Tannenbaum.
- 4260 **Irreversibility of Low-Grade Superficial Rat Bladder Carcinomas.** Seiichiro Ozono, Isao Numata and Ryoichi Oyasu.
- 4263 **Tumor and Tissue Distribution of a Methotrexate-Anti-EL4 Immunoglobulin Conjugate in EL4 Lymphoma-bearing Mice.** Patrick Uadia, A. Huntley Blair and Tarunendu Ghose.
- 4267 **In Vivo Genotoxicity and Acute Hepatotoxicity of 1,2-Dichloroethane in Mice: Comparison of Oral, Intraperitoneal, and Inhalation Routes of Exposure.** Richard D. Storer, Nancy M. Jackson and Rory B. Conolly.
- 4272 **Enhancement of the Rate of Spontaneous Mutation to 6-Thioguanine Resistance in Mammalian Cells by Polyamine Depletion.** Naoyuki Kamatani, Kusuki Nishioka, Toshimi Morita, Yutaka Morita, Fujio Takeuchi, Kunio Matsuta, Yutaro Nishida and Terumasa Miyamoto.
- *4276 **Effects of Gastrin on Tumor Growth and Cyclic Nucleotide Metabolism in Xenotransplantable Human Gastric and Colonic Carcinomas in Nude Mice.** Hiromichi Sumiyoshi, Wataru Yasui, Atsushi Ochiai and Eiichi Tahara.
- *4281 **Polyamine Requirements for Induction of HL-60 Promyelocyte Differentiation by Leukocyte-conditioned Medium and Phorbol Ester.** Donald W. Kufe, James Griffin, Thomas Mitchell and Tim Shafman.
- 4285 **Oxygen-carrying Perfluorochemical Emulsion as an Adjuvant to Radiation Therapy in Mice.** Beverly A. Teicher and Christopher M. Rose.
- *4289 **Cytotoxic and Antitumor Activity of 1-Nitroacridines as an Aftereffect of Their Interstrand DNA Cross-Linking.** Katarzyna Pawlak, Jan W. Pawlak and Jerzy Konopa.
- 4297 **Inactivation and Reactivation of Intracellular S-Adenosylhomocysteinase in the Presence of Nucleoside Analogues in Rat Hepatocytes.** J-S. Schanche, T. Schanche, P. M. Ueland and J. A. Montgomery.
- *4303 **Effects of Quinidine and Related Compounds on Cytotoxicity and Cellular Accumulation of Vincristine and Adriamycin in Drug-resistant Tumor Cells.** Takashi Tsuruo, Harumi Iida, Yoshiko Kitatani, Keiko Yokota, Shigeru Tsukagoshi and Yoshio Sakurai.
- 4308 **Mutagenic Activity of Tumor-associated Macrophages in Salmonella typhimurium Strains TA98 and TA100.** Amy M. Fulton, Scott E. Loveless and Gloria H. Heppner.
- *4312 **Effects of pH and Temperature on the Stability and Decomposition of N,N',N''-Triethylenethiophosphoramidate in Urine and Buffer.** Brian E. Cohen, Merrill J. Egorin, M. S. Balachandran Nayar and Peter L. Gutierrez.
- 4317 **Metabolism of 1-Nitro[U-4,5,9,10-¹⁴C]pyrene in the F344 Rat.** Karam El-Bayoumy and Stephen S. Hecht.
- *4323 **Repair of DNA Damage Caused by Formaldehyde in Human Cells.** Roland C. Grafstrom, Albert Fornace, Jr., and Curtis C. Harris.
- *4328 **Selection of 9-β-D-Arabinofuranosyladenine-resistant Human T-Lymphoblasts with Altered Ribonucleotide Reductase Activity.** Arnold Fridland.
- 4333 **Development and Characterization of the BALB/cNIV Mouse Strain.** Lawrence J. T. Young, Kenneth B. DeOme, Phyllis B. Blair, Dorothy R. Pitelka and Robert D. Cardiff.
- 4337 **Ultrasonic Measurement of Melanosomes for Characterization of Their Physicochemical Structure in B16 and Harding-Passey Melanomas.** Ryusuke Kono, Kowichi Jimbow, Hiroyuki Takahashi and Kazuo Maeda.

- *4342** Expression of Ca Antigen in Relation to Cell Cycle in Cultured Human Tumor Cells. Bogdan Czerniak, Zbigniew Darzynkiewicz, Lisa Staiano-Coico, Fritz Herz and Leopold G. Koss.
- *4347** Heat Sensitivity and Thermotolerance in Cells from Five Human Melanoma Xenografts. Einar K. Rofstad, Hilde Midthjell and Tor Brustad.
- 4355** Effects of New Antitumor Bifunctional Intercalators Derived from 7H-Pyridocarbazole on Sensitive and Resistant L1210 Cells. Catherine Esnault, Bernard P. Roques, Alain Jacquemin-Sablon and Jean Bernard Le Pecq.
- 4361** Selenium Inhibition of DNA Synthesis in Mouse Mammary Epithelial Cell Line YN-4. Daniel Medina and Carol J. Oborn.
- 4366** Characterization and Significance of Carbamyl Phosphate Phosphatase. Michael J. Black and Mary Ellen Jones.
- 4377** Inhibition of Mouse Bladder Tumor Proliferation by Murine Interferon- γ and Its Synergism with Interferon- β . Timothy L. Ratliff, Dov Kadmon, Amos Shapiro, Allan J. Jacobs and W. D. W. Heston.
- 4382** Effects of α -Difluoromethylornithine and Methylglyoxal Bis(guanylhydrazone) on the Growth of Experimental Renal Adenocarcinoma in Mice. Harry W. Herr, Edward L. Kleinert, Peter S. Conti, Joseph H. Burchenal and Willet F. Whitmore, Jr.
- 4386** Effects of Tamoxifen on Estrogen-induced Enhancement or Inhibition of Tumor Growth in Mouse Leydig Cell Tumor Lines. Bunzo Sato, Yoshiaki Maeda, Yasuko Nishizawa, Keizo Noma, Susumu Kishimoto and Keishi Matsumoto.
- 4392** Reversal of Acquired Resistance to Doxorubicin in P388 Murine Leukemia Cells by Tamoxifen and Other Triparanol Analogues. A. Ramu, D. Glaubiger and Z. Fuks.
- *4396** Abnormal Response of Xeroderma Pigmentosum Cells to Bleomycin. Myra M. Hurt and Robb E. Moses.
- *4403** Lack of Correlation between Natural Killer Activity and Tumor Growth Control in Nude Mice with Different Immune Defects. Øystein Fodstad, Carl T. Hansen, Grace B. Cannon, Charles N. Statham, Gary R. Lichtenstein and Michael R. Boyd.
- 4409** Effect of Oxygen on Misonidazole Chemosensitization and Cytotoxicity *in Vitro*. R. Timothy Mulcahy.
- *4414** Control of Hepatocyte Replication by Two Serum Factors. G. Michalopoulos, K. A. Houck, M. L. Dolan and N. C. Luetke.
- 4420** Comparison of the Mutagenic and Clastogenic Activity of Amsacrine and Other DNA-intercalating Drugs in Cultured V79 Chinese Hamster Cells. William R. Wilson, Noelene M. Harris and Lynnette R. Ferguson.
- *4432** HNK-1-defined Antigen Detected in Paraffin-embedded Neuroectoderm Tumors and Those Derived from Cells of the Amine Precursor Uptake and Decarboxylation System. Jean-Michel Caillaud, Souad Benjelloun, Jacques Bosq, Karim Braham and Marc Lipinski.
- 4440** Decreased Cell Kill of Vincristine and Methotrexate against 9L Rat Brain Tumor Cells *In Vitro* Caused by α -Difluoromethylornithine-induced Polyamine Depletion. Leena Alhonen-Hongisto, David T. Hung, Dennis F. Deen and Laurence J. Marton.
- 4443** Alteration in Pyruvate Metabolism in the Liver of Tumor-bearing Rats. Jeffry D. Shearer, Gordon P. Buzby, James L. Mullen, Elizabeth Miller and Michael D. Caldwell.
- *4447** DNA Strand Scission and Cross-Linking by Diaziridinylbenzoquinone (Diaziquone) in Human Cells and Relation to Cell Killing. Leszek Szmigiero, Leonard C. Erickson, Regina A. Ewig and Kurt W. Kohn.
- *4453** Mechanisms of DNA Strand Breakage and Interstrand Cross-Linking by Diaziridinylbenzoquinone (Diaziquone) in Isolated Nuclei from Human Cells. Leszek Szmigiero and Kurt W. Kohn.
- 4458** Efflux of Adenine Nucleotides in Mitochondria from Rat Tumor Cells of Varying Growth Rates. Brad W. C. Lau and Samuel H. P. Chan.
- 4465** Potent Activation of Mouse Macrophages by Recombinant Interferon- γ . Luigi Varesio, Elisabetta Blasi, Gary B. Thurman, James E. Talmadge, Robert H. Wittrout and Ronald B. Herberman.
- *4470** Constitutive Production and Release of a Lymphokine with Macrophage-activating Factor Activity Distinct from γ -Interferon by a Human T-Cell Leukemia Virus-positive Cell Line. Eugenie S. Kleinerman, Randy Zicht, Prem S. Sarin, Robert C. Gallo and Isaiah J. Fidler.
- *4476** Metabolism of a Transformation-sensitive Amino Acid Fucoside in Normal and Simian Virus 40-transformed Human Embryonic Lung Cells. Sheldon M. Steiner and Phillip A. Morton.
- 4480** Characterization of the Effector Cells Mediating an "Innocent Bystander" Cytotoxicity Reaction Induced by a Syngeneic Mammary Adenocarcinoma in Mice. Ronald D. Paul, Ranga Padmanabhan and Diana M. Lopez.
- 4487** Functional and Morphological Characteristics of Transplantable Rat Pituitary Tumors Established in Nude Mice. Susumu Makino, Hiroshi Mori, Kiyoshi Koizumi, Hirohumi Yamashita, Yoshiyuki Hayashi, Toshihiro Aono and Keishi Matsumoto.
- *4496** Immunohistology of Normal and Ovarian Cancer Tissue with a Monoclonal Antibody to Placental Alkaline Phosphatase. Christopher A. Sunderland, John O. Davies and Gordon M. Stirrat.

- *4503** Long-Term Cultivation of a Human Colony-stimulating Factor-producing Cell Line in a Protein-free Chemically Defined Medium. Tetsuro Okabe and Fumimaro Takaku.
- 4507** Comparative Studies of Heat Sensitivity of Several Rat Hepatoma Cell Lines and Hepatocytes in Primary Culture. Dennis H. J. Schamhart, Wim Berendsen, Johannes van Rijn and Roeland van Wijk.
- 4517** Morphological and Histological Characteristics of Mammary Dysplasias Occurring in Cell Dissociation-derived Murine Mammary Outgrowths. Stephen P. Ethier, Laurel M. Adams and Robert L. Ullrich.
- 4523** Factors Influencing Expression of Mammary Ductal Dysplasia in Cell Dissociation-derived Murine Mammary Outgrowths. Stephen P. Ethier and Robert L. Ullrich.
- *4528** Identification of a Human Cancer-associated Antigen Defined with Monoclonal Antibody. Malaya Bhat-tacharya, Sunil K. Chatterjee and Joseph J. Barlow.
- 4535** Induction of Major Chromosome Aberrations in Chinese Hamster Ovary Cells by α -Difluoromethylornithine. Pirkko Pohjanpelto and Sakari Knuutila.
- *4540** Identification of Human Leukemic Glucocorticoid Receptors Using Affinity Labeling and Anti-Human Glucocorticoid Receptor Antibodies. Jeffrey M. Harmon, Howard J. Eisen, Steven T. Brower, S. Stoney Simons, Jr., Carol L. Langley and E. Brad Thompson.
- 4548** Characterization of γ -Glutamyltranspeptidase in Murine Cervical Cancer by Biochemical and Immunological Techniques. Yu Fang Chen and Stephen Haskill.
- *4553** Continuous Culture and Soft Agarose Cloning of Multiple Human Breast Carcinoma Cell Lines in Serum-free Medium. Fabien Calvo, Martin Brower and Desmond N. Carney.
- *4560** Characterization of a Human, Sex Steroid-responsive Transitional Cell Carcinoma Maintained as a Tumor Line (R198) in Athymic Nude Mice. Lola M. Reid, Irwin Leav, Paul W. L. Kwan, Percy Russell and Frederick B. Merk.
- *4574** Sodium Butyrate Induction of Milk-related Antigens in Human MCF-7 Breast Carcinoma Cells. Miyako Abe and Donald W. Kufe.
- 4578** Selective Antitumor Effect on L10 Hepatocarcinoma Cells of a Potent Immunoconjugate Composed of the A Chain of Abrin and a Monoclonal Antibody to a Hepatoma-associated Antigen. Kou M. Hwang, Kenneth A. Foon, Puying H. Cheung, J. W. Pearson and Robert K. Oldham.
- 4587** Expression of Drug Sensitivity and Tumorigenicity in Intraspecies Hybrids between 9-Hydroxyellipticine-sensitive and -resistant Cells. Jean-Jacques Rémy, Jean Belehradek and Alain Jacquemin-Sablon.
- *4594** Be13, a Human T-Leukemia Cell Line Highly Sensitive to Dexamethasone-induced Cytolysis. Uri Galili, Aviva Peleg, Yoram Milner and Naomi Galili.
- 4602** Plasma Clearance and Tissue Distribution of Partially Thiolated Polycytidylic Acid and Its Degradation Products in Rodents. Mei-Ping Kung, Yau-Kwan Ho, David Lalka and Thomas J. Bardos.
- 4607** Effects of the Tumor Promoter 12-O-Tetradecanoylphorbol-13-acetate on Neurite Outgrowth from Chick Embryo Sensory Ganglia. L. Hsu, D. Natyzak and Jeffrey D. Laskin.
- 4615** Metabolism and Binding of Cyclophosphamide and Its Metabolite Acrolein to Rat Hepatic Microsomal Cytochrome P-450. A. J. Marinello, S. K. Bansal, B. Paul, P. L. Koser, J. Love, R. F. Struck and H. L. Gurtoo.
- 4622** Selection and Rejection of Retrovirus-expressing Tumor Cells from a Heterogeneous Murine Leukemia Virus-infected Cell Population. B. Zbar, N. Terata, A. Nagai, Y. Tanio and J. Hovis.
- 4630** Dose Response of Monoclonal Tumor Induction with 3-Methylcholanthrene in Mosaic Mice. Hiroshi Tanooka and Kazuhiko Tanaka.

CLINICAL AND EPIDEMIOLOGICAL INVESTIGATIONS

- 4633** Dietary Fat and the Risk of Colorectal Cancer. Grant N. Stemmermann, Abraham M. Y. Nomura and Lance K. Heilbrun.
- 4638** Cancer and Other Causes of Death among Embalmers. Judy Walrath and Joseph F. Fraumeni, Jr.
- 4642** Immunoassay for Melanoma-associated Proteoglycan in the Sera of Patients Using Monoclonal and Polyclonal Antibodies. Alonzo H. Ross, Meenhard Herlyn, Carolyn S. Ernst, DuPont Guerry, Jeanette Bennicelli, Barbara F. D. Ghrist, Barbara Atkinson and Hilary Kowrowski.
- 4648** Prediction of Response to Chemotherapy in Acute Leukemia by *In Vitro* Drug Sensitivity Testing on Leukemic Stem Cells. Anita Gustavsson and Tor Olofsson.
- 4653** Expression of Ductal Carcinoma Antigen in Breast Cancer Sera as Defined Using Monoclonal Antibody F36/22. Lawrence D. Papsidero, Takuma Nemoto, Gary A. Croghan and T. Ming Chu.
- 4658** Immunoglobulin Gene Rearrangement in Acute Myelogenous Leukemia. Kyungsae Ha, Mark Minden, Nobumichi Hozumi and Erwin W. Gelfand.
- 4661** Effects on Human Peripheral Lymphocytes of *In Vivo* Administration of 9- β -D-Arabinofuranosyl-2-fluoroadenine-5'-monophosphate (NSC 312887), a New Purine Antimetabolite. David H. Boldt, Daniel D. Von Hoff, John G. Kuhn and Marla Hersh.
- 4667** Phase I-II Trial of High-Dose Calcium Leucovorin and 5-Fluorouracil in Advanced Colorectal Cancer. Stefan Madajewicz, Nicholas Petrelli, Youcef M. Rustum, Joel Campbell, Lemuel Herrera, Arnold Mittelman, April Perry and Patrick J. Creaven.

4670 Estradiol and Progesterone Receptors in Malignant Gastrointestinal Tumors. Vincenzo Sica, Ernesto Nola, Enrico Contieri, Rodolfo Bova, Maria Teresa Masucci, Nicola Medici, Antonella Petrillo, Alessandro Weisz, Anna Maria Molinari and Giovanni Alfredo Puca.

4675 Relationship of Urinary Polyamines to Tumor Activity and Tumor Volume in Patients. Yoav Horn, Stuart L. Beal, Natalio Walach, Warren P. Lubich, Lina Spigel and Laurence J. Marton.

4679 Distribution of Human Class I (HLA-A,B,C) Histocompatibility Antigens in Normal and Malignant Tissues of Nonlymphoid Origin. P. G. Natali, A. Bigotti, M. R. Nicotra, M. Viora, D. Manfredi and S. Ferrone.

4688 Quantitative Changes in Adenosine Deaminase Isoenzymes in Human Colorectal Adenocarcinomas. Joop ten Kate, Juul T. Wijnen, René G. M. van der Goes, René Quadt, Gerrit Griffioen, Fred T. Bosman and P. Meera Khan.

* * *

Letter to the Editor

4693 Governance of Science at the National Cancer Institute: Perceptions and Opportunities in Oncogene Research. Peter J. Fischinger and Vincent T. DeVita, Jr.

4697 Special Announcement

4698 Announcements

4699 Recent Death

4700 Author Index