ANTICANCER RESEARCH

International Journal of Cancer Research and Treatment

ISSN: 0250-7005

Volume 45, Number 1, January 2025

Contents

Reviews

Ovarian Adult Granulosa Cell Tumors: A Scoping Review of DNA Alterations and Their Known Significance. S. KARSTENSEN, K. KAISER, T.S. POULSEN, K. JOCHUMSEN, C. HØGDALL, N. MARCUSSEN, F.F. LAUZSUS, E. HØGDALL (Aabenraa; Herlev; Odense; Copenhagen, Denmark)	1
Gene Expression Profiles in Ovarian Cancer Tissues as a Potential Tool to Predict Platinum-Based Chemotherapy Resistance. M. TALIJANOVIC, J. LOPACINSKA-JØRGENSEN, E.V. HØGDALL (Herlev, Denmark)	11
Malignant Melanoma: Vitamin D Status as a Risk and Prognostic Factor – Meta-analyses and Systematic Review. S. HADDAD, J.J. WEISE, S. WAGENPFEIL, T. VOGT, J. REICHRATH (Homburg, Germany)	27
Experimental Studies	
Eribulin Induction of Immunogenic Cell Death (ICD): Comparison With Other Cytotoxic Agents and Temporal Relationship of ICD Biomarkers. M. ZANG, J. ZHENG, X. AN, B. LI, H. YANG, B. ERICKSON, R. KUNZ, B.A. LITTLEFIELD (<i>Taicang</i> , <i>PR China</i> ; <i>Framingham</i> ; <i>Cambridge</i> , <i>MA</i> , <i>USA</i>)	39
Interaction of Vitamin D-BODIPY With Fat Cells and the Link to Obesity-associated Vitamin D Deficiency. N. UÇAR, J.T. DEENEY, R.T. PICKERING, TY. FAN, R. LOO, P.M. MUELLER, M.F. HOLICK (Boston, MA, USA; Valencia, Spain; Veenendaal, the Netherlands; Dubendorf, Switzerland)	55
SLC7A11/xCT-mediated Cystine Uptake Regulates Intracellular Glutathione and Promotes Antioxidant Defense in Lymphatic Endothelial Cells. S. HASHIGUCHI, T. TANAKA, R. MANO, S. KONDO, S. KODAMA (Fukuoka, Japan)	65
Impact of Rhenium(I)-Diselenoether Compound on Cell Adhesion, Migration, Invasion Capacities, and MMP-2 Release in MDA-MB-231 Breast Cancer Cells. P. COLLERY, D. DESMAELE, A. HARIKRISHNAN, V. VEENA (Algajola; Orsay, France; Chennai; Bangalore, India)	73

ANTICANCER RESEARCH

International Journal of Cancer Research and Treatment

Editorial Board

P. A. ABRAHAMSSON, Malmö, Sweden

B. B. AGGARWAL, San Diego, CA, USA

T. AKIMOTO, Kashiwa, Chiba, Japan

P. Z. ANASTASIADIS, Jacksonville, FL, USA

A. ARGIRIS, San Antonio, TX, USA

I. P. ARMAND, Paris, France

V. I. AVRAMIS, Los Angeles, CA, USA

D.-T. BAU, Taichung, Taiwan, ROC

G. BAUER, Freiburg, Germany

E. E. BAULIEU, Le Kremlin-Bicetre, France

E. J. BENZ, Jr., Boston, MA, USA

I.-Y. BLAY, Lyon, France

J. BERGH, Stockholm, Sweden

F. T. BOSMAN, Lausanne, Switzerland

M. BOUVET, La Jolla, CA, USA

J. BOYD, Miami, FL, USA

G. BROICH, Monza, Italy

Ø. S. BRULAND, Oslo, Norway

J. M. BUATTI, Iowa City, IA, USA

M. CARBONE, Honolulu, HI, USA

C. CARLBERG, Kuopio, Finland

A. F. CHAMBERS, London, ON, Canada

P. CHANDRA, Frankfurt am Main, Germany

L. CHENG, Indianapolis, IN, USA

J.-G. CHUNG, Taichung, Taiwan, ROC

R. CLARKE, Washington, DC, USA

A.P. CONLEY, Houston, TX, USA

E. DE CLERCQ, Leuven, Belgium

E. P. DIAMANDIS, Toronto, ON, Canada

L. EGEVAD. Stockholm. Sweden

D. W. FELSHER, Stanford, CA, USA

H. FU, Atlanta, GA, USA

B. FUCHS, Zurich, Switzerland

D. FUCHS. Innsbruck, Austria

D. FUKUMURA, Boston, MA, USA

G. GABBIANI, Geneva, Switzerland

R. GANAPATHI, Charlotte, NC, USA

A. GIORDANO, Philadelphia, PA, USA

M. GNANT, Vienna, Austria

R. H. GOLDFARB, Guilford, CT, USA

J.S. GREENBERGER, Pittsburgh, PA, USA

A. HELLAND, Oslo, Norway

L. HELSON, Quakertown, PA, USA

R. HENRIKSSON, Umeå, Sweden

R. M. HOFFMAN, San Diego, CA, USA

P. HOHENBERGER, Mannheim, Germany

F. JANKU, Boston, MA, USA

S. C. JHANWAR, New York, NY, USA

J. V. JOHANNESSEN, Oslo, Norway

R. JONES, London, UK

B. KAINA, Mainz, Germany

D. G. KIEBACK, Schleswig, Germany

R. KLAPDOR, Hamburg, Germany

K.L. KNUTSON, Jacksonville, FL, USA

H. KOBAYASHI, Bethesda, MD, USA

S. D. KOTTARIDIS, Athens, Greece

G. R. F. KRUEGER, Köln, Germany

Pat M. KUMAR, Manchester, UK

Shant KUMAR, Manchester, UK

F. I. LEIEUNE. Lausanne. Switzerland

S. LINDER, Linköping, Sweden

D. M. LOPEZ, Miami, FL, USA

E. LUNDGREN, Umeå, Sweden

Y. MAEHARA, Fukuoka, Japan

I. MAHER, London, UK

I. MARESCAUX, Strasbourg, France

S. S. MARTIN, Baltimore, MD, USA

S. MITRA, Houston, TX, USA

S. MIYAMOTO, Fukuoka, Japan

S. MONCADA, Manchester, UK

M. MUELLER, Villingen-Schwenningen,

M. NAMIKI, Kanazawa, Ishikawa, Japan

K. NILSSON, Uppsala, Sweden

S. PATHAK, Houston, TX, USA

J.L. PERSSON, Malmö, Sweden

G. J. PILKINGTON, Portsmouth, UK

C. D. PLATSOUCAS, Norfolk, VA, USA

A. POLLIACK, Jerusalem, Israel

D. RADES, Lübeck, Germany

M. RIGAUD, Limoges, France

U. RINGBORG, Stockholm, Sweden

M. ROSELLI, Rome, Italy

S.T. ROSEN, Duarte, CA, USA

M. SCHAUER. Düsseldorf, Germany

M. SCHNEIDER, Wuppertal, Germany

J. SEHOULI, Berlin, Germany

A. SETH, Toronto, ON, Canada

G. V. SHERBET, Newcastle-upon-Tyne, UK

R. E. SHACKELFORD, Mobile, AL, USA

A. SLOMINSKI, Birmingham, AL, USA

G.-I. SOMA, Kagawa, Japan

G. S. STEIN, Burlington, VT, USA

T. STIGBRAND, Umeå, Sweden

T. M. THEOPHANIDES, Athens, Greece

P. M. UELAND, Bergen, Norway

H. VAN VLIERBERGHE, Ghent, Belgium

R. G. VILE, Rochester, MN, USA M. WELLER, Zurich, Switzerland

J. WESTERMARCK, Turku, Finland

B. WESTERMARK, Uppsala, Sweden

Y. YEN, Taipei, Taiwan, ROC

M.R.I. YOUNG, Charleston, SC, USA

G. J. DELINASIOS, Athens, Greece Managing Editor and

Executive Publisher

J. G. DELINASIOS, Athens, Greece Managing Editor (1981-2016)



Tel / Fax: +30-22950-53389

ISSN (online): 1791-7530 Editorial Office: International Institute of Anticancer Research, 1st km Kapandritiou-Kalamou Rd., Kapandriti, P.O. Box 22, Attiki 19014, Greece.

ISSN (print): 0250-7005

U.S. Branch: Anticancer Research USA, Inc., 111 Bay Avenue, Highlands,

E-mails: Editorial Office: journals@iiar-anticancer.org

Managing Editor: editor@iiar-anticancer.org

ANTICANCER RESEARCH supports: (a) the establishment and the activities of the INTERNATIONAL INSTITUTE OF ANTICANCER RESEARCH (IIAR; Kapandriti, Attiki, Greece); and (b) the organization of the International Conferences of Anticancer Research. The IIAR is a member of UICC. For more information about ANTICANCER RESEARCH, IIAR and the Conferences, please visit the IIAR website: www.iiar-anticancer.org

Publication Data: ANTICANCER RESEARCH (AR) is published bimonthly from January 1981 to December 2008 and monthly from January 2009. Each annual volume comprises 12 issues. Annual Author and Subject Indices are included in the last issue of each volume. ANTICANCER RESEARCH Vol. 24 (2004) and onwards appears online with Stanford University HighWire Press from April 2009. All published articles are deposited in PubMed Central.

Copyright: On publication of a manuscript in AR, which is a copyrighted publication, the legal ownership of all published parts of the paper passes from the Author(s) to the Journal.

Annual Subscription Rates 2025 per volume: Institutional subscription US\$ 1,898.00 (online) or US\$ 2,277.00 (print & online). Personal subscription US\$ 897.00 (online) or US\$ 1,277.00 (print & online). Prices include rapid delivery and insurance. The complete previous volumes of Anticancer Research (Vol. 1-44, 1981-2024) are available at 50% discount on the above rates.

Subscription Orders: Orders can be placed at agencies, bookstores, or directly with the Publisher. (e-mail: subscriptions@ijar-anticancer.org) Advertising: All correspondence and rate requests should be addressed

to the Editorial Office Book Reviews: Recently published books and journals should be sent to the Editorial Office. Reviews will be published within 2-4 months.

Articles in ANTICANCER RESEARCH are regularly indexed in all bibliographic services, including Current Contents Life Sciences and Medical Sciences, Science Citation Index Expanded, Index Medicus, Biological Abstracts, PubMed, PubMed Central, Chemical Abstracts, BIOSIS, Previews, Essential Science Indicators, Excerpta Medica, University of Sheffield Biomedical Information Service, Current Clinical Cancer, AIDS Abstracts, Elsevier Bibliographic Database, EMBASE, Compendex, GEOBASE, EMBiology, Elsevier BIOBASE, FLUIDEX, World Textiles, Scopus, Progress in Palliative Care, Cambridge Scientific Abstracts, Cancergram (International Cancer Research Data Bank), MEDLINE, Reference Update - RIS Inc., PASCAL-CNRS, Inpharma-Reactions (Datastar, BRS), CABS, Immunology Abstracts, Telegen Abstracts, Genetics Abstracts, Nutrition Research Newsletter, Dairy Science Abstracts, Current Titles in Dentistry, Inpharma Weekly, BioBase, MedBase, CAB Abstracts/Global Health Databases, Investigational Drugs Database, VINITI Abstracts Journal, Leeds Medical Information, PubsHub.

Obtaining permission to reuse or reproduce our content: AR has partnered with Copyright Clearance Center (CCC) to make it easy to secure permissions to reuse its content. Please visit www.copyright.com and enter the title that you are requesting permission for in the 'Get Permission' search box. For assistance in placing a permission request, Copyright Clearance Center can be contacted directly at: Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923 USA. Phone: +1-978-750-8400. Fax: +1-978-646-8600. E-mail: info@copyright.com. The Editors and Publishers of ANTICANCER RESEARCH accept no responsibility for the opinions expressed by the contributors or for the content of advertisements appearing therein.

Sociedad Iberoamericana de Información Científica (SIIC) Data Bases.

Copyright© 2025, International Institute of Anticancer Research (Dr. George J. Delinasios), All rights reserved.

PRINTED BY ENTYPO, ATHENS, GREECE. PRINTED ON ACID-FREE PAPER

ANTICANCER RESEARCH

International Journal of Cancer Research and Treatment ISSN (print): 0250-7005, ISSN (online): 1791-7530

VOLUME 45 2025

Editorial Board

P. A. Abrahamsson Department of Urology, Skåne University Hospital, Lund University, Malmö, Sweden

B. B. Aggarwal Director, Inflammation Research Center, San Diego, CA, USA

T. Akimoto Division of Particle Therapy and Department of Radiation Oncology, National Cancer Center East, Kashiwa,

Chiba, Japan

P. Z. Anastasiadis Department of Cancer Biology, Mayo Cancer Center, Jacksonville, FL, USA

A. Argiris Division of Hematology/Oncology, UT Health Science Center at San Antonio, San Antonio, TX, USA

J. P. Armand Institut Gustave Roussy, Paris, France

V. I. Avramis Division of Hematology/Oncology, Childrens Hospital, Los Angeles, CA, USA

D.-T. Bau Terry Fox Cancer Research Lab, China Medical University Hospital, Taichung, Taiwan, ROC

G. Bauer Abteilung Virologie, Institut für Medizinische Mikrobiologie und Hygiene, Universität Freiburg, Freiburg,

Germany

E. E. Baulieu INSERM U488 and College de France, Le Kremlin-Bicetre, France

E. J. Benz, Jr. Dana-Farber Cancer Institute, Boston, MA, USA

J.-Y. Blay Centre Léon Bérard, Lyon, France

J. Bergh Department of Clinical and Molecular Medicine, Radiumhemmet, Karolinska Institute, Stockholm, Sweden

F. T. Bosman Institute of Pathology, University of Lausanne, Lausanne, Switzerland

M. Bouvet Department of Surgery, University of California San Diego, Moores Cancer Center, La Jolla, CA, USA

J. Boyd Department of Human and Molecular Genetics, Herbert Wertheim College of Medicine, Florida International

University, Miami, FL, USA

G. Broich Gruppo Policlinico di Monza, Monza, Italy

Ø. S. Bruland Department of Medical Oncology-Radiotherapy, Norwegian Radium Hospital, Oslo, Norway

J. M. Buatti Department of Radiation Oncology, University of Iowa, Iowa City, IA, USA

M. Carbone Cancer Research Center of Hawaii, Honolulu, HI, USA

C. Carlberg Institute of Biomedicine, University of Eastern Finland, Kuopio, Finland

A. F. Chambers Department of Oncology, London Regional Cancer Center, London, Ontario, Canada

P. Chandra Abt. für Molekularbiologie, Klinikum Wolfgang Goethe-Universität, Frankfurt am Main, Germany

L. Cheng Department of Pathology, Indiana University School of Medicine, Indianapolis, IN, USA

J.-G. Chung Department of Biological Science and Technology, China Medical University, Taichung, Taiwan, ROC

R. Clarke Georgetown University Medical Center, Washington, DC, USA

A.P. Conley Department of Sarcoma Medical Oncology, University of Texas MD Anderson Cancer Center,

Houston, TX, USA

E. De Clercq Rega Institute for Medical Research, Katholieke Universiteit Leuven, Leuven, Belgium

E. P. Diamandis Department of Pathology and Laboratory Medicine, Mount Sinai Hospital, Toronto, Ontario, Canada

L. Egevad Department of Pathology, Karolinska University Hospital, Stockholm, Sweden
 D. W. Felsher Division of Oncology, Stanford University School of Medicine, Stanford, CA, USA

H. Fu Discovery and Developmental Therapeuticis Program of Winship Cancer Institute, Emory University, Atlanta,

GA, USA

B. Fuchs Balgrist University Hospital, Zurich, Switzerland

D. Fuchs Center for Chemistry and Biomedicine, Innsbruck Medical University, Innsbruck, Austria

D. Fukumura Edwin L. Steele Laboratories, Department of Radiation Oncology, Harvard Medical School, Boston, MA, USA

G. Gabbiani Department of Pathology, University of Geneva, Geneva, Switzerland
 R. Ganapathi Levine Cancer Institute, Carolinas HealthCare System, Charlotte, NC, USA

A. Giordano Sbarro Institute for Cancer Research, Temple University, Philadelphia, PA, USA

ANTICANCER RESEARCH 45: (2025)

M. Gnant Department of Surgery, Medical University of Vienna, Vienna, Austria

R. H. Goldfarb Sopherion Therapeutics, LLC and Translational Oncology and ImmunoEngineering

Consulting, Guilford, CT, USA

J.S. Greenberger Department of Radiation Oncology, University of Pittsburgh, Pittsburgh, PA, USA

A. Helland Oslo University Hospital-Radium Hospital, Oslo, Norway

L. Helson Sign Path Pharma, Inc., Quakertown, PA, USA

R. Henriksson
 Department of Experimental Oncology, Umeå University, Umeå, Sweden
 R. M. Hoffman
 Department of Surgery, University of California, San Diego, CA, USA

P. Hohenberger Division of Surgical Oncology and Thoracic Surgery, Medical Faculty, University of Heidelberg, Mannheim,

Germany

F. Janku Monte Rosa Therapeutics, Boston, MA, USA

S. C. Jhanwar Laboratory of Solid Tumor Genetics, Department of Medicine, Memorial Sloan-Kettering Cancer Center,

New York, NY, USA

J. V. Johannessen Department of Pathology, The Norwegian Radium Hospital, Oslo, Norway

R. Jones Sarcoma Unit, Royal Marsden Hospital, London, UK

B. Kaina Institute of Toxicology, University of Mainz, Mainz, Germany
 D. G. Kieback Helios Medical Center Schleswig, Schleswig, Germany
 R. Klapdor Medical Clinic, University of Hamburg, Hamburg, Germany

K.L. Knutson Department of Immunology, Mayo Clinic College of Medicine, Jacksonville, FL, USA

H. Kobayashi Laboratory of Molecular Theranostics, NCI/NIH, Bethesda, MD, USA
 S. D. Kottaridis Department of Virology, Hellenic Anticancer Institute, Athens, Greece

G. R. F. Krueger Center of Anatomy II, University of Cologne Medical School, Cologne, Germany

Pat M. Kumar

Department of Biological Sciences, Manchester Metropolitan University, Manchester, UK

Shant Kumar

Department Pathology, University of Manchester Medical School, Manchester, UK

F. J. Lejeune

Fondation du Centre Pluridisciplinaire d' Oncologie, CHUV, Lausanne, Switzerland

S. Linder Department of Medicine and Health, Linköping University, Linköping, Sweden

D. M. Lopez Department of Microbiology and Immunology, University of Miami School of Medicine, Miami, FL, USA

E. Lundgren Unit of Applied Cell and Molecular Biology, University of Umeå, Umeå, Sweden

Y. Maehara Department of Surgery and Science, Graduate School of Medical Sciences, Kyushu University, Fukuoka, Japan

J. Maher Department of Research Oncology, Division of Cancer Studies, King's College London School of Medicine,

Guy's Hospital Campus, London, UK

J. Marescaux IRCAD, University of Strasbourg, Strasbourg, France

S. S. Martin Department of Physiology, University of Maryland School of Medicine, Baltimore, MD, USA

S. Mitra The Methodist Hospital Research Institute (TMHRI), Houston, TX, USA

S. Miyamoto Department of Obstetrics and Gynecology, Faculty of Medicine, Fukuoka University, Fukuoka, Japan

S. Moncada Manchester Cancer Research Centre, University of Manchester, Manchester, UK

M. Mueller Hochschule Furtwangen University, Villingen-Schwenningen, Germany

M. Namiki Department of Integrative Cancer Therapy and Urology, Kanazawa University Graduate School of Medical

Science, Kanazawa City, Ishikawa, Japan

K. Nilsson Rudbeck Laboratory, Department of Genetics and Pathology, Uppsala University Hospital, Sweden

S. Pathak Department of Cell Biology, University of Texas, Houston, TX, USA

J. L. Persson Section for Experimental Cancer Research, Clinical Research Center, Lund University, Malmö, Sweden

G. J. Pilkington Department of Cellular and Molecules Neurooncology, School of Pharmacy and Biomedical Sciences,

University of Portsmouth, Uppsala, UK

C. D. Platsoucas College of Sciences, Old Dominion University, Norfolk, VA, USA

ANTICANCER RESEARCH 45: (2025)

A. Polliack Department of Haematology, Hadassah University Hospital and Medical School, Jerusalem, Israel

D. Rades Department of Radiation Oncology, University of Lübeck, Lübeck, Germany

M. Rigaud Laboratory Biochimie et Génétique Molecules, Faculté de Médecine de Limoges, Limoges, France

U. Ringborg
 Department of General Oncology, Karolinska Hospital, Stockholm, Sweden
 M. Roselli
 Department of Medical Oncology, University of Rome "Tor Vergata", Rome, Italy
 S.T. Rosen
 Comprehensive Cancer Center and Beckman Research Institute, Duarte, CA, USA
 M. Schauer
 Visceral and Thoracic Surgery, Augusta Krankenhaus, Düsseldorf, Germany
 M. Schneider
 Department of Organic Chemistry, Bergische University, Wuppertal, Germany

J. Sehouli Department of Gynecology, Center for Oncological Surgery, Charité Comprehensive Cancer Center, Berlin,

Germany

A. Seth Laboratory of Molecular Pathology, Sunnybrook Research Institute and University of Toronto, Toronto,

Ontario, Canada

G. V. Sherbet Cancer Research Unit, University of Newcastle-upon-Tyne, Newcastle-upon-Tyne, UK

R. E. Shackelford Department of Pathology, University of South Alabama, Mobile, AL, USA

A. Slominski Department of Dermatology, University of Alabama at Birmingham, Birmingham, AL, USA

G.-I. Soma Department of Integrated and Holistic Immunology, Faculty of Medicine, Kagawa University,

Kagawa, Japan

G. S. Stein Department of Biochemistry, College of Medicine, University of Vermont, Burlington, VT, USA

T. Stigbrand Department of Immunology, Umeå University, Umeå, Sweden

T. M. Theophanides Department of Chemistry, Technical University of Athens, Athens, Greece

P. M. Ueland Clinical Pharmacolocy Unit, Department of Pharmacology, University of Bergen, Bergen, Norway
 H. Van Vlierberghe Department of Gastroenterology and Hepatology, Ghent University Hospital, Ghent, Belgium

R.G. Vile Department of Immunology, Mayo Clinic, Rochester, MN, USA

M. Weller Department of Neurology, University Hospital Zurich, Zurich, Switzerland

J. Westermarck Centre for Biotechnology, University of Turku, Turku, Finland

B. Westermark Rudbecklaboratoriet, Department of Genetics and Pathology, University of Uppsala, Uppsala, Sweden

Y. Yen Taipei Medical University, Taipei, Taiwan, ROC

M. R. I. Young Ralph H. Johnson VA Medical Center, Medical University of South Carolina, Charleston, SC, USA

Acknowledgements

The IIAR appreciates the support of the following Foundations, Institutions, Organizations and Universities for the works published in Anticancer Research, Volume 44, 2024.

2023 Inje University Haeundae Paik Hospital Research Grant, Busan, Republic of Korea

ACC Research Institute, Tokyo, Japan

Agena Bioscience GmbH, Hamburg, Germany

Amiens University Hospital, Amiens, France

Anhui Province Funds for Distinguished Young Scientists, Hefei, P.R. China

Asahi Rosai Hospital, Nagoya, Japan

Asan Institute for Life Sciences, Asan Medical Center, Seoul, Republic of Korea

Asia University, Taichung, Taiwan, R.O.C.

Basel Cancer League, Basel, Switzerland

Basic Science Research Program through The National Research Foundation of Korea, Ministry of Education, Seoul, Republic of Korea

Bayer Pharma Japan, Tokyo, Japan

Bionics program, Tokyo University of Technology Graduate School, Tokyo, Japan

Biostatistics Shared Resource of University of Arkansas for Medical Sciences Winthrop P. Rockefeller Cancer Institute, Little Rock, AR, U.S.A.

BK21 plus program "AgeTech-Service Convergence Major", National Research Foundation (NRF), Ministry of Education of Korea, Seoul, Republic of Korea

Boramae Medical Center, Seoul, Republic of Korea

Cancer Center, Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan, R.O.C.

CancerFree Biotech, Taipei, Taiwan, R.O.C.

Cantal Pathology in Aurillac, Aurillac, France

Carna Biosciences Inc., Kobe, Japan

C-CAT, Tokyo, Japan

Cell Innovator, Kyushu University, Fukuoka, Japan

Center for Oncology Research (NPO/UFPA), Belém, Brazil

Center for Teaching Excellence at the National Dong Hwa University, Hualien, Taiwan, R.O.C.

Center for University-wide Research Facilities (CURF), Jeonbuk National University, Jeonju, Republic of Korea

Central Laboratory, Chulabhorn Hospital, Bangkok, Thailand

Central Research Institute of Fukuoka University, Fukuoka, Japan

Centre Jean Perrin biobank, Clermont-Ferrand, France

Chang Bing Show Chwan Memorial Hospital, Changhua, Taiwan, R.O.C.

Changhua Christian Hospital, Changhua, Taiwan, R.O.C.

Chiba Foundation for Health Promotion and Disease Prevention, Chiba, Japan

Children's Cancer Association of Japan, Tokyo, Japan

China Medical University Hospital Cancer Registry, Taichung, Taiwan, R.O.C.

China Medical University Hospital, Taichung, Taiwan, R.O.C.

China Medical University, Taichung, Taiwan, R.O.C.

China Postdoctoral Science Foundation, Beijing, P.R. China

Chosun University, Gwangju, Republic of Korea

Chung Shan Medical University, Taichung, Taiwan, R.O.C.

Clear Science Pty Ltd for language editing, Sydney, Australia

Collaborative Innovation Program of Hefei Science Center, Hefei, P.R. China

College of Pharmacy and Integrated Biosciences, University of Minnesota, Duluth, MN, U.S.A.

Commercialization Promotion Agency for R&D Outcomes, Seoul, Republic of Korea

Consejo Nacional de Humanidades, Ciencia y Tecnología (CONAHCYT), Mexico City, Mexico

Cooperation Program, TMDU, Sony Corporation and Sony Group Corporation, Tokyo, Japan

Coordenação de Aperfeiçoamento de Pessoal de Ensino Superior (CAPES-PROSUP), Brasília, Brazil

Core Research Facilities, Jikei University School of Medicine, Tokyo, Japan

Creative Pharma Services, Athens, Greece

Crown Bioscience Inc., Beijing, P.R. China

Daido Hospital, Nagoya, Japan

Dartmouth Cancer Center, Lebanon, NH, U.S.A.

Data Manager, Department of Surgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea

Department of Anatomic Pathology, Kyushu University, Fukuoka, Japan

Department of Biochemistry, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand

Department of Biology and the Science Institute at Fairfield University, Fairfield, CT, U.S.A.

- Department of Breast Surgical Oncology, Osaka Metropolitan University Graduate School of Medicine, Osaka, Japan
- Department of Chemistry and Biochemistry, University of Minnesota Duluth, Duluth, MN, U.S.A.
- Department of Gastroenterology, Chiba Cancer Center, Chiba, Japan
- Department of Gastrointestinal Surgery, Graduate School of Medicine, University of Tokyo, Tokyo, Japan
- Department of Gastrointestinal Surgery, Kobe University, Kobe, Japan
- Department of Medical Oncology, National Cancer Center Hospital East, Chiba, Japan
- Department of Medical Statistics, Biomathematics and Information Processing, Medical Faculty Mannheim, University of Heidelberg, Mannheim, Germany
- Department of Medicine, Clinic III, Hematology, Oncology, and Palliative Medicine, University Medical Center Rostock, Rostock, Germany
- Department of Musculoskeletal Oncology and Rehabilitation, National Cancer Center Hospital, Tokyo, Japan
- Department of Musculoskeletal Oncology, National Hospital Organization Hokkaido Cancer Center, Sapporo, Japan
- Department of Natural Resources and Environmental Studies, College of Environmental Studies, National Dong Hwa University, Hualien, Taiwan, R.O.C.
- Department of Orthopaedic Surgery, Science of Functional Recovery and Reconstruction, Faculty of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, Okayama, Japan
- Department of Orthopedic Oncology, Cancer Institute Hospital of the Japanese Foundation for Cancer Research, Tokyo, Japan
- Department of Pathobiology, Faculty of Science, Mahidol University, Bangkok, Thailand
- Department of Pathology, Massachusetts General Hospital and Harvard Medical School, Boston, MA, U.S.A.
- Department of Pathology, Nikko Medical Center, Dokkyo Medical University, Tochigi, Japan
- Department of Radiation Oncology, International Medical Center, Saitama Medical University, Saitama, Japan
- Department of Rehabilitation, Nagoya University Hospital, Aichi, Japan
- Department of Surgery, Hiroshima City Asa Hospital, Hiroshima, Japan
- Department of Surgery, Kochi Medical School, Kochi, Japan

- Department of Surgery, Teikyo University, Tokyo, Japan Department of Surgery, Wakayama Medical University, Wakayama, Japan
- Department of Upper GI Surgery, Osaka Rosai Hospital, Osaka, Japan
- Department of Urology, Hamamatsu University School of Medicine, Hamamatsu, Japan
- Department of Urology, Hiroshima City Asa Hospital, Hiroshima, Japan
- Department of Urology, Tokyo Women's Medical University, Tokyo, Japan
- Des Moines University, Des Moines, IA, U.S.A.
- DGIST, Daegu, Republic of Korea
- Division of Clinical and Translational Research Center, Kobe University Hospital, Kobe, Japan
- Division of Orthopedic Surgery, Department of Regenerative and Transplant Medicine, Niigata University Graduate School of Medical and Dental Sciences, Niigata, Japan
- Dmed, Tokyo, Japan
- E-Da Cancer Hospital, Kaohsiung, Taiwan, R.O.C.
- Eisai Co. Ltd., Tokyo, Japan
- Eisai Co., Ltd., Tokyo, Japan
- Emergency Aid Program for "Refugee Scientists from Ukraine," Lübeck, Germany
- Emergency Aid Program for the Support of Refugee Academics from Ukraine, Germany
- Epidemiological & Clinical Research Information Network (ECRIN), Paris, France
- Erasmus Mundus ACES+, Brussels, Belgium, EU
- Erasmus+ Programme, Brussels, Belgium, EU
- European Regional Development Fund, Interreg Deutschland-Danmark Programme, Flensburg, Germany
- European Regional Development Fund, Interreg V-A Romania-Hungary Programme, Budapest, Hungary
- Federal University of ABC, Santo André, Brazil
- Federal University of Pará (UFPA), Belém, Brazil
- Florida A & M University TITLE III funding, Tallahassee, FL, U.S.A.
- Fobic Pharma of Hanoi, Hanoi, Vietnam
- FUJIFILM Toyama Chemical Co., Ltd., Tokyo, Japan
- Fujita Health University, Toyoake, Japan
- Fujiyoshida City Hospital, Fujiyoshida, Japan
- Fukuoka Foundation for Sound Health Cancer Research Fund, Fukuoka, Japan
- Fukuoka University, Fukuoka, Japan

Fundação de Amparo ao Ensino e Pesquisa do Estado de São Paulo, São Paulo, Brazil

Funds for Gold Ribbon Network, Tokyo, Japan

Gene Expression Omnibus and The Cancer Genome Atlas, Bethesda, MD, U.S.A.

German Egyptian Social & Scientific Relationships e.V. (GESR), Cairo, Egypt

German Society for Otorhinolaryngology (ASSE), Cologne, Germany

Graduate School of Pharmaceutical Sciences, Tohoku University, Sendai, Japan

Grant of Japan Orthopaedics and Traumatology Research Foundation, Tokyo, Japan

Grant of the Clinical Research Promotion Foundation, Fukuoka, Japan

Grant-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science and Technology of the Japanese Government, Tokyo, Japan

Grant-in-Aid from the Kakihara Science and Technology Foundation, Fukuoka, Japan

Grants-in-Aid for Scientific Research, Japan Society for the Promotion of Science, Tokyo, Japan

Grants-in-Aid for Scientific Research, Ministry of Education, Culture, Sports, Science and Technology of Japan, Tokyo, Japan

Gunma Oncological Surgery Group (GOSG), Maebashi, Japan Gunma University Graduate School of Medicine, Maebashi, Japan

Gunma University Hospital, Maebashi, Japan Gyeongsang National University, Jinju, Republic of Korea

HD Pharma, Ladenburg, Germany
Health and Welfare Data Science Center, Ministry of
Health and Welfare, Executive Yuan, Taiwan, R.O.C.

Health Data Science Center, China Medical University Hospital, Taichung, Taiwan, R.O.C.

Health Data Science Center, National Cheng Kung University Hospital, Tainan, Taiwan, R.O.C.

Healthcare Service Research Center, Department of Medical Research, Taichung Veterans General Hospital, Taichung, Taiwan, R.O.C.

Higher Education Sprout Project, Ministry of Education to the Headquarters of University Advancement at National Cheng Kung University (NCKU), Tainan, Taiwan, R.O.C.

Hikari Hospital, Hikari, Japan

Hungarian Academy of Sciences, Budapest, Hungary Hungarian Research Foundation, Budapest, Hungary Idaho INBRE Program, Moscow, ID, U.S.A.

Imai Hospital, Tokyo, Japan

Immuno Probe Co., Ltd, Tokyo, Japan

Innovative Clinical Research Center, Kanazawa University, Kanazawa, Japan

Inoue Enryou Memorial Foundation, Toyo University, Tokyo, Japan

Institute for Cancer Genetics and Informatics, Oslo, Norway

Institute of Biochemistry, Biotechnology and Bioinformatics, Technical University of Braunschweig, Braunschweig, Germany

Intractable Disease Research Center, Juntendo University Graduate School of Medicine, Tokyo, Japan

Istituto Nazionale Tumori IRCCS Fondazione Pascale, Naples, Italy

Italian Ministry of Health Ricerca Corrente Project, Rome, Italy

János Bolyai Research Scholarship, Budapest, Hungary Japan Medical Women's Association, Tokyo, Japan Japan Society for the Promotion of Science (JSPS) Grantin-Aid for Early-Career Scientists and Scientific Research (C), Tokyo, Japan

Japan Society for the Promotion of Science, Tokyo, Japan Japan Surgical Society (JSS) Young Researcher Award, Tokyo, Japan

Japanese CART Study Group, Tokyo, Japan JPSP KAKENHI, Tokyo, Japan

Kagoshima Shinsangyo Sousei Investment Limited Partnership, Kagoshima Development Co., Ltd., Kagoshima, Japan

Kaibara Morikazu Medical Science Promotion Foundation, Fukuoka, Japan

Kainan Hospital, Yanaizu, Japan

Kanae Foundation for the Promotion of Medical Science, Tokyo, Japan

Kanagawa Cancer Center, Yokohama, Japan

Kanetsu Central Hospital, Gunma, Japan

Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan, R.O.C.

Kato Memorial Bioscience Foundation, Tokyo, Japan

Kawasaki Medical School, Kurashiki, Japan

KeiHokkaido Hospital, Hokkaido, Japan

Kobayashi Foundation, Tokyo, Japan

Köln Fortune, Cologne, Germany

Korea Chemical Bank, Daejeon, Republic of Korea

Korea government (MSIT), Seoul, Republic of Korea

Korea Health Technology R&D Project, Korea Health Industry Development Institute (KHIDI), Ministry of Health & Welfare, Seoul, Republic of Korea

Korea Medical Device Development Fund Grant, Seoul, Republic of Korea

Korea University, Seoul, Republic of Korea

Korean Society of Medical Oncology, Seoul, Republic of Korea

Kouseikai Takai Hospital, Osaka, Japan

KRIBB Research Initiative Program, Daejeon, Republic of Korea

La Ligue Contre le Cancer, Paris, France

Laboratory Animals and Genome Sciences Section, Tokyo, Japan

Laboratory of Clinical and Translational Physiology, Kyoto Pharmaceutical University, Kyoto, Japan

Laboratory of Molecular and Biochemical Research, Biomedical Research Core Facilities, Juntendo University Graduate School of Medicine, Tokyo, Japan

Ligue Contre le Cancer, Comité de l'Aisne, Aisne, France Ligue Régionale Contre le Cancer, French Departments

Puy de Dôme and Allier, Clermont-Ferrand, France

Lotte Foundation, Tokyo, Japan

Lviv Medical Academy, Lviv, Ukraine

Maccabi Healthcare Services, Tel Aviv, Israel Maebashi Red Cross Hospital, Maebashi, Japan Medical Care Education Research Foundation, Fukuoka, Japan

Medical Research Core Facilities Center, Office of Research & Development, China Medical University, Taichung, Taiwan, R.O.C.

Medical Research Funds, Kangbuk Samsung Hospital, Seoul, Republic of Korea

Medical Scientific Research Foundation of Guangdong Province, Guangdong, P.R. China

Meharry Medical College Instructional and Informational Technology Services, Nashville, TN, U.S.A.

Meizhou People's Hospital, Guangdong, P.R. China

Ministry for Innovation and Technology, National Research, Development and Innovation Fund, Hungary, Budapest, Hungary

Ministry of Agriculture, Food and Rural Affairs of Seoul, Seoul, Republic of Korea

Ministry of Education, Culture, Sports, Science, and Technology (MEXT) of Japan, Tokyo, Japan

Ministry of Food and Drug Safety, Seoul, Republic of Korea

Ministry of Health & Welfare, Seoul, Republic of Korea Ministry of Health, Czech Republic – (Thomayer University Hospital), Prague, Czech Republic

Ministry of Health, Prague, Czech Republic

Ministry of Human Capacities, Hungary, Budapest, Hungary

Ministry of Science and ICT, Development Project for Emerging Research Instruments Technology, Seoul, Republic of Korea

Ministry of Science and ICT, Seoul, Republic of Korea Ministry of Science and Technology of Seoul, Republic of Korea

Ministry of Science and Technology, Taipei, Taiwan, R.O.C.

Ministry of Trade, Industry and Energy, Seoul, Republic of Korea

MoH – Ricerca Corrente 2023, Rome, Italy

Molecular Oncologic Pathology, Department of Pathology and Host-Defense, Faculty of Medicine, Kagawa University, Kagawa, Japan

Mountain States Tumor and Medical Research Institute, Boise, ID, U.S.A.

Nagoya City University East Medical Center, Nagoya, Japan

Nara Medical University Library, Kashihara, Japan National Cancer Institute, Bethesda, MD, U.S.A.

National Natural Science Foundation of China, Beijing, P.R. China

National Research Foundation of Korea (NRF) Grant, Korean Government (MSIT), Seoul, Republic of Korea

National Research Foundation of Korea (NRF), Seoul, Republic of Korea

National Science and Technology Council, Taiwan, Taipei, Taiwan, R.O.C.

Natural Science Foundation of Shandong Province, Jinan, P.R. China

NCI Cancer Center, Bethesda, MD, U.S.A.

Nihon University, Tokyo, Japan

Ningxia Natural Science Foundation, Yinchuan, P.R. China

Nishi-Gunma Hospital, Shibukawa, Japan

North Savo Regional Fund (Pohjois-Savon

Maakuntarahasto), Kuopio, Finland

Nova Southeastern University, Health Professions Division, Fort Lauderdale, FL, U.S.A.

Numata Hospital, Numata, Japan

Ogawa Red Cross Hospital, Gunma, Japan Ojiya Hospital, Ojiya, Japan Ooki Sangyo Co., Ltd., Tokyo, Japan Osaka Heavy Ion Therapy Center, Osaka, Japan

Pathologic Anatomy Laboratory, Tulle Hospital, Tulle, France

Pathological Center of Nevers, Nevers, France

Pathology Information and Learning Center, Department of Pathobiology, Faculty of Science, Mahidol University, Bangkok, Thailand

Project of Postdoctoral Innovation of Shandong Province, Jinan, P.R. China

Promega Corporation, Madison, WI, U.S.A.

Pró-Reitoria de Pesquisa e Pós-Graduação da UFPA (PROPESP), Belém, Brazil

Prostate Cancer Foundation, Santa Monica, CA, U.S.A.

Proteros Biostructures GmbH, Martinsried, Germany Pusan National University, Busan, Republic of Korea

Randy Shaver Cancer Research and Community Fund, Minneapolis, MN, U.S.A.

Research Equipment Sharing Center at the Nagoya City University, Nagoya, Japan

Research Project with Heavy Ions at National Institutes for Quantum Science and Technology Heavy-ion Medical Accelerator in Chiba, Chiba, Japan

RIKEN GENESIS Co., Ltd., Tokyo, Japan

Ryukyu Society for the Promotion of Oto-Rhino-Laryngology, Okinawa, Japan

Saint Louis University Hospital, Saint Louis, MO, U.S.A.

Saint Louis Veteran's Affairs Medical Center, Saint Louis, MO, U.S.A.

Saitama Cancer Center Pathology Division, Saitama, Japan Samsung Medical Center Grant, Seoul, Republic of Korea Samsung Medical Center HCC Registry Team, Seoul, Republic of Korea

Sapporo Medical University Urologic Oncology Consortium (SUOC), Sapporo, Japan

SCADS Inhibitor kit, Screening Committee of Anticancer Drugs, Tokyo, Japan

Scholarship Fund for Young Researchers, Tokyo, Japan

School of Chemical Sciences at the Universidad Autonoma de Nuevo León, Monterrey, Mexico

Science and Technology Program of Meizhou, Meizhou, P.R. China

Scientific Research and Cultivation Project of Meizhou People's Hospital, Meizhou, P.R. China

Section for Clinical Genomics and Advanced Technology of the Department of Pathology and Laboratory Medicine, Dartmouth Hitchcock Health System, Lebanon, NH, U.S.A.

Seiichi Imai Memorial Foundation, Fukuoka, Japan

Seoul Metropolitan Government, Seoul National University (SMG-SNU), Seoul, Republic of Korea

Sheba Medical Center, Tel Aviv, Israel

Shibukawa General Hospital, Shibukawa, Japan

Shin-Kong Wu Ho-Su Memorial Hospital, Taipei, Taiwan, R.O.C.

Shizuoka Cancer Center Hospital, Shizuoka, Japan Shizuoka Cancer Center Research Institute, Shizuoka, Japan

Show Chwan Memorial Hospital, Changhua, Taiwan, R.O.C.

Showa University Fujigaoka Hospital, Yokohama, Japan

Showa University Research Administration Center, Showa University, Tokyo, Japan

SIPATH Unilabs, Clermont-Ferrand, France

Society for Women's Health Science Research, Osaka, Japan

Sookmyung Women's University, Seoul, Republic of Korea StaGen Co., Tokyo, Japan

Starting Growth Technological R&D Program, Ministry of SMEs and Startups (MSS, Korea), Seoul, Republic of Korea

State of Florida, Tallahassee, FL, U.S.A.

Sumitomo Heavy Industries, Ltd., Tokyo, Japan

Sunplanet Co., Ltd., Tokyo, Japan

Surveillance, Epidemiology, and End Results (SEER) Program, Bethesda, MD, U.S.A.

Taichung Armed Forces General Hospital, Taichung, Taiwan, R.O.C.

Taichung Tzu Chi Hospital, Taichung, Taiwan, R.O.C. Taichung Veterans General Hospital, Taichung, Taiwan, R.O.C.

Takasaki General Medical Center, Takasaki, Japan Tatebayashi Kosei Hospital, Tatebayashi, Japan

TCGA Research Network, Center for Cancer Genomics, National Cancer Institute, Bethesda, MD, U.S.A.

The Hamaguchi Foundation for the Advancement of Biochemistry, Tokyo, Japan

The League Against Cancer Prague, Prague, Czech Republic

The Mother and Child Health Foundation, Tokyo, Japan The Naito Foundation, Tokyo, Japan

The Robert M. Hoffman Foundation for Cancer Research, U.S.A.

Tissue-bank of China Medical University Hospital, Taichung, Taiwan, R.O.C.

Toho Hospital, Tokyo, Japan

Tokyo University of Science, Tokyo, Japan

Tokyo Women's Medical University Adachi Medical Center, Tokyo, Japan

Tourangelle Association for Research in Oncology in the Loire Valley (AT-ROVL), Tours, France

Translation Research Core, China Medical University Hospital, Taichung, Taiwan, R.O.C.

Translational Cell Biology Core Facility, Kontinkangas Campus, Oulu, Finland

Tsuru Municipal Hospital, Tsuru, Japan

U.S. Department of Education, Washington, DC, U.S.A.
Uehara Memorial Foundation, Tokyo, Japan
University Hospital Marburg, Marburg, Germany
University of Illinois Research Resources Center and Carver Biotechnology Center, Urbana-Champaign, IL, U.S.A.
University of Lübeck, Lübeck, Germany
University of Pittsburgh Cancer Institute, Pittsburgh, PA, U.S.A.
University of Stellenbosch, Stellenbosch, South Africa
University of Texas M.D. Anderson Cancer Center,
Houston, TX, U.S.A.

University of Yamanashi, Yamanashi, Japan University Research Committee grants, Idaho State University, Pocatello, ID, U.S.A. UNM Comprehensive Cancer Center Support Grant NCI,

USF research computing, Tampa, FL, U.S.A.

Albuquerque, NM, U.S.A.

Vehicle Racing Commemorative Foundation, Tokyo, Japan Victor Babes University of Medicine and Pharmacy Timisoara, Timisoara, Romania

Vietnam National Foundation for Science and Technology Development (NAFOSTED), Hanoi, Vietnam Vivli, Inc., Cambridge, MA, U.S.A.

Whiteside Clinical Research Institute, Minneapolis, MN, U.S.A.

Working Group for Carbon Ion Radiotherapy for Bone and Soft Tissue Sarcomas, Chiba, Japan

Yokohama Surgical Research Group (YSRG), Yokohama, Japan

Yokoyama Surgical Research Group, Yokohama, Japan Yuanzhi Scholarship, Cardiff University School of Medicine, Cardiff, U.K.

