

in vivo

International Journal of Experimental and Clinical Pathophysiology and Drug Research

Volume 36, Number 1, January-February 2022

Contents

Reviews

- Complications of Trans-oral Endoscopic Thyroidectomy Vestibular Approach: A Systematic Review. E. AKRITIDOU, G. DOURIDAS, E. SPARTALIS, G. TSOUROUFLIS, D. DIMITROULIS, N.I. NIKITEAS (Athens, Greece) 1
- The Impact of ACE and ACE2 Gene Polymorphisms in Pulmonary Diseases Including COVID-19. I. GINTONI, M. ADAMOPOULOU, C. YAPIJAKIS (Athens, Greece) 13
- Revision of Roux-en-Y Gastric Bypass for Inadequate Weight Loss or Weight Regain. A. ALEXANDROU, P. SAKARELLOS, S. DAVAKIS, M. VAILAS, N. DIMITRIOU, A. PAPALAMPROS, D. SCHIZAS, A. CHARALABOPOULOS, E. FELEKOURAS (Athens, Greece)..... 30
- Ocular Side Effects of Aromatase Inhibitor Endocrine Therapy in Breast Cancer – A Review. D. SERBAN, D.O. COSTEA, A. ZGURA, M.S. TUDOSIE, A.M. DASCALU, G.A. GANGURA, C.G. SMARANDACHE, A.D. SABAU, C. TUDOR, M. FAUR, A.C. COSTEA, D. STANA, S.A. BALASESCU, L.C. TRIBUS, C. TANASESCU (Bucharest; Constanta; Sibiu, Romania)..... 40

Experimental Studies

- Thoracic Neuroblastoma: A Novel Surgical Model for the Study of Extra-adrenal Neuroblastoma. C.N. GRANT, C.A. WILLS, X. LIU, V.S. SPIEGELMAN, H.-G. WANG (Hershey, PA, USA) 49
- Fluorescent Anti-MUC5AC Brightly Targets Pancreatic Cancer in a Patient-derived Orthotopic Xenograft. M.A. TURNER, H.M. HOLLANDSWORTH, H. NISHINO, S. AMIRFAKHRI, T.M. LWIN, A.M. LOWY, S. KAUR, G. NATARAJAN, K. MALLYA, R.M. HOFFMAN, S.K. BATRA, M. BOUVET (La Jolla; San Diego, CA; Omaha, NE, USA) 57
- In Vitro* Analysis of the Cytocompatibility of a Novel Porcine Aortic Patch for Vascular Reconstruction. S. PANTERMEHL, S. ALKILDANI, E. MEYER, I. STOWE, J. PISSAREK, P. MOOSMANN, O. JUNG, M. BARBECK (Rostock; Berlin, Germany)..... 63
- Comparison of Macro-and Micro-porosity of a Titanium Mesh for Guided Bone Regeneration: An *In Vivo* Experimental Study. M. SENOO, A. HASUIKE, T. YAMAMOTO, Y. OZAWA, N. WATANABE, M. FURUHATA, S. SATO (Tokyo, Japan) 76

in vivo

International Journal of Experimental and Clinical Pathophysiology and Drug Research



ISSN (print): 0258-851X, ISSN (online): 1791-7549

Editorial Board

- I. ABRAHAM, Tucson, AZ, USA
N. J. AGNANTIS, Ioannina, Greece
D. ANDERSON, Bradford, West Yorkshire, UK
V. BARAK, Jerusalem, Israel
M. H. BARCELLOS-HOFF, New York, NY, USA
K. BEIER, Basel, Switzerland
M. BERGQVIST, Uppsala, Sweden
R. BJERKVIG, Bergen, Norway
W. BOWNE, Philadelphia, PA, USA
M. CARAGLIA, Naples, Italy
P. CHANDRA, Frankfurt am Main, Germany
J.-G. CHUNG, Taichung, Taiwan, ROC
L. A. COHEN, Northampton, MA, USA
A. I. CONSTANTINOU, Nicosia, Cyprus
T. DALIANIS, Stockholm, Sweden
D. T. DENHARDT, Bridgewater, NJ, USA
W. DEN OTTER, Amsterdam, The Netherlands
K. DE MEIRLEIR, Brussels, Belgium
L. DE RIDDER, Ghent, Belgium
E. P. DIAMANDIS, Toronto, ON, Canada
J.M. DRAKE, MN, USA
T. EFFERTH, Mainz, Germany
W. ENGSTRÖM, Uppsala, Sweden
M. ESKELINEN, Kuopio, Finland
J. A. FERNANDEZ-POL, Chesterfield, MO, USA
G. FIORENTINI, Pesaro, Italy
P. B. FISHER, New York, NY, USA
I. FREITAS, Pavia, Italy
M. FRIEDRICH, Krefeld, Germany
R. E. FRIEDRICH, Hamburg, Germany
R. GANAPATHI, Charlotte, NC, USA
V. GORGOLIS, Athens, Greece
J. S. GREENBERGER, Pittsburgh, PA, USA
J. W. GREINER, Bethesda, MD, USA
C. J. GRUBBS, Birmingham, AL, USA
F. GUADAGNI, Rome, Italy
J. HAU, Copenhagen, Denmark
M. HAUER-JENSEN, Little Rock, AR, USA
M. JHANWAR-UNIYAL, Valhalla, NY, USA
I. KISS, Pécs, Hungary
M. KOUTSILIERIS, Athens, Greece
G. R. F. KRUEGER, Köln, Germany
N. KYPRIANOU, Lexington, KY, USA
G. LANDBERG, Lund, Sweden
J. LEROY, Strasbourg, France
W. LICHTENEGGER, Berlin, Germany
J. LYKKESFELDT, Frederiksberg, Denmark
- P. MADARNAS, Sherbrooke, QC, Canada
H. MAEDA, Kumamoto, Japan
M. MAREEL, Ghent, Belgium
L. MARGOLIS, Bethesda, MD, USA
G. MARTORANA, Bologna, Italy
J. MOLNÁR, Szeged, Hungary
S.L. MOOBERRY, San Antonio, TX, USA
N. MOTOHASHI, Tokyo, Japan
R. M. NAGLER, Haifa, Israel
S. NAKANO, Fukuoka, Japan
M. NAKASHIMA, Nagasaki, Japan
M.B. NICHOLL, San Antonio, TX, USA
K. NILSSON, Uppsala, Sweden
K. R. NORUM, Oslo, Norway
K. OGAWA, Tokyo, Japan
M. PAGÉ, Laval, QC, Canada
C. POLYCHRONAKOS, Montreal, QC, Canada
M.-F. POUPON, Paris, France
D. RADES, Lübeck, Germany
F. M. ROBERTSON, Richmond, VA, USA
D. RUBELLO, Rovigo, Italy
C. A. RUBIO, Stockholm, Sweden
G. R. RUTEMAN, Utrecht, The Netherlands
H. SAKAGAMI, Saitama, Japan
G. SAVA, Trieste, Italy
L. D. SHULTZ, Bar Harbor, ME, USA
G. SICA, Rome, Italy
J. SIEGFRIED, Minneapolis, MN, USA
J. SLANSKY, Denver, CO, USA
R. M. SNAPKA, Columbus, OH, USA
G.-I. SOMA, Kagawa, Japan
P. P. SORDILLO, New York, NY, USA
T. A. SPRINGER, Boston, MA, USA
D. D. SPYROPOULOS, Charleston, SC, USA
K. SYRJÄNEN, Helsinki, Finland
G. C. TORRE, Finale Ligure (SV), Italy
B. TRIBUKAIT, Stockholm, Sweden
J. VADGAMA, Los Angeles, CA, USA
J.K. VISHWANATHA, Fort Worth, TX, USA
W. WANG, Wolverhampton, UK
N. WATANABE, Sapporo, Japan
W. WEBER, Basel, Switzerland
L. M. WEINER, Washington, DC, USA
J. A. WERNER, Marburg, Germany
S. YLÄ-HERTTUALA, Kuopio, Finland
H. YOSHIDA, Kagoshima, Japan

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

Editorial Office: journals@iiar-anticancer.org
Managing Editor: editor@iiar-anticancer.org

For more information about IN VIVO, IJAR and the International Conferences of Anticancer Research, please visit the IJAR website: www.iiar-anticancer.org

J. G. DELINASIOS, Athens, Greece
Managing Editor and Executive Publisher
(1987-2016)

Editorial Office: International Institute of Anticancer Research, 1st km Kapandritiou-Kalamou Rd., Kapandriti, P.O. Box 22, Attiki 19014, Greece. Tel / Fax: +30-22950-53389. e-mail: journals@iiar-anticancer.org.

U.S. Branch: Anticancer Research USA, Inc., 111 Bay Avenue, Highlands, NJ, 07732, USA. e-mail: journals@iiar-anticancer.org.

General Policy: IN VIVO is a multidisciplinary journal designed to bring together original high quality works and reviews on experimental and clinical biomedical research within the framework of human physiology, pathology and disease management. The topics of IN VIVO include: 1. Experimental development and application of new diagnostic and therapeutic procedures; 2. Pharmacological and toxicological evaluation of new drugs, drug combinations and drug delivery systems; 3. Clinical trials; 4. Development and characterization of models of biomedical research; 5. Cancer diagnosis and treatment; 6. Immunotherapy and vaccines; 7. Radiotherapy, Imaging; 8. Tissue engineering, Regenerative medicine; 9. Carcinogenesis; 10. Retrospective studies and case reports.

IN VIVO supports: (a) the activities of the INTERNATIONAL INSTITUTE OF ANTICANCER RESEARCH (IIAR; Kapandriti, Attiki, Greece) and (b) the organization of the International Conferences of Anticancer Research (www.iiar-anticancer.org).

Publication Data: IN VIVO is published bimonthly online-only and open access by the International Institute of Anticancer Research. Each annual volume comprises six issues. Annual Author and Subject Indexes are included in the sixth issue of each volume. IN VIVO Vol. 18 (2004) and onwards appears online with HighWire Press. All published articles are deposited in PubMed Central.

Copyright: Authors retain copyright. The unrestricted non-commercial use, distribution and reproduction in any medium of IN VIVO articles for academic reasons is allowed, provided that the original work is properly cited. The Authors grant the permanent right to the publisher to use any articles published in this journal without any restriction, including academic advertising purposes. PDF, XML and HTML files of all articles published in IN VIVO are the property of the publisher.

Open Access Policy: Open Access Policy: IN VIVO appears bimonthly as an online-only open access journal through the Stanford University HighWire Press. Upon acceptance, Authors will be asked to contribute an online publication fee of US\$ 800 for articles up to 8 online pages (including figures and tables). Each additional excess page will be charged US\$ 60,00. Color will not be charged. Authors from developing countries may apply for a 25% discount after the acceptance of their paper. IN VIVO online will keep the volume, issue, and page numbering.

Articles in IN VIVO are regularly indexed in bibliographic services, including Current Contents Life Sciences and Medical Sciences, Index Medicus, PubMed, PubMed Central, MEDLINE, Biological Abstracts, Chemical Abstracts, BIOSIS Previous, Science Citation Index Expanded, Essential Science Indicators, Chemical Abstracts, Excerpta Medica, Elsevier Bibliographic Database, EMBASE, Compendex, GEOBASE, EMBiology, Elsevier BIOBASE, FLUIDEX, World Textiles, Scopus, CANCER-LIT Database, University of Sheffield Biomedical Information Service (SUBIS), Current Clinical Cancer, AIDS Abstracts, Progress in Palliative Care, Update-Research Information Systems Inc., Inpharma-Reactions Dastar, BRS), Reference Update (I.S.I.), Research Alert, Biochemistry & Biophysics Citation (I.S.I.), BioBase, MedBase, Google Scholar, Investigational Drugs Database, VINITI Abstracts Journal, PubsHub, SIIC Data Bases.

The Editors and Publishers of IN VIVO accept no responsibility for the opinions expressed by the contributors or for the content of advertisements appearing therein.

All correspondence status of submitted manuscripts, change of address, general editorial matters, advertising rate requests) should be addressed to the Editorial Office, e-mail: journals@iiar-anticancer.org. Articles should be submitted only through our online submission system (www.iiar-submissions.com).

Copyright© 2022, International Institute of Anticancer Research (Dr. George J. Delinasios), All rights reserved

in vivo

**International Journal of Experimental and
Clinical Pathophysiology and Drug Research**

ISSN (print): 0258-851X; ISSN (online): 1791-7549

**Volume 36
2022**

This volume is dedicated to the memory of

D. SCHIFFER, Vercelli, Italy

Editorial Board

I. ABRAHAM	The HOPE Center, University of Arizona, Tucson, AZ, USA
N.J. AGNANTIS	Department of Pathology, University of Ioannina, Ioannina, Greece
D. ANDERSON	Department of Biomedical Sciences, University of Bradford, Bradford, West Yorkshire, UK
V. BARAK	Department of Oncology, Hadassah University Hospital, Jerusalem, Israel
M.H. BARCELLOS-HOFF	Department of Radiation Oncology, New York University School of Medicine, New York, NY, USA
K. BEIER	Department of Histology, University of Basel, Basel, Switzerland
M. BERGQVIST	Department of Oncology, Radiology and Clinical Immunology, University Hospital, Uppsala, Sweden
R. BJERKVIK	Norlux Neuro-Oncology, Department of Biomedicine, University of Bergen, Bergen, Norway
W. BOWNE	Department of Surgery, Drexel University College of Medicine, Philadelphia, PA, USA
M. CARAGLIA	Department of Experimental Oncology, National Institute of Tumours Fondazione G. Pascale, Naples, Italy
P. CHANDRA	Department of Molecular Biology, Frankfurt University, Frankfurt am Main, Germany
J.-G. CHUNG	Department of Medicine, China Medical College, Taichung, Taiwan, ROC
L.A. COHEN	Northampton, MA, USA
A.I. CONSTANTINOU	Department of Biological Sciences, University of Cyprus, Nicosia, Cyprus
T. DALIANIS	Department of Pathology-Oncology, Karolinska Institute, Stockholm, Sweden
D.T. DENHARDT	Division of Life Sciences, Rutgers University, Bridgewater, NJ, USA
W. DEN OTTER	VUMC - Department of Urology, Amsterdam, The Netherlands
K. DE MEIRLEIR	Department of Human Physiology and Medicine, Faculty of Physical Education and Physiotherapy, Vrije Universiteit Brussel, Brussels, Belgium
L. DE RIDDER	Department of Anatomy, Embryology and Histology, University of Ghent, Ghent, Belgium
E.P. DIAMANDIS	Department of Pathology and Laboratory Medicine, University of Toronto, Toronto, Ontario, Canada
J.M. DRAKE	Department of Pharmacology, University of Minnesota Medical School, Minneapolis, MN, USA
T. EFFERTH	Department of Pharmaceutical Biology, Institute of Pharmacy and Biochemistry, University of Mainz, Mainz, Germany
W. ENGSTRÖM	Department of Molecular Biosciences, Swedish University of Agricultural Sciences, Uppsala, Sweden
M. ESKELINEN	Department of Surgery, University Hospital of Kuopio, Kuopio, Finland
J.A. FERNANDEZ-POL	Metalloproteomics, LLC, Chesterfield, MO, USA
G. FIORENTINI	UOC Oncologia, Azienda Ospedaliera Marche Nord, Pesaro, Italy
P.B. FISHER	Virginia Commonwealth University, School of Medicine, Richmond, VA, USA
I. FREITAS	Dipartimento di Biologia Animale, University of Pavia, Pavia, Italy
M. FRIEDRICH	Department of Obstetrics and Gynecology, Klinikum Krefeld, Krefeld, Germany
R.E. FRIEDRICH	Department of Oral and Maxillofacial Surgery, Eppendorf University Hospital, Hamburg, Germany
R. GANAPATHI	Levine Cancer Institute, Carolinas HealthCare System, Charlotte, NC, USA
V. GORGOLIS	Department of Histology-Embryology, Medical School, University of Athens, Athens, Greece
J.S. GREENBERGER	Department of Radiation Oncology, University of Pittsburgh, Pittsburgh, PA, USA
J.W. GREINER	National Cancer Institute, NIH, Bethesda, MD, USA
D.S. GRIDLEY	Department of Radiation Medicine, Radiation Research Laboratories, Loma Linda University and Medical Center, Loma Linda, CA, USA
C.J. GRUBBS	Department of Nutrition Sciences, University of Alabama, Birmingham, AL, USA
F. GUADAGNI	IRCCS San Raffaele, Rome, Italy
J. HAU	Department of Comparative Medicine, University of Copenhagen, Copenhagen, Denmark
M. HAUER-JENSEN	Arkansas Cancer Research Center, University of Arkansas Medical Sciences, Little Rock, AR, USA
M. JHANWAR-UNIYAL	Department of Neurosurgery, New York Medical College, Valhalla, NY, USA

- I. KISS** Institute of Preventive Medicine, Medical School, University of Pécs, Pécs, Hungary
- M. KOUTSILIERIS** Department of Experimental Physiology, University of Athens Medical School, Athens, Greece
- G.R.F. KRUEGER** Department of Anatomy II, Center for Anatomy, The University of Cologne Medical School, Cologne, Germany
- B. KRUSLIN** Department of Pathology, Ljudevit Jurak University, Sestre milosrdnice University Hospital, Zagreb, Croatia
- N. KYPRIANOU** Department of Urology, University of Kentucky, Lexington, KY, USA
- G. LANDBERG** Department of Laboratory Medicine, Lund University, Lund, Sweden
- J. LEROY, IRCAD** IRCAD, University of Strasbourg, Strasbourg, France
- W. LICHTENEGGER** Charité Campus Virchow-Klinikum, Berlin, Germany
- J. LYKKESFELDT** Department of Veterinary Disease Biology, University of Copenhagen, Frederiksberg, Denmark
- P. MADARNAS** Department of Pathology, University of Sherbrooke, Québec, Canada
- H. MAEDA** BioDynamics Research Foundation, Kumamoto, Japan
- M. MAREEL** Laboratory of Experimental Cancerology, State University, Ghent, Belgium
- L. MARGOLIS** Eunice Kennedy Shriver National Institute of Child Health and Human Development, Bethesda, MD, USA
- G. MARTORANA** Policlinico S. Orsola Malpighi, University of Bologna, Bologna, Italy
- J. MOLNÁR** Department of Medical Microbiology and Immunobiology, Faculty of Medicine, University of Szeged, Szeged, Hungary
- S.L. MOOBERRY** Cancer Therapy & Research Center, University of Texas Health Science Center at San Antonio, San Antonio, TX, USA
- N. MOTOHASHI** Department of Medicinal Chemistry, Meiji Pharmaceutical University, Tokyo, Japan
- R.M. NAGLER** Department of Oral and Maxillofacial Surgery, Rambam Medical Center, Haifa, Israel
- S. NAKANO** Graduate School of Health and Nutritional Sciences, Nakamura Gakuen University, Fukuoka, Japan
- M. NAKASHIMA** Department of Tumor and Diagnostic Pathology, Atomic Bomb Disease Institute, Nagasaki University, Nagasaki, Japan
- M.B. NICHOLL** South Texas Veterans Health Care System, San Antonio, TX, USA
- K. NILSSON** Tumor Biology Laboratory, Department of Pathology, University Hospital, Uppsala, Sweden
- K.R. NORUM** Institute for Nutrition Research, University of Oslo, Oslo, Norway
- K. OGAWA** Department of Surgery, Tokyo Women's Medical University Medical Center East, Tokyo, Japan
- M. PAGÉ** Département de Biologie, Division de Biochimie, Université Laval, Québec, Canada
- C. POLYCHRONAKOS** Department of Paediatrics and Human Genetics, McGill University Health Centre Research Institute, Montreal, QC, Canada
- M.-F. POUPON** Institut Curie, Section de Recherche, Paris, France
- D. RADES** Department of Radiation Oncology, University of Lübeck, Lübeck, Germany
- F.M. ROBERTSON** Virginia Commonwealth University, Clinical Research Services, Center for Clinical and Translational Research, Richmond Academy of Medicine, Richmond, VA, USA
- D. RUBELLO** Department of Nuclear Medicine, PET Unit, S. Maria della Misericordia Hospital, IOV, Rovigo, Italy
- C.A. RUBIO** Karolinska Institute, Pathology Research Laboratory, Stockholm, Sweden
- G.R. RUTTEMAN** Department of Clinical Sciences of Companion Animals, University of Utrecht, Utrecht, The Netherlands
- H. SAKAGAMI** Department of Dental Pharmacology, Meikai University School of Dentistry, Saitama, Japan
- G. SAVA** Institutes of Biological Research, Fondazione Callerio-Onlus, Trieste, Italy
- L.D. SHULTZ** The Jackson Laboratory, Bar Harbor, ME, USA

G. SICA	Istituto di Istologia ed Embriologia, Universita Cattolica del Sacro Cuore, Roma, Italy
J.M. SIEGFRIED	Department of Pharmacology, MNPI Center, University of Minnesota, Minneapolis, MN, USA
J. SLANSKY	Integrated Department of Immunology, School of Medicine, University of Colorado Denver and National Jewish Health, Denver, CO, USA
R.M. SNAPKA	Department of Radiology, The Ohio State University, Columbus, OH, USA
G.-I. SOMA	Department of Integrated and Holistic Immunology, Faculty of Medicine, Kagawa University, Kagawa, Japan
P.P. SORDILLO	Department of Medical Oncology and Hematology, Lenox Hill Hospital, New York, NY, USA
T.A. SPRINGER	Department of Pathology, Harvard Medical School, Boston, MA, USA
D.D. SPYROPOULOS	Department of Pathology and Laboratory Medicine, Medical University of South Carolina, Charleston, SC, USA
K. SYRJÄNEN	Biohit Healthcare Oyj, Helsinki, Finland
G.C. TORRE	Centro Ippocrate, Vico Cosmelli 4, Finale Ligure (SV), Italy
B. TRIBUKAIT	Department of Medical Radiobiology, Karolinska Hospital, Stockholm, Sweden
J. VADGAMA	Department of Internal Medicine, Charles E. Drew University of Medicine and Science, Los Angeles, CA, USA
J.K. VISHWANATHA	Graduate School of Biomedical Sciences, University of North Texas Health Science Center, Fort Worth, TX, USA
W. WANG	Research Institute of Healthcare Science, University of Wolverhampton, Wolverhampton, UK
N. WATANABE	Department of Clinical Laboratory Medicine, Sapporo Medical University School of Medicine, Sapporo, Japan
W. WEBER	Clinical Cancer Etiology Unit, Basel, Switzerland
L.M. WEINER	Lombardi Comprehensive Cancer Center, Georgetown University Medical Center, Washington, DC, USA
J.A. WERNER	Department of Otolaryngology, Head and Neck Surgery, Marburg, Germany
S. YLÄ-HERTTUALA	Department of Molecular Medicine, A.I. Virtanen Institute, University of Kuopio, Kuopio, Finland
H. YOSHIDA	Department of Pathology, Kagoshima University, Kagoshima, Japan