BREAKING ADVANCES

3809 Highlights from Recent Cancer Literature

REVIEWS

3811 The Dormancy Dilemma: Quiescence versus Balanced Proliferation
Alan Wells, Linda Griffith, Jakob Z. Wells, and Donald P. Taylor

3817 Optimal Targeting of HER2–PI3K Signaling in Breast Cancer: Mechanistic Insights and Clinical Implications
Brent N. Rexer and Carlos L. Arteaga

CLINICAL STUDIES

3821 Combination of Protein Coding and Noncoding Gene Expression as a Robust Prognostic Classifier in Stage I Lung Adenocarcinoma
Ichiro Akagi, Hirokazu Okayama, Aaron J. Schetter, Ana I. Robles, Takashi Kohno, Elise D. Bowman, Dickran Kazandjian, Judith A. Welsh, Naohide Oue, Motonobu Saito, Masao Miyashita, Eiji Uchida, Jun Yokota, and Curtis C. Harris

INTEGRATED SYSTEMS AND TECHNOLOGIES

3833 Coevolution of Solid Stress and Interstitial Fluid Pressure in Tumors During Progression: Implications for Vascular Collapse
Triantafyllos Stylianopoulos, John D. Martin, Matija Smuderl, Fotios Mpekris, Saloni R. Jain, and Rakesh K. Jain

MICROENVIRONMENT AND IMMUNOLOGY

3842 Avirulent Toxoplasma gondii Generates Therapeutic Antitumor Immunity by Reversing Immunosuppression in the Ovarian Cancer Microenvironment
Jason R. Baird, Barbara A. Fox, Kiah L. Sanders, Patrick H. Lizotte, Juan R. Cubillos-Ruiz, Uciane K. Scarlett, Melanie R. Rutkowski, Jose R. Conejo-Garcia, Steven Fiering, and David J. Bzik

3852 Critical Role of STAT3 in IL-6–Mediated Drug Resistance in Human Neuroblastoma
Tasnim Ara, Rie Nakata, Michael A. Sheard, Hiroyuiki Shimada, Ralf Buettner, Susan G. Grosen, Liangyun Ji, Hua Yu, Richard Jove, Robert C. Seeger, and Yves A. DeClerck

3865 Synergistic Induction of Adaptive Antitumor Immunity by Codelivery of Antigen with α-Galactosylceramide on Exosomes
Ulf Gehrmann, Stefanie Hiltbrunner, Anna-Maria Georgoudaki, Mikael C. Karlsson, Tanja I. Näsblund, and Susanne Gabrielsson

3877 Melanoma-Educated CD14+ Cells Acquire a Myeloid-Derived Suppressor Cell Phenotype through COX-2–Dependent Mechanisms
Yumeng Mao, Isabel Poschke, Erik Wennerberg, Yago Pico de Coaña, Suzanne Egyhazi Brage, Inkeri Schultz, Johan Hansson, Giuseppe Masucci, Andreas Lundqvist, and Rolf Kiessling

Précis: These results reveal how immune suppression by myeloid-derived suppressor cells can be initiated in the tumor microenvironment of human melanoma.
Identification of Two Distinct Carcinoma-Associated Fibroblast Subtypes with Differential Tumor-Promoting Abilities in Oral Squamous Cell Carcinoma
Daniela Elena Costea, Allison Hills, Amani H. Osman, Johanna Thurlow, Gabriela Kalna, Xiaohong Huang, Claudia Pena Murillo, Himalaya Parajuli, Salwa Suliman, Keerthi K. Kulasekara, Anne Chr. Johannessen, and Max Partridge

Precis: Cancer-associated fibroblasts sustain the tumor microenvironment, and unraveling their heterogeneity may point to targetable weaknesses.

Myeloid Cell Receptor LRPI/CD91 Regulates Monocyte Recruitment and Angiogenesis in Tumors
Nicole D. Staudt, Minji Jo, Jingjing Hu, Jeanne M. Bristow, Donald P. Pizzo, Alban Gaultier, Scott R. VandenBerg, and Steven L. Gonias

Precis: A signaling system that controls recruitment of tumor-associated macrophages may have a very important role in determining the amount of VEGF that is secreted into the tumor microenvironment.

miR-124 Inhibits STAT3 Signaling to Enhance T Cell–Mediated Immune Clearance of Glioma
Jun Wei, Fei Wang, Ling-Yuan Kong, Shao Xu, Tiffany Doucette, Donald P. Pizzo, Alban Gaultier, Scott R. VandenBerg, and Steven L. Gonias

Precis: This study highlights approaches to plumb the untapped potential of microRNA in generalized immunotherapeutic strategies to treat cancer.

Dynamic Mast Cell–Stromal Cell Interactions Promote Growth of Pancreatic Cancer
Ying Ma, Rosa F. Hwang, Craig D. Logsdon, and Stephen E. Ullrich

Precis: Mast cells are being ascribed unexpected but important roles in the cancer microenvironment, increasing interest in targeting them for therapeutic purposes.

Membrane versus Soluble Isoforms of TNF-α Exert Opposing Effects on Tumor Growth and Survival of Tumor-Associated Myeloid Cells
Shidrokh Ardestani, Bin Li, Desirae L. Deskins, Huiyun Wu, Pierre P. Massion, and Pampee P. Young

Precis: Controversies about the role of TNF-α in cancer progression may be explained by the findings from this study, which offer a basis to understand its contradictory effects on tumor progression.
The Steroid Receptor Coactivator-3 Is Required for the Development of Castration-Resistant Prostate Cancer
Jean C-Y. Tien, Zhaoliang Liu, Lan Liao, Fen Wang, Yixiang Xu, Ye-Lin Wu, Niya Zhou, Michael Ittmann, and Jianming Xu

Précis: These findings offer a preclinical proof of concept to therapeutically target a transcriptional coactivator in castration-resistant prostate cancer, the development of which is responsible for nearly all prostate cancer deaths.

MEK1/2 Inhibition Decreases Lactate in BRAF-Driven Human Cancer Cells
Maria Falck Miniotis, Vaitha Arunan, Thomas R. Eykyn, Richard Marais, Paul Workman, Martin O. Leach, and Mounia Beloueche-Babari

Précis: The use of magnetic resonance spectroscopy to measure lactate depletion could provide a simple, noninvasive metabolic biomarker for evaluating pharmacodynamic responses to the many BRAF/MEK inhibitors currently in clinical trials.

Enhanced Inhibition of ERK Signaling by a Novel Allosteric MEK Inhibitor, CH5126766, That Suppresses Feedback Reactivation of RAF Activity
Noribuya Ishii, Naoki Harada, Eric W. Joseph, Kazuhiro Ohara, Takaaki Miura, Hiroshi Sakamoto, Yutaka Matsuda, Yasushi Tomii, Yukako Tachibana-Kondo, Hitoshi Ikura, Toshihiro Aoki, Nobu Shimma, Mikio Arisawa, Yoshihiro Sowa, Poulikos I. Poulikakos, Neal Rosen, Yuko Aoki, and Toshiyuki Sakai

Précis: A novel class of MEK inhibitor described in this preclinical study causes MEK to function as a dominant negative inhibitor of RAF, enhancing its therapeutic action in tumors driven by mutant RAS or RAF.

Conditional Loss of ErbB3 Delays Mammary Gland Hyperplasia Induced by Mutant PIK3CA without Affecting Mammary Tumor Latency, Gene Expression, or Signaling
Christian D. Young, Adam D. Pfefferle, Philip Owens, Maria G. Kubia, Brent N. Reiter, Justin M. Balko, Violeta Sánchez, Hailing Cheng, Charles M. Perou, Jean J. Zhao, Rebecca S. Cook, and Carlos L. Arteaga

Précis: These findings suggest a rationale to combine inhibitors against PI3K and ErbB receptors in treating breast cancers that harbor PIK3CA activating mutations.
Th-MYCN Mice with Caspase-8 Deficiency Develop Advanced Neuroblastoma with Bone Marrow Metastasis

Tal Teitz, Madoka Inoue, Marcus B. Valentine, Kejin Zhu, Jerold E. Rehg, Wei Zhao, David Finkelstein, Yong-Dong Wang, Melissa D. Johnson, Christopher Calabrese, Marcelo Bubstein, Razqallah Hakem, William A. Weiss, and Jill M. Lahti

Précis: An in vivo model of neuroblastoma that undergoes bone marrow metastasis will be useful to enable better studies of dissemination processes and therapeutic candidates.

miR-214 Coordinates Melanoma Progression by Upregulating ALCAM through TFAP2 and miR-148b Downmodulation

Elisa Penna, Francesca Orso, Daniela Cimino, Irene Vercellino, Elena Grassi, Elena Quaglino, Emilia Turco, and Daniela Taverna

Précis: By establishing a critical pathway to coordinate metastatic dissemination in melanoma, this study offers an initial preclinical proof of concept for targeting its elements as a rational approach to block or reverse this deadly process.

Cancer Stem–like Cell Marker CD44 Promotes Bone Metastases by Enhancing Tumorigenicity, Cell Motility, and Hyaluronan Production

Toru Hiraga, Susumu Ito, and Hiroaki Nakamura

Précis: This important study provides an initial glimpse of the functional meaning of a cell surface protein widely associated with stem-like cell properties in human cancer.

Stress-Response Protein RBM3 Attenuates the Stem-like Properties of Prostate Cancer Cells by Interfering with CD44 Variant Splicing

Yu Zeng, Dana Wodzenski, Dong Gao, Takumi Shiraiishi, Naoki Terada, Youqiang Li, Donald J. Vander Giendt, Jun Luo, Chuize Kong, Robert H. Getzenberg, and Prakash Kulkarni

Précis: This study focuses on a member of a little-studied family of stress regulators in cancer, the cold shock proteins, offering new perspectives on how stress alters RNA splicing for a modulator of stem cell–like character in malignant disease.

G-CSF Receptor Positive Neuroblastoma Subpopulations Are Enriched in Chemotherapy-Resistant or Relapsed Tumors and Are Highly Tumorigenic

Danielle M. Hsu, Saurabh Agarwal, Ashley Benham, Cristian Coarfa, Denae N. Trahan, Zaowen Chen, Paris N. Stowers, Amy N. Courtney, Anna Lakoma, Eveline Barbieri, Leonid S. Metelitsa, Preethi Gunaratne, Eugene S. Kim, and Jason M. Sholet

Précis: Stem-like cells in an aggressive pediatric tumor uniformly express the receptor for G-CSF, which, as a means to elevate white blood cell counts, is commonly given to patients where it might unsuspectingly contribute to progression.

Connective Tissue Growth Factor Activates Pluripotency Genes and Mesenchymal–Epithelial Transition in Head and Neck Cancer Cells

Cheng-Chi Chang, Wen-Hao Hsu, Chen-Chien Wang, Chun-Hung Chou, Mark Yen-Ping Kuo, Been-Ren Lin, Szu-Ta Chen, Shyh-Kuan Tai, Min-Liang Kuo, and Muh-Hwa Yang

Précis: These findings provide insights into epithelial plasticity during progression of head and neck cancers that are rapidly rising in incidence, perhaps also providing a basis for improvement in their classification.

Nrf2 Prevents Initiation but Accelerates Progression through the Kras Signaling Pathway during Lung Carcinogenesis

Hironori Satoh, Takashi Morishita, Jun Takai, Masahito Ebina, and Masayuki Yamamoto

Précis: The Nrf2 cellular antioxidant system has different roles during cancer initiation and progression, much like TNF, such that Nrf2 inhibitors offer more rational tools than Nrf2 activators to attack established malignancy.

Correction: Cell Surface Expression of Epihermal Growth Factor Receptor and Her-2 with Nuclear Expression of Her-4 in Primary Osteosarcoma

Correction: Helicobacter pylori Cytotoxin-Associated Gene A Activates the Signal Transducer and Activator of Transcription 3 Pathway In Vitro and In Vivo
CD44, a cancer stem-like cell marker, has been implicated in cancer cell migration, invasion, and metastasis. This study shows that CD44 expression in cancer cells promotes bone metastases by enhancing tumorigenicity, cell migration and invasion, and production of hyaluronan, the primary ligand for CD44. Using a mouse model of bone metastasis, it was found that 4-methylumbelliferone, an inhibitor of hyaluronan synthesis, inhibited bone metastases of MDA-MB-231 human breast cancer cells with reduced number of osteoclasts. For details, see article by Hiraga and colleagues on page 4112.