BREAKING ADVANCES

3733 Highlights from Recent Cancer Literature

REVIEW

3735 Roles of Sildenafil in Enhancing Drug Sensitivity in Cancer
Zhi Shi, Amit K. Tiwari, Atish S. Patel, Li-Wu Fu, and Zhe-Sheng Chen

PERSPECTIVE

3739 Evolved Tumor Suppression: Why Are We So Good at Not Getting Cancer?
James DeGregori

CLINICAL STUDIES

3745 Serial Magnetic Resonance Spectroscopy Reveals a Direct Metabolic Effect of Cediranib in Glioblastoma
Heisoo Kim, Ciprian Catana, Eva-Maria Ratai, Ovidiu C. Andronesi, Dominique L. Jennings, Tracy T. Batchelor, Rakesh K. Jain, and A. Gregory Sorensen

3753 Preclinical Validation of Electrochemotherapy as an Effective Treatment for Brain Tumors
Birgit Agerholm-Larsen, Helle K. Iversen, Per Ihse, Jakob M. Moller, Faisal Mahmood, Kurt Svarre Jensen, and Julie Gehl

3763 Chronic Inflammatory IFN-γ Signaling Suppresses Hepatocarcinogenesis in Mice by Sensitizing Hepatocytes for Apoptosis
Stefan Lüth, Jörg Schrader, Stefan Zander, Antonella Carambia, Juliane Buchkremer, Samuel Huber, Kurt Reifenberg, Ken-Ichi Yamamura, Peter Schirrmacher, Ansgar W. Lohse, and Johannes Herkel

3772 A Requirement of STAT3 DNA Binding Precludes Th-1 Immunostimulatory Gene Expression by NF-κB in Tumors
Heehyong Lee, Jiehui Deng, Hong Xin, Yong Liu, Drew Pardoll, and Hua Yu

3781 Proangiogenic Factor PlGF Programs CD11b⁺ Myelomonocytes in Breast Cancer during Differentiation of Their Hematopoietic Progenitors
Julien Laurent, Eveline Faes-van’t Hull, Cedric Touvrey, François Kuonen, Qiang Lan, Girieca Lorusso, Marie-Agnès Doucey, Laura Ciaroni, Natsuko Imazumi, Gian Carlo Alghisi, Ernesta Fagiani, Khalil Zaman, Roger Stupp, Masabumi Shibuya, Jean-François Delaloye, Gerhard Christofori, and Curzio Ruegg

3792 Exosomes Released by Melanoma Cells Prepare Sentinel Lymph Nodes for Tumor Metastasis
Joshua L. Hood, Susana San Roman, and Samuel A. Wickline

INTEGRATED SYSTEMS AND TECHNOLOGIES

3793 Preclinical Validation of Electrochemotherapy as an Effective Treatment for Brain Tumors
Birgit Agerholm-Larsen, Helle K. Iversen, Per Ihse, Jakob M. Moller, Faisal Mahmood, Kurt Svarre Jensen, and Julie Gehl

Précis: Enhancing drug uptake through the use of a novel electrode technology can achieve high rates of complete response in a rat model of brain cancer.
### 3802

**CD24 Offers a Therapeutic Target for Control of Bladder Cancer Metastasis Based on a Requirement for Lung Colonization**

Jonathan B. Overdevest, Shibu Thomas, Glen Kristiansen, Donna E. Hansel, Steven C. Smith, and Dan Theodorescu

**Précis:** Findings offer preclinical proof-of-concept for antibody targeting of a marker of metastatic progression as a potential new adjuvant therapy for clinical investigation.

### 3812

**An EGFR-ERK-SOX9 Signaling Cascade Links Urothelial Development and Regeneration to Cancer**

Shizhang Ling, Xiaofei Chang, Luciana Schultz, Thomas K. Lee, Alcides Chaux, Luigi Marchionni, George J. Netto, David Sidransky, and David M. Berman

**Précis:** Cells undergoing injury turn on EGF ligand production, which induces the developmental transcription factor SOX9 and supports emergence of a migratory, invasive phenotype.

### 3822

**Epithelial Cell Organization Suppresses Myc Function by Attenuating Myc Expression**

David R. Simpson, Min Yu, Siyuan Zheng, Zhongming Zhao, Senthil K. Muthuswamy, and William P. Tansey

**Précis:** This study finds that epithelial cell organization does not pose a barrier to Myc oncogenicity, pointing to roles for tumor suppression mechanisms other than three-dimensional structure in antagonizing Myc during carcinogenesis.

### 3831

**Bone Marrow Stroma–Secreted Cytokines Protect JAK2V617F-Mutated Cells from the Effects of a JAK2 Inhibitor**

Taghi Manshouri, Zeev Estrov, Alfonso Quintás-Cardama, Jan Burger, Ying Zhang, Ana Livun, Liza Knez, David Harris, Chad J. Creighton, Hagop M. Kantarjian, and Srdan Verstovsek

**Précis:** Myeloproliferative neoplasms rely on support from stromal cells in the bone marrow microenvironment that release IL-6, FGF, and CXCL10.

### 3841

**A Genome-Wide Search for Promoters That Respond to Increased MYCN Reveals Both New Oncogenic and Tumor Suppressor MicroRNAs Associated with Aggressive Neuroblastoma**

Jason M. Shohet, Rajib Ghosh, Cristian Coarfa, Andrew Ludwig, Ashley L. Benham, Zaowen Chen, Danielle M. Patterson, Eveline Barbieri, Pieter Mestdagh, Denae N. Sikorski, Aleksandar Milosavljevic, Eugene S. Kim, and Preethi H. Gunaratne

**Précis:** N-Myc activation is associated with direct repression of a microRNA program that is not generally suppressive to neuroblastoma cells, with possible implications for how to better attack this aggressive pediatric cancer.

### 3852

**The Melanoma-Upregulated Long Noncoding RNA SPRY4-IT1 Modulates Apoptosis and Invasion**

Divya Khaitan, Marcel E. Dinger, Joseph Mazar, Joanna Crawford, Martin A. Smith, John S. Mattick, and Ranjan J. Perera

**Précis:** Long noncoding RNAs (lncRNAs) are a rapidly emerging area of cancer research because of their suspected roles in interacting with messenger RNAs, regulatory microRNAs, and proteins and modulating their functions.
A Multistage Association Study Identifies a Breast Cancer Genetic Locus at NCOA7


**Précis:** A large genetic association study of growth factor signaling and estrogen metabolism defines a variant in an estrogen receptor-binding transcriptional co-activator that may confer a reduced risk of breast cancer.

Physical Activity after Diagnosis and Risk of Prostate Cancer Progression: Data from the Cancer of the Prostate Strategic Urologic Research Endeavor

Erin L. Richman, Stacey A. Kenfield, Meir J. Stampfer, Alan Paciorek, Peter R. Carroll, and June M. Chan

**Précis:** Brisk walking after diagnosis may inhibit or delay prostate cancer progression among men diagnosed with clinically localized prostate cancer.

LIN28B Polymorphisms Influence Susceptibility to Epithelial Ovarian Cancer


**Précis:** Common inherited variants in miRNA biogenesis genes may be useful to identify high-risk populations and to develop novel cancer diagnostic, prognostic, and therapeutic strategies.

Combining Histone Deacetylase Inhibitor Vorinostat with Aurora Kinase Inhibitors Enhances Lymphoma Cell Killing with Repression of e-Myc, hTERT, and microRNA Levels

Leo Kretzner, Anna Scuto, Pamela M. Dino, Claudia M. Kowolik, Jun Wu, Patrick Ventura, Richard Jove, Stephen J. Forman, Yun Yen, and Mark H. Kirschbaum

**Précis:** Proof-of-concept and mechanistic findings prompt clinical evaluation for a novel drug combination that could improve cancer treatment.

Histone Methyltransferase KMT1A Restrains Entry of Alveolar Rhabdomyosarcoma Cells into a Myogenic Differentiated State

Min-Hyung Lee, Mathivanan Jothi, Andrei V. Gudkov, and Asoke K. Mal

**Précis:** Results address the longstanding question of how an aggressive childhood cancer might be prompted to undergo terminal differentiation, suggesting new strategies to improve therapy.

Erlotinib-Mediated Inhibition of EGFR Signaling Induces Metabolic Oxidative Stress through NOX4


**Précis:** Findings suggest that the cytotoxicity of EGFR kinase inhibitors in cancer cells may be based in large part on induction of oxidative stress via hydrogen peroxide produced by NOX4 signaling.
ErbB3 Ablation Impairs PI3K/Akt-Dependent Mammary Tumorigenesis
Rebecca S. Cook, Joan T. Garrett, Violeta Sánchez, Jamie C. Stanford, Christian Young, Anindita Chakrabarty, Cammie Rinehart, Yixian Zhang, Yaming Wu, Lee Greenberger, Ivan D. Horak, and Carlos L. Arteaga

Précis: Findings offer preclinical proof-of-concept that ErbB3 disruption may be therapeutically effective in PI3K/Akt-driven breast cancers.

Comparison of Neuropathy-Inducing Effects of Eribulin Mesylate, Paclitaxel, and Ixabepilone in Mice
Krystyna M. Wozniak, Kenichi Nomoto, Rena G. Lapidus, Ying Wu, Valentina Carozzi, Guido Cavaletti, Kazuhiro Hayakawa, Satoru Hosokawa, Murray J. Towle, Bruce A. Littlefield, and Barbara S. Slusher

Précis: Compared to taxanes and epothilones, the two major classes of antimitotic drugs used in cancer treatment, a new FDA approved antitubulin drug may cause far less debilitating nerve damage in cancer survivors.

Convection-Enhanced Delivery of Topotecan into a PDGF-Driven Model of Glioblastoma Prolongs Survival and Ablates Both Tumor-Initiating Cells and Recruited Glial Progenitors
Kim A. Lopez, Aaron M. Tannenbaum, Marcela C. Assanah, Katy Linskey, Jonathan Yun, Alayar Kangarlu, Orlando D. Gil, Peter Canoll, and Jeffrey N. Bruce

Précis: The findings of this study suggest that chemotherapy may prime later recurrence by decreasing recruitment of normal glial progenitor cells into a brain tumor microenvironment.

6-Bromoindirubin-3’-Oxime Inhibits JAK/STAT3 Signaling and Induces Apoptosis of Human Melanoma Cells
Lucy Liu, Sangkil Nam, Yan Tian, Fan Yang, Jun Wu, Yan Wang, Anna Scuto, Panos Polychronopoulos, Prokopios Magiatis, Leandros Skaltsounis, and Richard Jove

Précis: Inhibitors of the JAK/STAT3 signaling pathway represent a very appealing therapeutic direction because of the central importance of this pathway in tumor cells and the tumor microenvironment in sustaining malignant growth and progression.

Phosphorylation of Serine 68 of Twist1 by MAPKs Stabilizes Twist1 Protein and Promotes Breast Cancer Cell Invasiveness
Jun Hong, Jian Zhou, Junjiang Fu, Tao He, Jun Qin, Li Wang, Lan Liao, and Jianming Xu

Précis: Ras-activated MAP kinases promote invasion and metastasis by stabilizing a master regulator of epithelial-mesenchymal transition.

Aldehyde Dehydrogenase in Combination with CD133 Defines Angiogenic Ovarian Cancer Stem Cells That Portend Poor Patient Survival
Ines A. Silva, Shoumei Bai, Karen McLean, Kun Yang, Kent Griffith, Dafydd Thomas, Christophe Ginestier, Carolyn Johnston, Angela Kueck, R. Kevin Reynolds, Max S. Wicha, and Ronald J. Buckanovich

Précis: This report identifies a pair of ovarian cancer stem cell markers that may be functionally critical for stem cell differentiation in cancers.

Hedgehog Overexpression Is Associated with Stromal Interactions and Predicts for Poor Outcome in Breast Cancer
Sandra A. O’Toole, Dorothy A. Machalek, Robert F. Shearer, Ewan K.A. Millar,Radhika Nair, Peter Schofield, Duncan McLeod, Caroline L. Cooper, Catriona M. McNeil, Andrea McFarland, Akira Nguyen, Christopher J. Ormandy, Min Ru Qiu, Brian Rabinovich, Luciano G. Martelotto, Duc Vu, Gregory E. Hannigan, Elizabeth A. Musgrove, Daniel Christ, Robert L. Sutherland, D. Neil Watkins, and Alexander Swarbrick

Précis: This study identifies an important prognostic role of Hedgehog pathway in breast cancer and highlights its potential as a novel therapeutic target in metastatic carcinoma.

The Hypoxia-Associated Factor Switches Cells from HIF-1α– to HIF-2α–Dependent Signaling Promoting Stem Cell Characteristics, Aggressive Tumor Growth and Invasion
Mei Yee Koh, Robert Lemos, Jr., Xiuping Liu, and Garth Powis

Précis: This study shows how tumor cells exposed to more intense periods of hypoxia in the microenvironment will respond to improve their likelihood of survival and progression, with implications for therapeutic targeting.
EZH2-Mediated Concordant Repression of Wnt Antagonists Promotes β-Catenin–Dependent Hepatocarcinogenesis

Précis: Mechanistic results reveal how the prometastatic transcription repressor EZH2 coordinately blocks Wnt antagonists, thereby promoting Wnt/β-catenin signaling in cancer.

Uncoupling Cancer Mutations Reveals Critical Timing of p53 Loss in Sarcomagenesis
Nathan P. Young, Denise Crowley, and Tyler Jacks

Précis: Altering the sequence of mutations in a mouse model of sarcomagenesis shows that mutation order dictates tumor phenotype.

Correction: Peptide Vaccination after T-Cell Transfer Causes Massive Clonal Expansion, Tumor Eradication, and Manageable Cytokine Storm

Correction: FLT3-Mediated p38–MAPK Activation Participates in the Control of Megakaryopoiesis in Primary Myelofibrosis

Correction: Functional Cooperation of RKTG with p53 in Tumorigenesis and Epithelial-Mesenchymal Transition

ABOUT THE COVER
Melanoma exosomes home to sentinel lymph nodes and induce microenvironmental responses that permit metastasis of melanoma cells. The figure demonstrates an increase in the number of melanoma cells (green) infiltrating a sentinel node (blue) for the larger melanoma exosome–induced sentinel node (bottom) in contrast to the smaller control liposome node (top) following serial injections of melanoma exosomes or control liposomes. For details, see the article by Hood and colleagues on page 3792 of this issue.