Highlights from Recent Cancer Literature

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

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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 Schirmacher, Ansgar W. Lohse, and Johannes Herkel

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

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

Proangiogenic Factor PlGF Programs CD11b+ Myelomonocytes in Breast Cancer during Differentiation of Their Hematopoietic Progenitors
Julien Laurent, Eveline Faes-van't Hull, Cedric Tovvrey, François Kuijen, Qiang Lan, Gireeca Lorusso, Marie-Agnès Doucey, Laura Ciarnoni, Natsuko Inazumi, Gian Carlo Alghisi, Ernesta Fagiani, Khalil Zaman, Roger Stupp, Masabumi Shibuya, Jean-François Delaloye, Gerhard Christophori, and Curzio Ruegg

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

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

PRECEIS: Metabolic changes in the tumor and brain tissue during anti-VEGF therapy can serve as imaging biomarkers for predicting treatment response in patients with recurrent malignant glioblastomas.

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PRECEIS: 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.

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

PRECEIS: Preparation of the metastatic niche in lymph nodes relies in part on the ability of a primary tumor to secrete nanovesicles that can remodel the nodal microenvironment and permit its colonization by tumor cells.
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.

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.

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.

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.

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.

Mutationally Activated BRAFV600E Elicits Papillary Thyroid Cancer in the Adult Mouse
Roch-Philippe Charles, Gioia Iezza, Elena Amendola, David Dankort, and Martin McMahon

Précis: Studies of thyroid cancer, the most common endocrine cancer, will benefit from the development of a high-penetrance, genetically-engineered mouse model, which recapitulates key features of the genetics and pathophysiology of the human disease.

Mild Elevation of Body Temperature Reduces Tumor Interstitial Fluid Pressure and Hypoxia and Enhances Efficacy of Radiotherapy in Murine Tumor Models
Arindam Sen, Maegan L. Capitano, Joseph A. Spernyak, John T. Schueckler, Seneca Thomas, Anurag K. Singh, Sharon S. Evans, Bonnie L. Hylander, and Elizabeth A. Repasky

Précis: Preclinical findings show how mild systemic hyperthermia in mice bearing tumors can increase tumor blood flow and improve the efficacy of radiotherapy, prompting immediate attention for clinical evaluation.
PREVENTION AND EPIDEMIOLOGY

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.

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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.

THERAPEUTICS, TARGETS, AND CHEMICAL BIOLOGY

Combining Histone Deacetylase Inhibitor Vorinostat with Aurora Kinase Inhibitors Enhances Lymphoma Cell Killing with Repression of c-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, Prokopiou Magiatis, Leandros Skalsoumis, 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, Yan 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.

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.