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Cancer Research

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Tumor Endothelial Markers Define Novel Subsets of Cancer-Specific Circulating Endothelial Cells Associated with Antitumor Efficacy

Reza Mehran, Monique Nilsson, Mehrdad Khajavi, Zhiqiang Du, Tina Cascone, Hua Kang Wu, Andrea Cortes, Li Xu, Amado Zurita, Robert Schier, Bernhard Riedel, Randa El-Zein, and John V. Heymach

Précis: This report describes a blood-based surrogate marker to assess the presence of tumor vasculature and antiangiogenic drug activity.

Biallelic DICER1 Mutations in Sporadic Pleuropulmonary Blastoma

Masafumi Seki, Kenichi Yoshida, Yuichi Shiraishi, Tepppei Shimamura, Yusuke Satoh, Riki Nishimura, Yusuke Okuno, Kenichi Chiba, Hiroko Tanaka, Keisuke Kato, Motohiro Kato, Ryoji Hanada, Yuko Nomura, Myoung-Ja Park, Toshiaki Ishida, Akira Oka, Takashi Igarashi, Satoru Miyano, Yasuhide Hayashi, Seishi Ogawa, and Junko Takita

Précis: A rare pediatric tumor with poorly understood pathogenesis is found to be characterized by nearly universal biallelic mutations in the microRNA processing enzyme DICER1, with an obligatory somatic RNase IIIb domain mutation, along with less frequent but still common mutations in p53.

HNRNPAB Induces Epithelial–Mesenchymal Transition and Promotes Metastasis of Hepatocellular Carcinoma by Transcriptionally Activating SNAIL

Zheng-Jun Zhou, Zhi Dai, Shao-Lai Zhou, Zhi-Qiang Hu, Qing Chen, Yi-Ming Zhao, Ying-Hong Shi, Qiang Gao, Wei-Zhong Wu, Shuang-Jian Qiu, and Jia Fan

Précis: Overexpression of a ribonuclear protein that transcriptionally activates the EMT regulator Snail confers metastatic properties and poor prognosis in liver cancer, a pathway that may have broader relevance in human cancer.

NF-κB Gene Signature Predicts Prostate Cancer Progression

Renjie Jin, Yajun Yi, Fiona E. Yull, Timothy S. Blackwell, Peter E. Clark, Tatsuki Koyama, Joseph A. Smith Jr, and Robert J. Matusik

Précis: An expression signature generated in an NF-κB-activated mouse model of prostatic hyperplasia successfully predicts disease-specific survival and distant metastasis-free survival in prostate cancer patients.

BRCA1 Deficiency Exacerbates Estrogen-Induced DNA Damage and Genomic Instability

Kieran I. Savage, Kyle B. Matchett, Eliana M. Barros, Kevin M. Cooper, Gareth W. Irwin, Julia J. Gorski, Katy S. Orr, Jekaterina Vohhodina, Joy N. Kavanagh, Angelina F. Madden, Alexander Powell, Lorenzo Manti, Simon S. McDade, Ben Ho Park, Kevin M. Prise, Stuart A. McIntosh, Manuel Salto-Tellez, Derek J. Richard, Christopher T. Elliott, and D. Paul Harkin

Précis: This study provides pivotal new insights into the long-standing question of why BRCA1 mutation drives the formation of estrogen-regulated tissues, despite the general role of BRCA1 in DNA repair in all cell types, with implications for how to prevent breast cancer in BRCA1 carriers.

CLPTM1L Promotes Growth and Enhances Aneuploidy in Pancreatic Cancer Cells


Précis: A gene that lies at human chromosome 5p15.33 and harbors germline risk variants for multiple cancers is a plausible candidate for an important pancreatic cancer susceptibility allele.

Emergence, Involution, and Progression to Carcinoma of Mutant Clones in Normal Endometrial Tissues

George L. Mutter, Nicolas M. Monte, Donna Neuberg, Alex Ferenzy, and Charis Eng

Précis: These findings show that the prevalence and turnover rate of latent endometrial precancers is high over time in otherwise normal-appearing tissues, with implications for understanding cancer etiology.

PREVENTION AND EPIDEMIOLOGY

Emergence, Involution, and Progression to Carcinoma of Mutant Clones in Normal Endometrial Tissues

George L. Mutter, Nicolas M. Monte, Donna Neuberg, Alex Ferenzy, and Charis Eng

Précis: These findings show that the prevalence and turnover rate of latent endometrial precancers is high over time in otherwise normal-appearing tissues, with implications for understanding cancer etiology.
Sphingosine Kinase 2 Promotes Acute Lymphoblastic Leukemia by Enhancing MYC Expression
Craig T. Wallington-Beddoe, Jason A. Powell, Daochen Tong, Stuart M. Pitson, Kenneth F. Bradstock, and Linda J. Bendall
Précis: This study offers a tractable approach to target MYC expression in human cancer where it may be a universal therapeutic target, addressing the long-standing but mainly intractable problem of how to selectively block MYC function in the disease setting.

Transient Antiangiogenic Treatment Improves Delivery of Cytotoxic Compounds and Therapeutic Outcome in Lung Cancer
Sampurna Chatterjee, Caroline Wieczorek, Jakob Schottle, Maike Siobal, Yvonne Hinze, Thomas Franz, Alexandra Florin, Joanna Adamczak, Lukas C. Heukamp, Bernd Neumaier, and Roland T. Ullrich
Précis: These findings offer compelling preclinical evidence that short-term antiangiogenic therapy can promote a transient normalization of tumor vessels that improves the delivery and efficacy of cytotoxic drugs, with clinical implications for how to properly schedule the most effective use of antiangiogenic drugs in patients.

EGFR-Mediated Chromatin Condensation Protects KRAS-Mutant Cancer Cells against Ionizing Radiation
Meng Wang, Ashley M. Kern, Marieke Huiskötter, Patricia Greninger, Anurag Singh, Yunfeng Pan, Dipanjan Chowdhury, Mechthild Krause, Michael Baumann, Cyril H. Benes, Jason A. Efstathiou, Jeff Settleman, and Henning Willers
Précis: These findings challenge a paradigm for understanding the resistance of KRAS-mutant cancers to EGFR inhibitors, with implications for treating lung cancer in particular.

ATR Pathway Inhibition Is Synthetically Lethal in Cancer Cells with ERCC1 Deficiency
Kareem N. Mohni, Gina M. Kavanaugh, and David Cortez
Précis: Drugs that target the ATR pathway of DNA damage repair may offer particular utility in cancers with reduced ATR pathway function or reduced levels of ERCC4 activity, with implications for treatment of a broad array of aggressive tumors such as triple-negative breast cancers and lung cancers.

Rapamycin Rescues ABT-737 Efficacy in Small Cell Lung Cancer
Eric E. Gardner, Nick Connis, John T. Poirier, Leslie Cope, Irina Dobromilskaya, Gary L. Gallia, Charles M. Rudin, and Christine L. Hann
Précis: This work provides support for rational combination therapy with mTOR and Bcl-2 inhibitors for the treatment of small-cell lung cancer.

Differential Effects of RUNX2 on the Androgen Receptor in Prostate Cancer: Synergistic Stimulation of a Gene Set Exemplified by SNAI2 and Subsequent Invasiveness
Gillian H. Little, Sanjeev K. Baniwal, Helty Adisetiyo, Susan Groshen, Nyam-Osor Chimge, Sun Young Kim, Omar Khalid, Debra Hawes, Jeremy O. Jones, Jacek Pinski, Dustin E. Schones, and Baruch Frenkel
Précis: A prostate cancer–associated transcription factor known to inhibit androgen-dependent gene expression was found to activate certain genes that drive invasion, with implications for prognosis and individualized therapy.

Endothelial Cell-Secreted EGF Induces Epithelial to Mesenchymal Transition and Endows Head and Neck Cancer Cells with Stem-like Phenotype
Zhaocheng Zhang, Zhihong Dong, Isabel S. Lauxen, Manoel Sant’Ana Filho, and Jacques E. Nor
Précis: These findings suggest that vascular endothelial cells contribute to dissemination of carcinomas by secreting factors that endow carcinoma cells with enhanced motility and stemness.

KLF5 Regulates the Integrity and Oncogenicity of Intestinal Stem Cells
Takeo Nakaya, Seishi Ogawa, Ichiro Manabe, Masami Tanaka, Masashi Sanada, Toshiro Sato, Makoto M. Takeo, Kazuki Nakao, Hans Clevers, Masashi Fukayama, Masahiko Kuroda, and Ryozo Nagai
Précis: This study offers a genetic proof of concept in the mouse that the stem cell integrity gene KLF5 acts as a core regulator of intestinal oncogenesis at the stem cell level, and it further suggests KLF5 targeting may offer a therapeutic strategy to eradicate stem-like cells in colorectal cancer.
A Meta-analysis of Lung Cancer Gene Expression Identifies PTK7 as a Survival Gene in Lung Adenocarcinoma
Ron Chen, Purvesh Khatri, Pawel K. Mazur, Melanie Polin, Yanyan Zheng, Dedeepya Vaka, Chuong D. Hoang, Joseph Shragger, Yue Xu, Silvestre Vicent, Atul J. Butte, and E. Alejandro Sweet-Cordero

Précis: These findings define a little-studied protein tyrosine kinase as a highly and specifically expressed gene and a potential therapeutic target in lung adenocarcinoma.

LETTER TO THE EDITOR

Lipid Metabolism Signatures in NASH-Associated HCC—Letter
Sonja M. Kessler, Stephan Laggai, Ahmad Barghash, Volkhard Helms, and Alexandra K. Kiemer

ABOUT THE COVER

The BH3 mimetics ABT-737/263 were developed to trigger programmed cell death (apoptosis) in tumors that express high levels of the antiapoptotic proteins BCL-2 and BCL-xL. Promising preclinical data in chronic lymphocytic leukemia (CLL) and small cell lung cancer (SCLC) warranted clinical investigation; however, single agent responses to ABT-263 in extensive-stage SCLC were minimal. Here, using patient-derived xenograft (PDX) models of SCLC, it was found that responses to single agent ABT-737 were acute in duration and accompanied by decreases in HIF-1α target genes. Using transcriptome signatures of ABT-737 responses, the authors identified that classes of PI3K/mTOR inhibitors were synergistic when combined with BH3 mimetics in vitro and provided durable tumor regressions in BCL-2-expressing PDX models of SCLC in vivo. Interestingly, the mTOR inhibitor rapamycin preserved levels of BAX protein, a requisite gateway for programmed cell death by ABT-737. These data add a new light on acute resistance mechanisms targeting antiapoptotic proteins. For details, see article by Gardner and colleagues on page 2846.