BREAKING ADVANCES

6471 Highlights from Recent Cancer Literature

REVIEWS

6473 Precision Oncology: Between Vaguely Right and Precisely Wrong
Amy Brock and Sui Huang

6480 The Biology of Cancer Exosomes: Insights and New Perspectives
Carolina F. Ruivo, Bárbara Adem, Miguel Silva, and Sónia A. Melo

6489 Recent Advances of Cell-Cycle Inhibitor Therapies for Pediatric Cancer
Christopher C. Mills, EA. Kolb, and Valerie B. Sampson

MOLECULAR AND CELLULAR PATHOBIOLOGY

6499 Calcium Promotes Human Gastric Cancer via a Novel Coupling of Calcium-Sensing Receptor and TRPV4 Channel
Rui Xie, Jingyu Xu, Yufeng Xiao, Jilin Wu, Hanxing Wan, Bo Tang, Jingjue Liu, Yahan Fan, Suming Wang, Youjun Wu, Tobias Xiao Dong, Michael X. Zhu, John M. Careathers, Hui Dong, and Shiming Yang
Précis: These results raise the possibility that daily calcium supplements may be harmful to patients at risk for gastric cancer.

6513 Mechanisms of Acquired Resistance to BRAF V600E Inhibition in Colon Cancers Converge on RAF Dimerization and Are Sensitive to Its Inhibition
Rona Yaeger, Zhan Yao, David M. Hyman, Jaclyn F. Hechtman, Eseveia Vakiani, HuiYong Zhao, Wenjing Su, Lu Wang, Andrew Joelson, Andrea Cercek, Jose Baselga, Elisa de Stanchina, Leonard Saltz, Michael F. Berger, David B. Solit, and Neal Rosen
Précis: Colorectal cancer resistance to combination inhibition of EGFR and mutant RAF converges on formation of RAF dimers, such that targeting RAF dimers together with EGFR may effectively treat these resistant cancers.

6524 Loss of FOXO1 Cooperates with TMPRSS2–ERG Overexpression to Promote Prostate Tumorigenesis and Cell Invasion
Yinhui Yang, Alexandra M. Blee, Dejie Wang, Jian An, Yunqian Pan, Yuqian Yan, Tao Ma, Yundong He, Joseph Dugdale, Xiaonan Hou, Jun Zhang, S. John Weroha, Wei-Guo Zhu, Y. Alan Wang, Ronald A. DePinho, Wanhai Xu, and Haojie Huang
Précis: This study identifies a signaling pathway that promotes prostate cancer, suggesting new directions to limit progression of this disease, which is the key issue in promoting patient survival.

6538 Integrated Analysis of Whole-Genome ChIP-Seq and RNA-Seq Data of Primary Head and Neck Tumor Samples Associates HPV Integration Sites with Open Chromatin Marks
Précis: This study is the first to describe global relationships between chromatin organization and HPV integration sites in head and neck cancers, with implications for more effective prognosis and treatment.

6551 Clonality, Heterogeneity, and Evolution of Synchronous Bilateral Ovarian Cancer
Xia Yin, Ying Jing, Mei-Chun Cai, Pengfei Ma, Yi Zhang, Cong Xu, Meiying Zhang, Wen Di, and Guanglei Zhuang
Précis: Bilateral ovarian cancers are more likely to form by pelvic spread rather than independent multifocal oncogenesis, with the early characteristic metastasis in this disease mainly a function of dynamic mutational processes and divergent evolution.

6562 DDB2 Is a Novel Regulator of Wnt Signaling in Colon Cancer
Shuo Huang, Damiano Fantini, Bradley J. Merrill, Srilata Bagchi, Grace Guzman, and Pradip Raychaudhuri
Précis: This study describes a novel regulatory element in WNT oncogenic signaling that expands the perspective on how colon cancers develop.
Sleeping Beauty Insertional Mutagenesis in Mice Identifies Drivers of Steatosis-Associated Hepatic Tumors
Précis: Fatty liver disease is growing with the obesity epidemic and the inflammatory damage that it can create can influence the risks and genetic evolution of liver cancer, which is poised to increase in incidence in parallel with obesity.

R-Spondin1/LGR5 Activates TGFβ Signaling and Suppresses Colon Cancer Metastasis
Xiaolin Zhou, Liying Geng, Degeng Wang, Haowei Yi, Geoffrey Talmon, and Jing Wang
Précis: These findings establish a novel cross-talk between an important adult intestinal stem cell marker and a well-established tumor suppressor pathway in colon cancer.

Administering xCT Inhibitors Based on Circadian Clock Improves Antitumor Effects
Fumiyasu Okazaki, Naoya Matsunaga, Kengo Hamamura, Kayoko Suzuki, Takaharu Nakao, Hiroyuki Okazaki, Masahiko Kutsukake, Shiro Fukumori, Yasuhiro Tsuchi, and Hide To
Précis: The circadian gene clock regulates the transcription of the essential cystine transporter xCT, the expression of which determines the effectiveness of the chemotherapy drug sulfasalazine.

Super-Enhancers Promote Transcriptional Dysregulation in Nasopharyngeal Carcinoma
Jiang Yuan, Yan-Yi Jiang, Anand Mayakonda, Moli Huang, Ling-Wen Ding, Han Lin, Fenggang Yu, Yanan Lu, Thomas Kwok Seng Loh, Marilynn Chow, Samantha Savage, Jeffrey W. Tyner, De-Chen Lin, and H. Phillip Koelker
Précis: This study identifies a network of new candidate therapeutic targets in a cancer with high incidence in southeast Asia.

JAM-C Identifies Src Family Kinase-Activated Leukemia-Initiating Cells and Predicts Poor Prognosis in Acute Myeloid Leukemia
Maria De Grandis, Florence Bardin, Cyril Fauriat, Christophe Zemmour, Abdessead El-Kaoutari, Arnauld Sérégé, Samuel Gzanjeaud, Laurent Pouyet, Camille Montersino, Anne-Sophie Chretien, Marie-Joelle Moziconacci, Remy Castellano, Ghislain Bidaut, Jean-Marie Boher, Yves Collette, Stéphane J.C. Mancini, Norbert Vey, and Michel Aurand-Lions
Précis: These findings define a gene signature for tumor-initiating cells in the early heterogeneous population of acute myeloid leukemias, with implications for fighting disease relapse.

MYC Inhibition Depletes Cancer Stem-like Cells in Triple-Negative Breast Cancer
Aimin Yang, Shenghui Qin, Bradley A. Schulte, Stephen P. Ethier, Kenneth D. Tew, and Gavin Y. Wang
Précis: A natural product described in this study may offer an opportunity to selectively kill drug-resistant cancer stem-like cells in triple-negative breast cancer by triggering degradation of the c-MYC oncoprotein.

EZH2 Modifies Sunitinib Resistance in Renal Cell Carcinoma by Kinome Reprogramming
Remi Adelaiye-Ogala, Justin Budka, Nur P. Damayanti, Justine Arrington, Mary Ferris, Chuan-Chih Hsu, Seenivasulu Chintala, Ashley Orillion, Kiersten Marie Miles, Li Shen, May Elbanna, Eric Ciam porterco, Sreevani Arisa, Piergiorgio Pettazzoni, Giulio F. Draetta, Mukund Seshadri, Bradley Hancock, Milan Radovich, Janaiah Kota, Michael Buck, Heike Krilbach, Brian P. Mccarthy, Scott A. Persohn, Paul R. Territo, Yong Zang, Joseph Insalauraj, W. Andy Tao, Peter Hollenhorst, and Roberto Pili
Précis: These results offer a mechanistic rationale to target an oncogenic histone methyltransferase as a strategy to have an impact on sunitinib-resistance in kidney cancers.

IL10 Release upon PD-1 Blockade Sustains Immunosuppression in Ovarian Cancer
Punshottam Larnichbhe, Lavakumar Karyampudi, Barath Shreeder, James Kremps, Deborah Bahr, Joshua Daum, Kimberly R. Kalli, Ellen L. Goode, Matthew S. Block, Martin J. Cannon, and Keith L. Knutson
Précis: These findings identify an actionable mechanism of resistance to anti-PD-1, with implications for broadening therapeutic responses to this immune checkpoint drug.
Secretory Autophagy in Cancer-Associated Fibroblasts Promotes Head and Neck Cancer Progression and Offers a Novel Therapeutic Target
Jacob New, Levi Arnold, Megha Ananth, Sameer Alvi, Mackenzie Thornton, Lauryn Werner, Ossama Tawfik, Hongying Dai, Yelizaveta Shnayder, Kiran Kakarala, Tanace T. Tsue, Douglas A. Girod, Wen-Xing Ding, Shrikant Anant, and Sufi Mary Thomas

Précis: These results establish an oncogenic function for secretory autophagy in the stromal fibroblasts in head and neck cancers, with possible implications to prevent malignant progression in this and other cancer settings.

Astrocytes Promote Medulloblastoma Progression through Hedgehog Secretion

Précis: Astrocytes support the growth of medulloblastomas by secreting the developmental growth factor sonic hedgehog, enabling activation of a key progression pathway in this pediatric brain tumor.

Mesenchymal Stem Cells Promote Hepatocarcinogenesis via lncRNA–MUF Interaction with ANXA2 and miR-34a
Xinlong Yan, Dongdong Zhang, Wei Wu, Shuheng Wu, Jingfeng Qian, Yaqing Hao, Fang Yan, Pingping Zhu, Jiayi Wu, Guanling Huang, Yinghui Huang, Jianjun Luo, Xinhu Liu, Benyu Liu, Xiaomin Chen, Ying Du, Runsheng Chen, and Zusen Fan

Précis: These findings provide compelling evidence that long noncoding RNAs support liver carcinogenesis by facilitating contributions from mesenchymal stem cells in the tumor microenvironment.

SMYD5 Controls Heterochromatin and Chromosome Integrity during Embryonic Stem Cell Differentiation
Benjamin L. Kidder, Runsheng He, Darawalee Wangsa, Hesed M. Padilla-Nash, M. Margarida Bernardo, Shijie Sheng, Thomas Ried, and Keji Zhao

Précis: Changes in a repressive chromatin structure in embryonic stem cells leads to genome instability during differentiation.

Glutamine Addiction in Kidney Cancer Suppresses Oxidative Stress and Can Be Exploited for Real-Time Imaging
Omran Abu Aboud, Samy L. Habib, Josephine Trott, Benjamin Stewart, Sitai Liang, Abhijit J. Chaudhari, Julie Sutcliffe, and Robert H. Weiss

Précis: Glutamine consumed by clear cell renal tumors to support an antioxidant survival pathway can be exploited for functional PET imaging.

Modeling Cytostatic and Cytotoxic Responses to New Treatment Regimens for Ovarian Cancer
Francesca Falcetta, Francesca Bizzaro, Elisa D’Agostini, Maria Rosa Bani, Raffaella Giavazzi, and Paolo Ubezio

Précis: A comparative preclinical study of several treatment regimens for ovarian cancer with paclitaxel, cisplatin, and bevacizumab alone or in combination decodes tumor growth curves via mathematical modeling of the proliferation process.

Disparities in Prostate, Lung, Breast, and Colorectal Cancer Survival and Comorbidity Status among Urban American Indians and Alaskan Natives
Marc A. Emerson, Matthew P. Banegas, Neetu Chawla, Ninah Achacoso, Stacey E. Alexeeff, Alyce S. Adams, and Laurel A. Habel

Précis: These findings address a critical gap in information concerning the cancer experience of the majority of Native Americans and Alaskan Natives in the U.S. who live in urban areas.

Oral Microbiome Composition Reflects Prospective Risk for Esophageal Cancers
Brandilyn A. Peters, Jing Wu, Zhiheng Pei, Liying Yang, Mark P. Purdie, Neal D. Freedman, Eric J. Jacobs, Susan M. Capstur, Richard B. Hayes, and Jiyoung Ahn

Précis: A prospective study of the relationship between the oral microbiome and risks of developing esophageal cancers has potential implications for early detection and prevention.
CORRECTIONS

6788 Correction: miR-103/107 Promote Metastasis of Colorectal Cancer by Targeting the Metastasis Suppressors DAPK and KLF4

6789 Correction: Myc Induces miRNA-Mediated Apoptosis in Response to HDAC Inhibition in Hematologic Malignancies

ABOUT THE COVER

8-Oxo7,8-dihydro-2'-deoxyguanosine (8-oxodG), an oxidized form of deoxyguanosine, is a major product of DNA oxidation and is used as a biomarker for oxidative stress in cancer. The level of 8-oxodG in cellular DNA reflects the balance between the rate of DNA damage and the efficiency of DNA repair. This merged image of double fluorescent-labeled murine xenografted human kidney cancer cells shows a high abundance of 8-oxodG (stained green with FITC) within the nuclei (identified by red propidium iodide staining of all DNA). A higher level of orange to green staining within the kidney tumor section as compared with the normal kidney (not shown) indicates more oxidative DNA damage within the tumor. The image was taken using a Nikon research microscope equipped for epifluorescence with excitation and band pass filters. For details, see article by Abu Aboud and colleagues on page 6746.
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