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Mitochondrial and Metabolic Pathways Regulate Nuclear Gene Expression to Control Differentiation, Stem Cell Function, and Immune Response in Leukemia 1052

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RESEARCH ARTICLES
St. Jude Cloud: A Pediatric Cancer Genomic Data-Sharing Ecosystem 1082

Précis: The St. Jude Cloud enables sharing, visualization, and analysis of large datasets on pediatric cancer and other catastrophic childhood illnesses; recent use cases include classification of and investigations of mutation rates in pediatric cancers.
splice variants promoted an invasive, migratory, stemlike duct was associated with breast tumorigenesis, in the gut or breast cancer, including enzalutamide-resistant prostate cancer, reduced expression of thyroid differentiation genes, blocked the redifferentiation effects of MAPK inhibition, and reduced radioiodine treatment efficacy in vivo.

See commentary, p. 1008

Targeting the p300/CBP Axis in Lethal Prostate Cancer ................. 1118


Précis: AR signaling depends on the transcription factors p300 and CBP, inhibition of which reduced tumor growth in xenograft models of prostate cancer, including enzalutamide-resistant prostate cancer with AR amplification and expression of AR splice variants.

See commentary, p. 1011

A Procarcinogenic Colon Microbe Promotes Breast Tumorigenesis and Metastatic Progression and Concomitantly Activates Notch and β-Catenin Axes ............... 1138


Précis: The presence of the colon-dwelling microbe Bacteroides fragilis in the gut or breast duct was associated with breast tumorigenesis, and a toxin produced by enterotoxigenic B. fragilis promoted an invasive, migratory, stemlike phenotype in breast cancer cells.

SWI/SNF Complex Mutations Promote Thyroid Tumor Progression and Insensitivity to Redifferentiation Therapies .......................... 1158


Précis: Mutations in components of the BAF (mammalian SWI/SNF) complex promoted thyroid cancer, reduced expression of thyroid differentiation genes, blocked the redifferentiation effects of MAPK inhibition, and reduced radioiodine treatment efficacy in vivo.

DNA Polymerase and Mismatch Repair Exert Distinct Microsatellite Instability Signatures in Normal and Malignant Human Cells .......... 1176


Précis: Defective DNA polymerase or mismatch repair proteins left distinct genomic signatures: Microsatellite mutations were most often multi-base pair deletions in the former and single-base pair deletions in the latter; this influenced immune checkpoint blockade efficacy.

CRISPR Screening of CAR T Cells and Cancer Stem Cells Reveals Critical Dependencies for Cell-Based Therapies ............... 1192


Précis: CRISPR-Cas9-based screens uncovered glioma stem cell vulnerabilities and possible ways to enhance chimeric antigen receptor (CAR) T-cell therapies for glioblastoma, potentially improving the so-far disappointing results of CAR-T-cell trials for this cancer.
Metastasis and Immune Evasion from Extracellular cGAMP Hydrolysis 1212

Précis: When expressed by cancer cells, the transmembrane glycoprotein ENPP1 hydrolyzed cGAS-generated extracellular cGAMP—which would otherwise elicit a STING-mediated antitumor response—to produce AMP that was processed into immunosuppressive adenosine.

MNK Inhibition Sensitizes KRAS-Mutant Colorectal Cancer to mTORC1 Inhibition by Reducing elf4E Phosphorylation and c-MYC

Précis: Loss-of-function APC mutations confer susceptibility to rapamycin in colorectal cancer, but oncogenic KRAS mutations circumvent this; however, blocking the MNK-elf4E translation pathway restored sensitivity of these tumors to rapamycin.

Gut Microbiome Directs Hepatocytes to Recruit MDSCs and Promote Cholangiocarcinoma

Précis: In mice with impaired gut barrier function, liver exposure to Gram-negative commensal bacteria led to TLR4-dependent recruitment of immunosuppressive myeloid-derived suppressor cells, which promoted cholangiocarcinoma.

See commentary, p. 1014

Endogenous Retroelement Activation by Epigenetic Therapy Reverses the Warburg Effect and Elicits Mitochondrial-Mediated Cancer Cell Death

Précis: Epigenetic inhibitors cause transcription of endogenous retroviruses, causing ATP depletion via the double-stranded RNA helicases RIG-I and MDAS and leading to tumor cell dependence on aerobic glycolysis, in contradiction to the Warburg effect.

Direct and Indirect Regulators of Epithelial–Mesenchymal Transition–Mediated Immunosuppression in Breast Carcinomas

Précis: Quasi-mesenchymal (qM) breast carcinoma cells produced immunomodulatory proteins, including CD73, which conferred resistance to anti-CTLA4; Cd73 knockout in minority populations of qM cells restored anti-CTLA4 sensitivity in entire tumors.

Retraction
Retraction: Increased Levels of COX-2 and Prostaglandin E2 Contribute to Elevated Aromatase Expression in Inflamed Breast Tissue of Obese Women
Pharmacologic disruption of epigenetic enzymes such as DNA methyltransferases, histone methyltransferases, and histone acetyltransferases has shown some efficacy in cancer, likely in part due to their ability to reactivate normally silenced genomic regions. Endogenous retroviruses are among the regions often activated, resulting in a RIG-I–MDA5-dependent innate immune response. Additionally, Fresquet and colleagues found that the helicase activity of RIG-I and MDA5 depleted intracellular ATP, reversing the Warburg effect and increasing cancer cell dependence on aerobic glycolysis. This was associated with succinate dehydrogenase hyperactivation and consequent production of reactive oxygen species, leading to caspase-independent tumor cell necroptosis that could be enhanced by blocking the programmed-cell-death inhibitor BCL2. For more information, see the article by Fresquet and colleagues on page 1268.