AG-221, a First-in-Class Therapy Targeting Acute Myeloid Leukemia Harboring Oncogenic IDH2 Mutations


Précis: Targeted inhibition of IDH2R140Q with the allosteric inhibitor AG-221 reduces production of the oncometabolite 2HG, promotes differentiation of malignant AML blasts, and extends survival in AML xenografts.

See commentary, p. 459
See article, p. 494

Combination Targeted Therapy to Disrupt Aberrant Oncogenic Signaling and Reverse Epigenetic Dysfunction in IDH2- and TET2-Mutant Acute Myeloid Leukemia


Précis: Mutations in TET2 or IDH2 sensitize AML cells to the DNA hypomethylating agents 5-Aza and AG-221, which induce differentiation, reverse aberrant hypermethylation, and cooperate with FLT3 inhibition to suppress AML.

See commentary, p. 459
See article, p. 478
BCL6 Antagonizes NOTCH2 to Maintain Survival of Human Follicular Lymphoma Cells ........................................... 506
Précis: BCL6 binds to and represses NOTCH2 and other NOTCH pathway genes in follicular lymphoma and GC B cells to promote their survival, and BCL6 inhibition suppresses the growth of follicular lymphoma xenografts.

Gut Microbiota Promotes Obesity-Associated Liver Cancer through PGE2-Mediated Suppression of Antitumor Immunity ..................... 522
Précis: The obesity-associated gut microbial component and metabolite, LTA and DCA, promote COX2-mediated PGE2 production in senescent HSCs to suppress the antitumor immunity in mice fed a high-fat diet and promote HCC.

The activating IDH2R140Q mutation promotes accumulation of the oncometabolite (R)-2-hydroxyglutarate (2HG) to drive acute myeloid leukemia (AML) in a subset of patients. Yen and colleagues generated a potent allosteric inhibitor of IDH2R140Q, AG-221, which reduced 2HG production, promoted differentiation of AML blasts, and extended survival in AML xenografts. In a related study, Shih, Meydan, and colleagues showed that AG-221 reversed aberrant DNA hypermethylation and induced differentiation in IDH2R140Q AML cells, and the DNA hypomethylating agent 5-Azacytidine had similar effects in TET2-mutant AML. Both AG-221 and 5-Azacytidine cooperated with a FLT3 inhibitor to reverse aberrant hypermethylation and suppress leukemic stem cells. Together, these studies indicate that DNA hypomethylating agents can promote AML differentiation and may cooperate with other inhibitors. For details, please see the article by Yen and colleagues on page 478 and the article by Shih, Meydan, and colleagues on page 494.