# Meet The Professors:
## Acute Myeloid Leukemia Edition, 2016

## CME Information

### TARGET AUDIENCE

This activity is intended for medical oncologists and other healthcare providers involved in the treatment of acute myeloid leukemia (AML).

### OVERVIEW OF ACTIVITY

AML is the most common form of leukemia among adults, and in 2016 an estimated 19,950 cases will be diagnosed and 10,430 individuals will die from this disease. Despite the frequency of AML and its associated morbidity and mortality, standard treatment algorithms for this disease have largely remained unchanged. Historically, front-line management has included induction chemotherapy with cytarabine and an anthracycline in an effort to reduce leukemic burden and induce disease remission followed by consolidation strategies using various doses and sequences of similar agents with or without stem cell transplantation depending on the patient's ability to tolerate intensive therapy.

Much dismay has been expressed over the lack of progress in the management of this challenging disease, but in truth a number of recent scientific and therapeutic advances indicate that the future may be much brighter for patients with AML. Significantly, recent progress in molecular diagnostics has not only led to improvements in risk stratification but has also raised the potential hope that effective targeted therapeutic interventions may soon become available. Specifically, molecular diagnostics have led to the identification of several novel genetic markers, including FLT3-ITD, NPM1, CEBPA, c-KIT and others, the presence or absence of which appear to inform patient outcomes. As a result, a number of these have been incorporated into available risk stratification models and clinical practice Guidelines, including those developed by the National Comprehensive Cancer Network.

An array of other targeted and novel therapeutics are being investigated across a variety of AML subsets and clinical situations. These, in addition to the significant strides that have been made to date, provide reason for hope that new treatments will be approved in the near future and that their incorporation into standard care will improve outcomes for patients with this disease. To offer optimal patient care, clinicians need educational interventions designed to increase their knowledge of recent advancements and appropriately counsel them regarding how those new strategies can be safely and effectively integrated into current protocol and off-protocol treatment algorithms for patients with AML.

### LEARNING OBJECTIVES

- Consider age, performance status and disease-related factors to guide the selection of appropriate patients for treatment with induction therapy and/or allogeneic stem cell transplantation.
- Appreciate the clinical and prognostic significance of specific cytogenetic and molecular abnormalities, and employ this information in treatment decision-making for patients with AML.
- Recognize the importance of genetic testing in the treatment of AML.
- Assess available research evidence with existing and emerging FLT3 inhibitors, and use these data to inform decisions concerning clinical care and protocol opportunities.
- Appreciate the recent FDA breakthrough designations for and available data with midostaurin and venetoclax in preparation for their potential availability in the clinic.

### ACCREDITATION STATEMENT

Research To Practice is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

### CREDIT DESIGNATION STATEMENT

Research To Practice designates this enduring material for a maximum of 2.75 *AMA PRA Category 1 Credits™*. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

### AMERICAN BOARD OF INTERNAL MEDICINE (ABIM) — MAINTENANCE OF CERTIFICATION (MOC)

Successful completion of this CME activity enables the participant to earn up to 2.75 MOC points in the American Board of Internal Medicine's (ABIM) Maintenance of Certification (MOC) program. Participants will earn MOC points equivalent to the amount of CME credits claimed for the activity. It is the

CME activity provider's responsibility to submit participant completion information to ACCME for the purpose of granting ABIM MOC credit.

Please note, this program has been specifically designed for the following ABIM specialty: **medical oncology**.

Personal information and data sharing: Research To Practice aggregates deidentified user data for program-use analysis, program development, activity planning and site improvement. We may provide aggregate and deidentified data to third parties, including commercial supporters. We do not share or sell personally identifiable information to any unaffiliated third parties or commercial supporters. Please see our privacy policy at **ResearchToPractice.com/Privacy-Policy** for more information.

## HOW TO USE THIS CME ACTIVITY

This CME activity consists of a video component. To receive credit, the participant should watch the video, complete the Post-test with a score of 80% or better and fill out the Educational Assessment and Credit Form located at **ResearchToPractice.com/MTPAML116/CME**.

## CONTENT VALIDATION AND DISCLOSURES

Research To Practice (RTP) is committed to providing its participants with high-quality, unbiased and state-of-the-art education. We assess conflicts of interest with faculty, planners and managers of CME activities. Conflicts of interest are identified and resolved through a conflict of interest resolution process. In addition, all activity content is reviewed by both a member of the RTP scientific staff and an external, independent physician reviewer for fair balance, scientific objectivity of studies referenced and patient care recommendations.

**FACULTY** — The following faculty (and their spouses/partners) reported relevant conflicts of interest, which have been resolved through a conflict of interest resolution process:

**Jorge E Cortes, MD**
Jane and John Justin Distinguished Chair
in Leukemia Research
Chief, CML and AML Sections
Deputy Chair, Department of Leukemia
The University of Texas MD Anderson Cancer Center
Houston, Texas

**Consulting Agreements:** Bristol-Myers Squibb Company, Daiichi Sankyo Inc, Novartis Pharmaceuticals Corporation, Pfizer Inc; **Contracted Research:** Astellas Pharma Global Development Inc, Boehringer Ingelheim Pharmaceuticals Inc, Bristol-Myers Squibb Company, Celgene Corporation, Daiichi Sankyo Inc, Novartis Pharmaceuticals Corporation, Pfizer Inc.

**Richard M Stone, MD**
Director, Adult Leukemia Program
Dana-Farber Cancer Institute
Professor of Medicine
Harvard Medical School
Boston, Massachusetts

**Advisory Committee:** Agios Pharmaceuticals, Amgen Inc, Arog Pharmaceuticals Inc, Bristol-Myers Squibb Company, Celator Pharmaceuticals Inc, Celgene Corporation, Genentech BioOncology, Janssen Biotech Inc, Merck, Novartis Pharmaceuticals Corporation, Pfizer Inc; **Clinical Research:** Novartis Pharmaceuticals Corporation; **Data and Safety Monitoring Board:** Celgene Corporation.

**COMMUNITY ONCOLOGISTS** — The following community oncologists (and their spouses/partners) reported relevant conflicts of interest, which have been resolved through a conflict of interest resolution process:

**Suzanne Cole, MD**
Hematologist and Medical Oncologist
Mercy Hospital Coletta Cancer Center
Oklahoma City, Oklahoma

No relevant conflicts of interest to disclose.

**Lyle Feinstein, MD**
Miami Cancer Institute
Miami, Florida

No relevant conflicts of interest to disclose.

**Jewel Johl, MD**
Diablo Valley Oncology
Pleasant Hill, California

**Speakers Bureau:** Takeda Oncology.

**MODERATOR** — **Dr Love** is president and CEO of Research To Practice, which receives funds in the form of educational grants to develop CME activities from the following commercial interests: AbbVie Inc, Acerta Pharma, Agendia Inc, Amgen Inc, Array BioPharma Inc, Astellas Pharma Global Development Inc, AstraZeneca Pharmaceuticals LP, Baxalta Inc, Bayer HealthCare Pharmaceuticals, Biodesix Inc, bioTheranostics Inc, Boehringer Ingelheim Pharmaceuticals Inc, Boston Biomedical Pharma Inc, Bristol-Myers Squibb Company, Celgene Corporation, Clovis Oncology, CTI BioPharma Corp, Daiichi Sankyo Inc, Dendreon Pharmaceuticals Inc, Eisai Inc, Exelixis Inc, Foundation Medicine, Genentech BioOncology, Genomic Health Inc, Gilead Sciences Inc, ImmunoGen Inc, Incyte Corporation, Infinity Pharmaceuticals Inc, Janssen Biotech Inc, Jazz Pharmaceuticals Inc, Lilly, Medivation Inc, Merck, Merrimack Pharmaceuticals Inc, Myriad Genetic Laboratories Inc, NanoString Technologies, Natera Inc, Novartis Pharmaceuticals Corporation, Novocure, Onyx Pharmaceuticals, an Amgen subsidiary, Pharmacyclics LLC, an AbbVie Company, Prometheus Laboratories Inc, Regeneron Pharmaceuticals, Sanofi, Seattle Genetics, Sigma-Tau Pharmaceuticals Inc, Sirtex Medical Ltd, Spectrum Pharmaceuticals Inc, Taiho Oncology Inc, Takeda Oncology, Tesaro Inc, Teva Oncology, Tokai Pharmaceuticals Inc and VisionGate Inc.

**RESEARCH TO PRACTICE STAFF AND EXTERNAL REVIEWERS** — The scientific staff and reviewers for Research To Practice have no relevant conflicts of interest to disclose.

*This educational activity contains discussion of published and/or investigational uses of agents that are not indicated by the*

*Food and Drug Administration. Research To Practice does not recommend the use of any agent outside of the labeled indications. Please refer to the official prescribing information for each product for discussion of approved indications, contraindications and warnings. The opinions expressed are those of the presenters and are not to be construed as those of the publisher or grantors.*

This activity is supported by educational grants from AbbVie Inc, Astellas Pharma Global Development Inc, Celgene Corporation and Novartis Pharmaceuticals Corporation.

**Hardware/Software Requirements:**
A high-speed Internet connection
A monitor set to 1280 x 1024 pixels or more
Internet Explorer 7 or later, Firefox 3.0 or later, Chrome, Safari 3.0 or later
Adobe Flash Player 10.2 plug-in or later
Adobe Acrobat Reader
(Optional) Sound card and speakers for audio

**Last review date:** November 2016

**Expiration date:** November 2017

## Select Publications


**A phase 3 open-label, multicenter, randomized study of ASP2215 versus salvage chemotherapy in patients with relapsed or refractory acute myeloid leukemia (AML) with FLT3 mutation.** NCT02421939

**A phase 3 open-label randomized study of quizartinib (AC220) monotherapy versus salvage chemotherapy in subjects with tyrosine kinase 3 - internal tandem duplication (FLT3-ITD) positive acute myeloid leukemia (AML) refractory to or relapsed after first-line treatment with or without hematopoietic stem cell transplantation (HSCT) consolidation.** NCT02039726

Cancer Genome Atlas Research Network. **Genomic and epigenomic landscapes of adult de novo acute myeloid leukemia.** *N Engl J Med* 2013;368(22):2059-74.

Chou et al. **The prognostic impact and stability of isocitrate dehydrogenase 2 mutation in adult patients with acute myeloid leukemia.** *Leukemia* 2011;25(2):246-53.

Cortes JE et al. **Final results of a phase 2 open-label, monotherapy efficacy and safety study of quizartinib (AC220) in patients ≥ 60 years of age with FLT3-ITD positive or negative relapsed/refractory acute myeloid leukemia.** *Proc ASH* 2012;**Abstract 48**.

Dang L et al. **IDH mutations in glioma and acute myeloid leukemia.** *Trends in Mol Med* 2010;16:387-97.

DiNardo C et al. **A phase 1b study of venetoclax (ABT-199/GDC-0199) in combination with decitabine or azacitidine in treatment-naive patients with acute myelogenous leukemia who are ≥ to 65 years and not eligible for standard induction therapy.** *Proc ASH* 2015;**Abstract 327**.

Dombret H et al. **International phase 3 study of azacitidine vs conventional care regimens in older patients with newly diagnosed AML with >30% blasts.** *Blood* 2015;126(3):291-9.

Foran JM et al. **North American Leukemia, Intergroup phase III randomized trial of single agent clofarabine as induction and post-remission therapy, and decitabine as maintenance therapy in newly-diagnosed acute myeloid leukemia in older adults (age ≥60 years): A trial of the ECOG-ACRIN Cancer Research Group (E2906).** *Proc ASH* 2015;**Abstract 217**.

Frohling S et al. **Prognostic significance of activating FLT3 mutations in younger adults (16 to 60 years) with acute myeloid leukemia and normal cytogenetics: A study of the AML Study Group Ulm.** *Blood* 2002;100(13):4372-80.

Kantarjian HM et al. **Multicenter, randomized, open-label, phase III trial of decitabine versus patient choice, with physician advice, of either supportive care or low-dose cytarabine for the treatment of older patients with newly diagnosed acute myeloid leukemia.** *J Clin Oncol* 2012;30(21):2670-7.

Konopleva M et al. **A phase 2 study of ABT-199 (GDC-0199) in patients with acute myelogenous leukemia (AML).** *Proc ASH* 2014;**Abstract 118**.

Levis M et al. **Results of a first-in-human, phase I/II trial of ASP2215, a selective, potent inhibitor of FLT3/Axl in patients with relapsed or refractory (R/R) acute myeloid leukemia (AML).** *Proc ASCO* 2016;**Abstract 7003**.

Levis M et al. **Results from a randomized trial of salvage chemotherapy followed by lestaurtinib for patients with FLT3 mutant AML in first relapse.** *Blood* 2011;117(12):3294–301.

Litzow MR. **More flitting about FLT3.** *Blood* 2005;106:3331-2.

Lo-Coco F et al. **Retinoic acid and arsenic trioxide for acute promyelocytic leukemia.** *N Engl J Med* 2013;369 (2):111-21.

Marcucci G et al. **Adding KIT inhibitor dasatinib (DAS) to chemotherapy overcomes the negative impact of KIT mutation/over-expression in core binding factor (CBF) acute myeloid leukemia (AML): Results from CALGB 10801 (Alliance).** *Blood* 2014;124:8.

Pan R et al. **Selective BCL-2 inhibition by ABT-199 causes on-target cell death in acute myeloid leukemia.** *Cancer Discov* 2014;4(3):362-75.

Popplewell LL, Forman SJ. **Is there an upper age limit for bone marrow transplantation?** Bone Marrow Transplantation 2002;29(4):277-84.

Prensner JR, Chinnaiyan AM. **Metabolism unhinged: IDH mutations in cancer.** *Nat Med* 2011;17(3):291-3.

Röllig C et al. **Addition of sorafenib versus placebo to standard therapy in patients aged 60 years or younger with newly diagnosed acute myeloid leukaemia (SORAML): A multicentre, phase 2, randomised controlled trial.** *Lancet Oncol* 2015;16(16):1691-9.

Souers AJ et al. **ABT-199, a potent and selective BCL-2 inhibitor, achieves antitumor activity while sparing platelets.** *Nat Med* 2013;19(2):202-8.

## Select Publications


Stone RM et al. **The multi-kinase inhibitor midostaurin (M) prolongs survival compared with placebo (P) in combination with daunorubicin (D)/cytarabine (C) induction (ind), high-dose C consolidation (consol), and as maintenance (maint) therapy in newly diagnosed acute myeloid leukemia (AML) patients (pts) age 18-60 with FLT3 mutations (muts): An international prospective randomized (rand) P-controlled double-blind trial (CALGB 10603/RATIFY [Alliance]).** *Proc ASH* 2015;**Abstract 6**.

Uy G et al. **Addition of sorafenib to chemotherapy improves the overall survival of older adults with FLT3-ITD mutated acute myeloid leukemia (AML) (Alliance C11001).** *Proc ASH* 2015;**Abstract 319**.

Walter RB et al. **Impact of pretransplantation minimal residual disease, as detected by multiparametric flow cytometry, on outcome of myeloablative hematopoietic cell transplantation for acute myeloid leukemia.** *J Clin Oncol* 2011;29(9):1190-7.

Wolach O, Stone RM. **How I treat mixed-phenotype acute leukemia.** *Blood* 2015;125(16):2477-85.