What's on the Horizon for Acute Myeloid Leukemia?

LEUKEMIA & LYMPHOMA SOCIETY®

Welcome & Introductions

Dr. Steensma's slides are available for download at **www.LLS.org/programs**.

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What's on the Horizon for Acute Myeloid Leukemia?

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What's on the Horizon for Acute Myeloid Leukemia?

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What's on the Horizon for Acute Myeloid Leukemia?

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Disclosure

David P. Steensma, MD, FACP, has affiliations with Acceleron, Amgen, Incyte, Onconova, and Takeda *(Consultant).*

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Definitions and Risk Assessment

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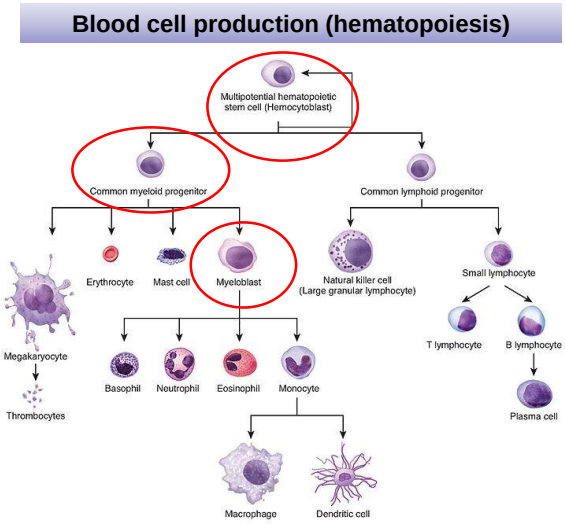
Definitions

- AML is a hematological cancer: "*Clonal"* proliferation of myeloid precursor cells (immature white blood cells), unable to mature
- These malignant "blasts" accumulate in marrow, blood, and sometimes other tissues
  - 20% blasts = acute leukemia
- These abnormal cells inhibit production of red blood cells, platelets, and mature neutrophils / granulocytes



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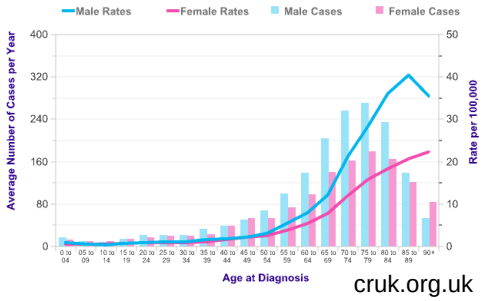
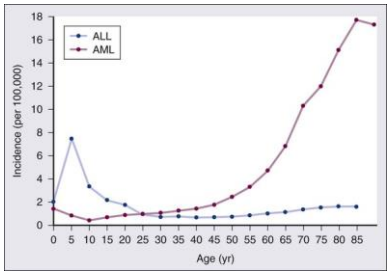
AML – By The Numbers



cruk.org.uk

- New US cases each year: ~21,000
- Deaths each year: ~11,000
- Median age: ~67 years



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Prognostication in AML

- **Who** is the patient?
  - Age
  - Medical "co-morbidities" (i.e., other problems)
- Did it evolve out of **preceding marrow disease** (e.g. myelodysplastic syndromes (MDS))?
  - Not always easy to tell…
- Is it a consequence of **therapy for another cancer?** ("therapy-related AML")
- What are the **biological characteristics**?
  - Cytogenetic (chromosome) analysis
  - DNA mutational analysis: *FLT3, NPM1, CEBPA,* etc

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Cytogenetics (chromosomes, karyotype)

"Good-risk"

- Translocation t(15;17) - Acute promyelocytic leukemia (APML, APL)
  - ~10%... A different disease
- t(8;21) and inv(16),
  - ~15%, "Core binding factor" alterations

"Poor-Risk"

-Chromosome 7 deletion
-Chromosome 5 deletion
-t(6;9)
-Complex (i.e., 3 or more abnormalities)
-Chromosome 11 translocations at 11q23
-Chromosome 17p abnormalities

"Intermediate"

-Normal
-One or two (non-bad) abnormalities

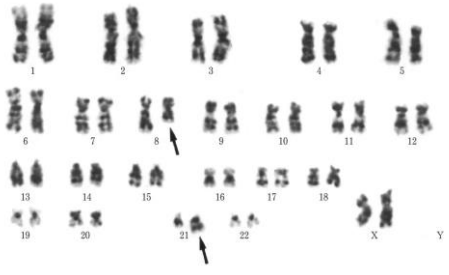

Figure 2. The karyotype at the diagnosis of AML [46, XX, t(8;21)(q22;q22)].

Sakai et al Internal Medicine 43: 582–586, 2004

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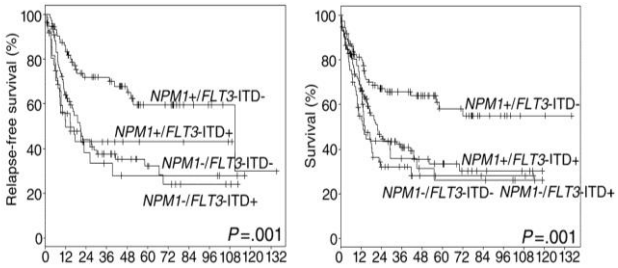
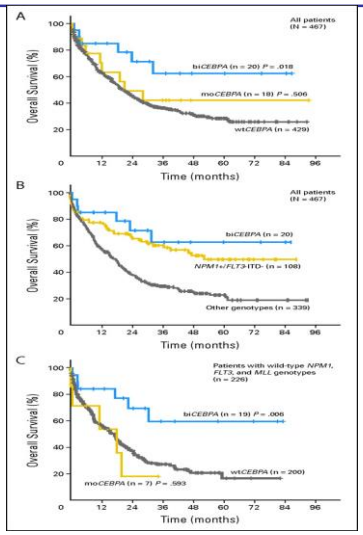
Prognostically important genes: *NPM1, FLT3* and *CEBPA*



Dohner, K. et al. ***Blood*** **2005**



NPM1 mutation*:* Favorable
FLT3 ITD: Unfavorable
FLT3 TKD (D835/D836): Controversial
CEBPA one mutation: Unfavorable
CEBPA two mutations: Favorable

Dufour, A. et al. *J Clin Oncol*, 2010

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European LeukemiaNet (ELN) Molecular and Cytogenetic Risk Groups

Table 1. European LeukemiaNet Standardized Reporting System for Correlation of Cytogenetic and Molecular Genetic Data in AML With Clinical Data[12]

Genetic Group	Subsets
Favorable	t(8;21)(q22;q22); *RUNX1-RUNX1T1*
	inv(16)(p13.1q22) or t(16;16)(p13.1;q22); *CBFB-MYH11*
	Mutated *NPM1* without *FLT3*-ITD (normal karyotype)
	Mutated *CEBPA* (normal karyotype)
Intermediate-I	Mutated *NPM1* and *FLT3*-ITD (normal karyotype)
	Wild-type *NPM1* and *FLT3*-ITD (normal karyotype)
	Wild-type *NPM1* without *FLT3*-ITD (normal karyotype)
Intermediate-II	t(9;11)(p22;q23); *MLLT3-MLL*
	Cytogenetic abnormalities not classified as favorable or adverse
Adverse	inv(3)(q21q26.2) or t(3;3)(q21;q26.2); *RPN1-EVI1*
	t(6;9)(p23;q34); *DEK-NUP214*
	t(v;11)(v;q23); *MLL* rearranged
	–5 or del(5q)
	–7
	abnl(17p)
	Complex karyotype*

Abbreviations: AML, acute myeloid leukemia; ITD, internal tandem duplication.
*Complex karyotype is defined as three or more chromosome abnormalities in the absence of one of the WHO designated recurring translocations or inversions: t(8;21), inv(16) or t(16;16), t(15;17), t(9;11), t(v;11)(v;q23), t(6;9), inv(3) or t(3;3).

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Mrozek K et al, *JCO* 2012

Outcome by ELN Risk Group

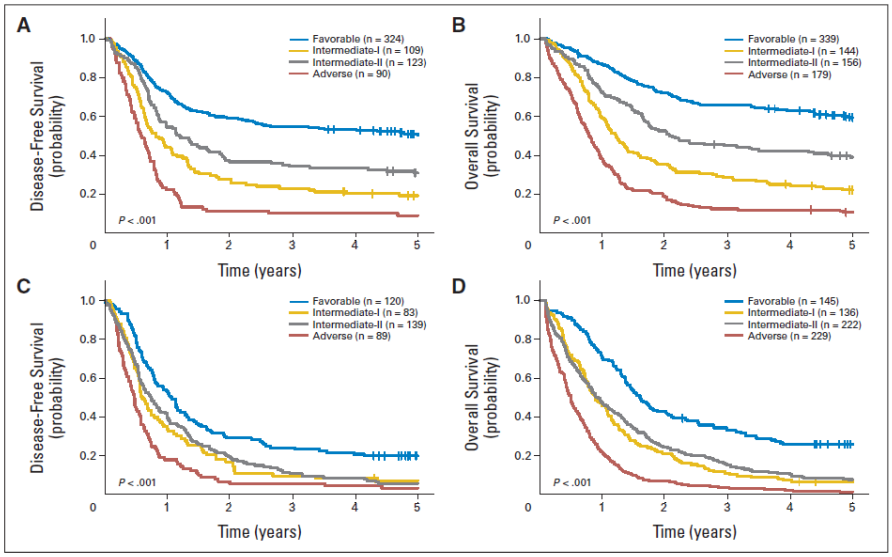

Fig 4. Outcome of patients with primary acute myeloid leukemia classified into the four European LeukemiaNet genetic groups according to the European LeukemiaNet recommendations. (A) Disease-free survival and (B) overall survival of patients younger than age 60 years; (C) disease-free survival and (D) overall survival of patients age 60 years or older.

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Mrozek K et al, *J Clin Oncol* 2012

AML Survival by Age

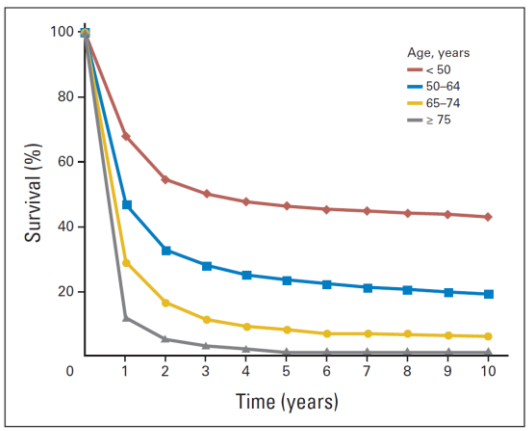

Fig 1. Relative survival by time and age for acute myeloid leukemia based on SEER data.

Klepin et al. JCO 2014

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Why Do Older Patients with AML Have A Poorer Prognosis?

- Frailer and more commonly have other health problems
- Less favorable and more unfavorable cytogenetics
- Higher incidence of preceding MDS
- Elevated therapy-related morbidity and mortality
- Higher incidence of treatment-resistant disease
- Lower rates and duration of complete remission, and shorter median overall survival
- Less likely to be eligible for allogeneic hematopoietic cell transplantation

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AML gets more complex!

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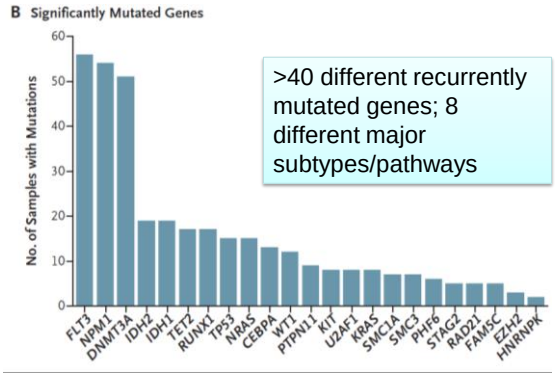
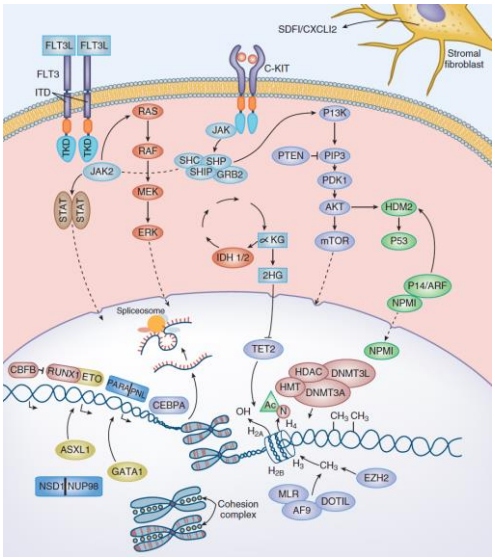
The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 MAY 30, 2013 VOL. 368 NO. 22

Genomic and Epigenomic Landscapes of Adult De Novo Acute Myeloid Leukemia

The Cancer Genome Atlas Research Network



>40 different recurrently mutated genes; 8 different major subtypes/pathways



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200 Patients – 200 Different Diseases?

Each column represents a patient;
each row is a gene;
each colored box indicates mutation

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Current Treatment

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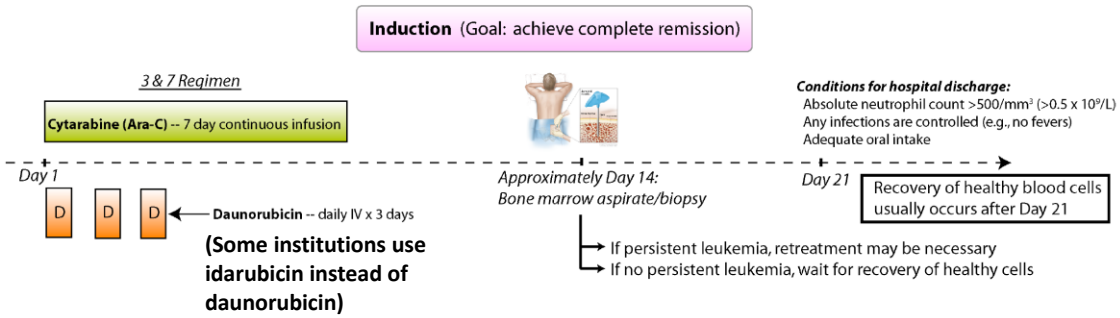
"3&7" or "7+3" – The Standard Remission Induction Approach for "Fit" Patients From 1973-2017

Standard Non-Protocol Therapy for Acute Myeloid Leukemia (AML)



Remission rate: 40-75%, depending on age and disease biology
Mortality rate: 10-30%, depending on age and comorbid conditions

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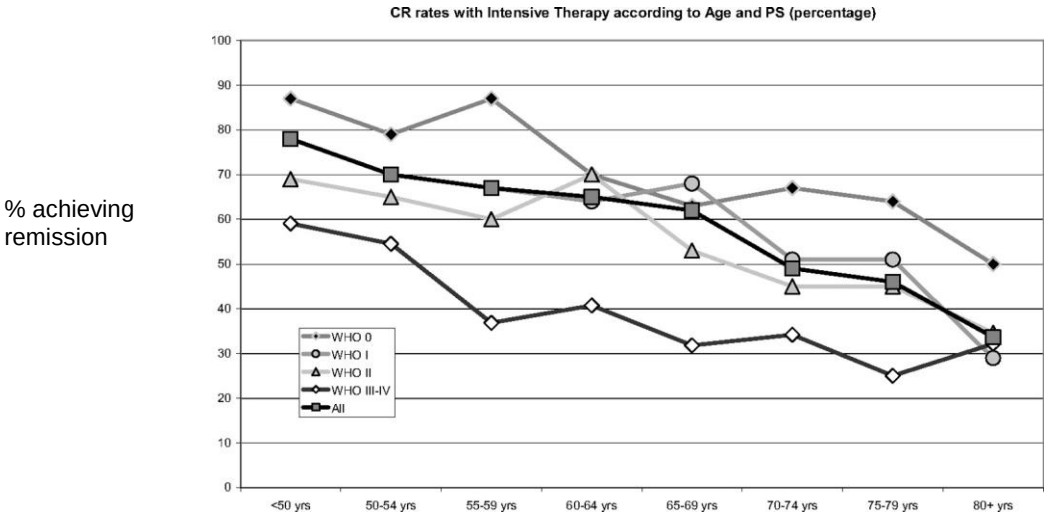
Complete remission rates with intensive treatment according to age and performance status



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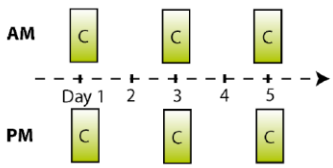
Juliusson, G. et al. *Blood* 2009

Standard Post-Remission Intensive Therapy: 1993-?

Consolidation (Goal: lower risk of relapse)

High-dose or Mid-dose Cytarabine (Ara-C) -- "HiDAC" or "MiDAC" *(May be repeated up to 4 times, with 2-6 week break between cycles after count recovery)*



6 **Cytarabine (Ara-C)** doses total, each dose is a ~3 hour infusion
1 dose in AM and 1 dose in PM on days 1, 3, and 5 (no chemotherapy on day 2 or day 4)

Most patients can be safely discharged from the hospital on day 6, but about one-half will need to be readmitted later, usually due to fevers during the period of low white counts (neutropenia)

*First Consolidation treatment ("cycle") usually begins 2-6 weeks after recovery of blood counts following Induction chemotherapy
* For some patients, the first Consolidation cycle may be "2 & 5", a shortened version of 3 & 7, instead of HiDAC or MiDAC
* Some patients will go to stem cell transplant during or instead of Consolidation (depends on patient age, risk of relapse, and donor availability)

DANA-FARBER/BRIGHAM AND WOMEN'S CANCER CENTER

Created August 2010 by David Steensma MD for the Dana-Farber Cancer Institute Leukemia Group

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Emerging Approaches

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2017 Acute Myeloid Leukemia FDA Approvals

- 4/28/17: **Midostaurin** (Rydapt™; Novartis)
  - *For adult patients with newly diagnosed AML who have a FLT3 mutation*
  - Companion diagnostic: Invivoscribe LeukoStrat CDx FLT3 mutation assay
- 8/1/17: **Enasidenib** (Idhifa™; Agios)
  - *For adult patients with relapsed/refractory AML who have an IDH2 mutation*
  - Companion diagnostic: Abbott m2000 RealTime IDH2 mutation assay
- 8/3/17: **CPX351** / fixed ratio daunorubicin-cytarabine (Vyxeos™; Jazz)
  - *For adults with either of two types of AML: newly diagnosed therapy-related AML (t-AML) or AML with myelodysplasia-related changes (AML-MRC)*
- 9/1/17: **Gemtuzumab ozogamicin** (Mylotarg™; Pfizer)
  - *For adults with newly diagnosed AML whose tumors express the CD33 antigen (CD33+), and for treatment of patients 2 years or older with relapsed/refractory CD33+ AML*

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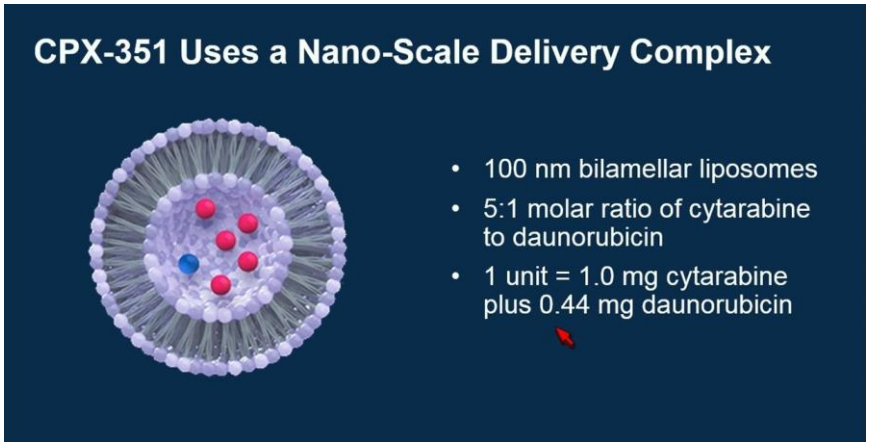
CPX-351 Structure



Source: Celator

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CPX-351 Trial Design

Randomized Phase 3 Trial of CPX-351 vs "7+3" in Older Patients with sAML

Primary Endpoint:
Overall Survival

Eligibility
- Previously untreated sAML or tAML
- Ages 60- 75
- Able to tolerate intensive therapy
- PS 0-2

CPX-351

100 units/m^2 IV days 1, 3, 5
Up to 2 inductions and 2 consolidations

7+3

Daunorubicin 60 mg/m^2
Cytarabine 100 mg/m^2

Source: Celator

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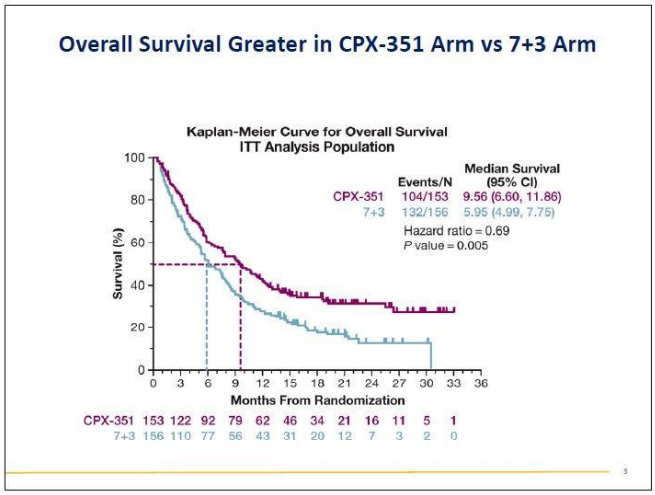
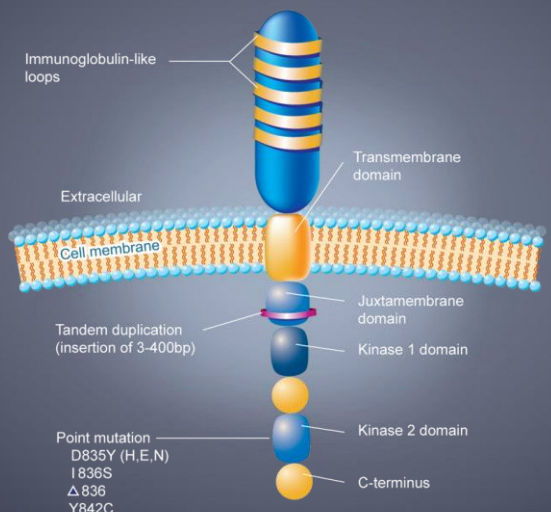
CPX-351 Trial Result



Lancet J et al *ASCO* 2016 annual meeting 25

Activating *FLT3* Mutations in AML



ITD: 25-30%

High relapse, poor prognosis

TKD: 5-10%

Litzow MR. *Blood*. 2005;106:3331-3332.

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A Phase III Randomized Double-blinded Study Of Chemotherapy +/- Midostaurin (PKC412) In Newly Diagnosed Adults aged 18-60 with *FLT3* Mutated Acute Myeloid Leukemia (AML)

Richard M. Stone, Sumithra Mandrekar, Ben L Sanford, Susan Geyer, Clara D. Bloomfield, Konstanze Dohner, Christian Thiede, Guido Marcucci, Francesco Lo-Coco, Rebecca B. Klisovic, Andrew Wei, Jorge Sierra, Miguel A. Sanz, Joseph M. Brandwein, Theo de Witte, Dietger Niederwieser, Frederick R. Appelbaum, Bruno C. Medeiros, Martin S Tallman, Jurgen Krauter, Richard F. Schlenk, Arnold Ganser, Hubert Serve, Gerhard Ehninger, Sergio Amadori, Richard A. Larson, and Hartmut Dohner

Participants: ALLIANCE/CALGB, AMLSG, CETLAM, ECOG, EORTC, GIMEMA, NCIC, OSHO, PETHEMA, SAL, SWOG

CTEP sponsored, Novartis provided drug and sponsored outside North America, and Alliance (formerly CALGB) chaired study, collected data and performed analysis

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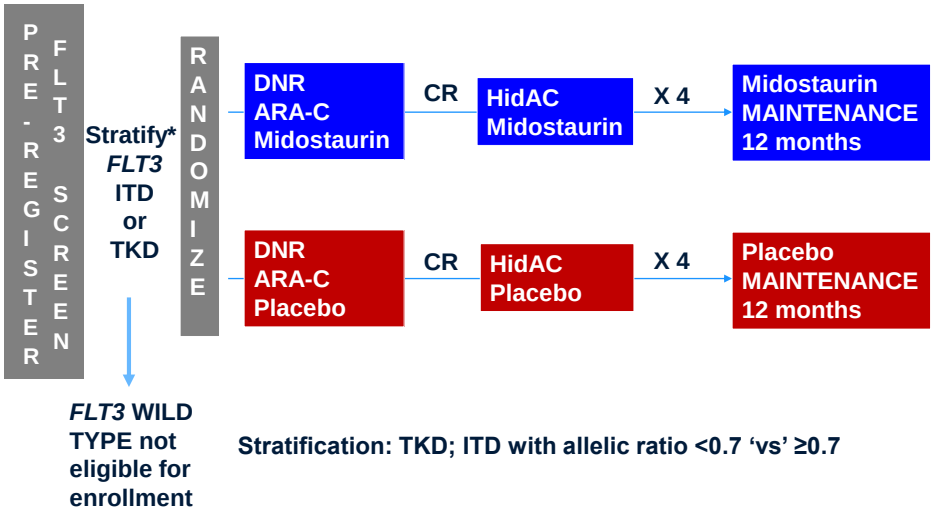
RATIFY Trial Schema



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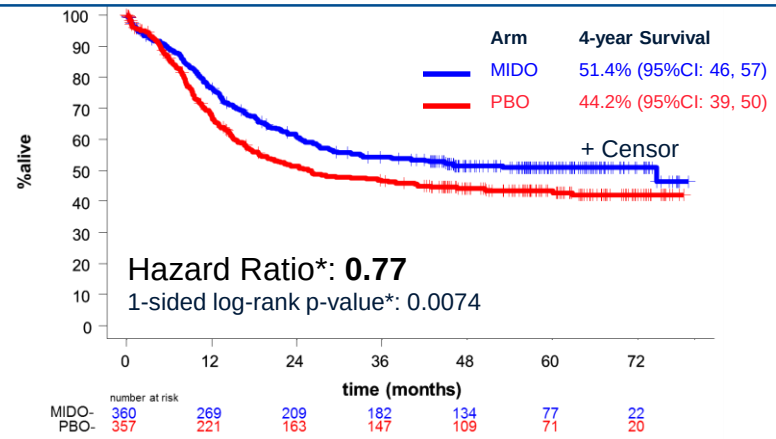
Overall Survival (Primary Endpoint)

23% reduced risk of death in the Midostaurin arm



- **Median OS**: Mido 74.7 (31.7-NE); PBO 25.6 (18.6-42.9) months

NE: not estimable
* controlled for FLT3 subtype (TKD, ITD-Low, ITD-High)

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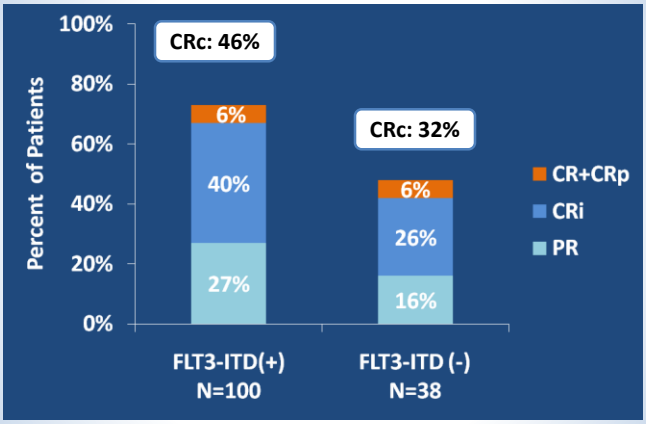
Phase 2 Study of Quizartinib in AML: Response Rate



- **Median duration of response: 12.1 weeks FLT3-ITD(+) & 7.0 weeks FLT3-ITD(-)**
- **75% of FLT3-ITD(+) and 48% of FLT3-ITD(-) patients refractory to their last prior therapy, achieved at least a PR to quizartinib**

Levis et al
ASH 2015

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Clinical Response to Gilteritinib Treatment by FLT3 Mutation or TKI Status

Clinical Response	≥80 mg Gilteritinib				
	Mutation Type			TKI Status	
	FLT3-ITD only	FLT3-D835 only	ITD and D835	Prior TKI	TKI Naïve
	N=142	N=11	N=9	N=40	N=127
CR	16 (11)	0	0	2 (5)	14 (11)
CRp	11 (8)	0	0	3 (8)	8 (7)
CRi	38 (27)	1 (9)	4 (44)	9 (23)	35 (28)
PR	15 (11)	2 (18)	0	5 (13)	13 (10)
CRc (CR+CRp+CRi)	**65 (46)**	**1 (9)**	**4 (44)**	**14 (35)**	**57 (45)**
ORR (CRc+PR)	**80 (56)**	**3 (27)**	**4 (44)**	**19 (48)**	**70 (55)**

Data presented as n (%).
CR, complete remission; CRc, composite complete remission; CRi, complete remission with incomplete hematologic recovery; CRp, complete remission with incomplete platelet recovery; ORR, overall response rate; PR, partial response.

CHRYSALIS

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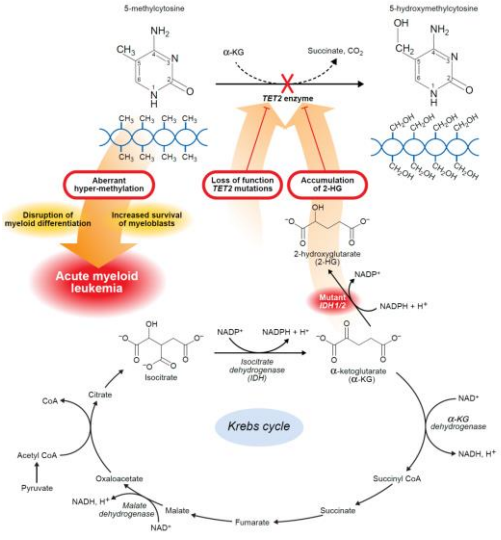
IDH1/2-mutant AML

- Mardis et al, NEJM 2009: First description of *IDH1* mutations in ~8% of patients with AML, associated with normal cytogenetic status (cn-AML).
- Subsequent studies found a larger subset, ~15%, of patients with mutations in the *IDH2* gene.
- IDH proteins, essential to the Krebs Cycle, catalyze decarboxylation of isocitrate to α-ketoglutarate (α-KG) in cytoplasm (IDH1) and mitochondria (IDH2).
- Mutant IDH enzymes catalyze an NADPH-dependent reduction of α-KG to 2-hydroxyglutarate (2-HG).
- This leads to accumulation of 2-HG onco-metabolite in IDH-mutant tumors.



-Ward et al. Cancer cell, 2010
-Gross et al. J Exp Med 207:339-44, 2010.
-Dang et al. Nature 462:739-44, 2009.

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Response to Enasidenib (AG-221) in AML/MDS

	RR-AML (n = 159)	Untreated AML (n = 24)	MDS (n = 14)	All (N = 209)
Overall Response (CR, CRp, CRi, mCR, PR)	**59 (37%)** [95%CI: 30%, 45%]	**10 (42%)** [22%, 63%]	**7 (50%)** [23%, 77%]	**79 (38%)** [31%, 45%]
CR	**29 (18%)** [95%CI: 13%, 25%]	**4 (17%)** [5%, 37%]	**3 (21%)** [5%, 51%]	**37 (18%)** [13%, 24%]
CRp	1 (1%)	1 (4%)	1 (7%)	3 (1%)
CRi	3 (2%)	0	0	3 (1%)
mCR	9 (6%)	1 (4%)	3 (21%)	14 (7%)
PR	17 (11%)	4 (17%)	0	22 (11%)
SD	72 (45%)	9 (38%)	6 (43%)	96 (46%)
PD	10 (6%)	1 (4%)	0	11 (5%)
Not evaluable	18 (11%)	4 (17%)	1 (7%)	23 (11%)

- Overall response by IDH mutation type: R140Q 36% / R172K 42%

CR, complete response; CRp, CR with incomplete platelet recovery; CRi, CR with incomplete hematologic recovery; mCR, marrow CR; PR, partial response; SD, stable disease; PD, progressive disease

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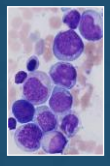
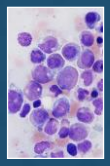
Clinical activity of AG-120 in R/R AML

Patient achieved CR by end of Cycle 1

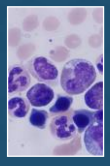
Screening
44% blasts



Cycle 1
Day 15
3%
blasts



Cycle 1
Day 28
2% blasts



	Dose escalation	
	R/R AML n=63	Overall N=78
CR, n (%)	10 (16)	14 (18)
CRi/CRp, n (%)	8 (13)	8 (10)
PR, n (%)	1 (2)	2 (3)
mCR/MLFS, n (%)	2 (3)	6 (8)
SD, n (%)	27 (43)	30 (38)
PD, n (%)	8 (13)	8 (10)
NE, n (%)	7 (11)	10 (13)
ORR, n (%) [95% CI]	21 (33) [22, 46]	30 (38) [28, 50]

DiNardo et al ASH 2016

Data cut off date 1 August 2016
CR = complete response; CRi = CR with incomplete neutrophil recovery; CRp = CR with incomplete platelet recovery; PR = partial response; mCR/MLFS (marrow CR/morphologic leukemia-free state) = <5% blasts in bone marrow, no hematologic recovery; SD = stable disease; NE = not evaluable; ORR = overall response rate (CR + CRi + CRp + PR + mCR/MLFS)

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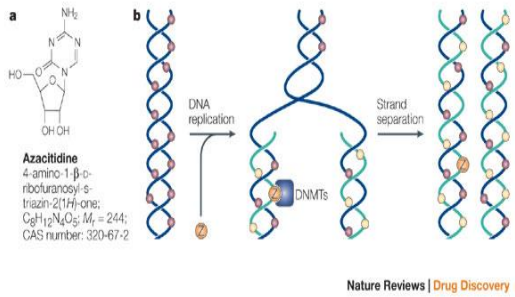
DNA Hypomethylating Therapies

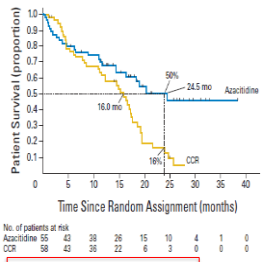
- Less intensive treatment, increasingly used for frailer or older patients
- Typically administered in outpatient clinic
- Can lead to therapeutic responses, including transfusion independence, decrease in leukemic burden, and less commonly, remissions
- However, responses often transient, with leukemic progression and brief post-HMA survival
- **Decitabine** and **azacitidine** FDA approved for MDS (and AML with 20-30% blasts)
- Development: guadecitabine (SGI-110), CC-486, ASTX727



Issa JP, et al. Nature Reviews Drug Discovery 2005.

Hypomethylating Therapy among Older Adults

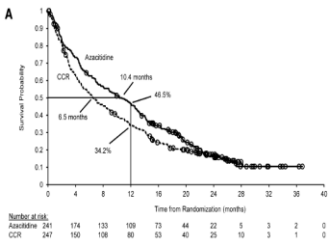
Azacitidine Prolongs Overall Survival Compared With Conventional Care Regimens in Elderly Patients With Low Bone Marrow Blast Count Acute Myeloid Leukemia



CR rate: 18 % (10/55)

Fenaux P, et al. JCO 2010

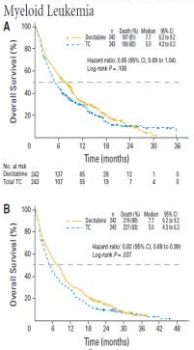
International phase 3 study of azacitidine vs conventional care regimens in older patients with newly diagnosed AML with >30% blasts



	Azacitidine (n = 241)	
	No.	%
Hematologic response*		
CR + CRi	67	27.8
CR	47	19.5
CRi	20	8.3

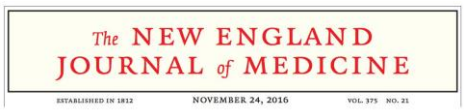
Dombret H, et al. Blood 2015

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



Response	Supportive Care (n = 26) No.	%	Cytarabine (n = 215) No.	%	Total TC (n = 243) No.	%	Decitabine (n = 242) No.	%
CR	1	3.6	17	7.9	18	7.4	38	15.7
CRi	1	3.6	6	2.8	7	2.9	24	9.9
CRp	0	0	1	0.5	1	0.4	5	2.1
CR + CRp	1	3.6	18	8.4	19	7.8*	43	17.8*

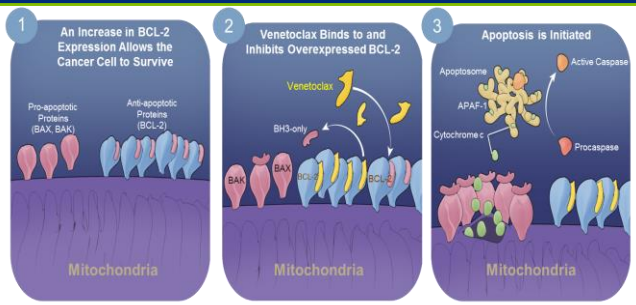
Kantarjian H, et al. JCO 2012



TP53 and Decitabine in Acute Myeloid Leukemia and Myelodysplastic Syndromes

Welch et al *NEJM* 2016

Venetoclax: An Oral Selective BCL-2 Inhibitor



- Venetoclax was shown to synergize with HMA in preclinical models, suggesting that combination with HMA may be a promising approach in AML
- FDA approved for CLL
- Reported: phase 1b, open-label, nonrandomized, dose-escalation trial of venetoclax in combination with DEC or AZA in older (≥65 years), treatment-naive AML patients (NCT02203773)
- *Ongoing: randomized trials in up-front and relapsed/refractory AML*

1. Souers A, et al. *Nat Med*. 2013;19:202-8; 2. Pan R, et al. *Cancer Discov*. 2014;4:362-75; 3. Konopleva M, et al. 56th Annual American Society of Hematology; December 6–9, 2014; Abstract 118; 4. Tsao T, et al. *Ann Hematol.* 2012;91:1861-70.

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Venetoclax + HMA Efficacy in AML

Overall Response, n (%)	Arm A (VEN + DEC)		Arm B (VEN + AZA)		Total
	VEN 400 mg (n=6)	VEN 800 mg (n=12)	VEN 400 mg (n=4)	VEN 800 mg (n=12)	N=34
CR+CRi	3 (50)	9 (75)	4 (100)	7 (58)	23 (68)
ORR (CR+CRi+PR)	3 (50)	10 (83)	4 (100)	7 (58)	24 (71)
CR+CRi+PR+MLFS	3 (50)	11 (92)	4 (100)	10 (83)	28 (82)

- 27/45 (60%) patients achieved CR/CRi, 1/45 (2%) had partial remission (PR), and 4/45 (9%) patients achieved morphologic leukemia free state (MLFS) when treated at all dose levels
- 23/34 (68%) patients achieved CR/CRi when treated at 400 and 800mg dose levels
- Median time to CR/CRi was 1 month (range, 0.8–3.8)
- The median duration of response was 8.4 months (95% CI = 6.8—not reached)
- 7/45 (16%) patients experienced morphologic relapse after achieving a CR or CRi
- Median time on study was 3.2 months (range, 0.2−14.6)

Dinardo C, ASH 2015, Abstract 327
Pollyea D, ASCO 2016, Abstract 7009.

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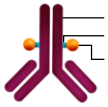
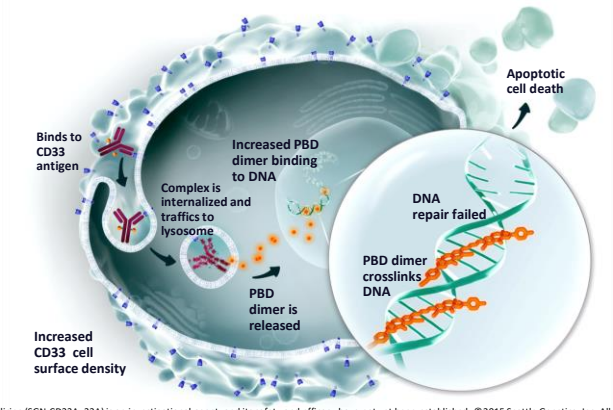
Vadastuximab Talirine (SGN-CD33A; 33A)

Proposed Mechanism of Action in Combination with HMA



Anti-CD33 antibody, engineered cysteines to enable uniform site-specific conjugation
Cleavable dipeptide linker, highly stable in circulation
Pyrrolobenzodiazepine (PBD) dimer, binds DNA with high intrinsic affinity



Vadastuximab talirine (SGN-CD33A; 33A) is an investigational agent, and its safety and efficacy have not yet been established.

Fathi AT et al. ASH 2015

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Vadastuximab Best Clinical Response: Efficacy Evaluable Patients

Efficacy Evaluable	All N=49	Secondary AML[d] N=22	FLT3/ITD+ N=5	Age ≥75 years N=26
Remission Rate (CR + CRi)	**73%**	**77%**	**100%**	**65%**
CR	47%	50%	80%	38%
CRi (p)[a]	20%	18%	20%	19%
CRi (n)[b]	6%	9%	0	8%
mLFS[c]	2%	5%	0	4%
ORR (CR + CRi + mLFS)	**76%**	**82%**	**100%**	**69%**

But… 7/2017, development on hold due to excess deaths in randomized study; FDA and sponsor evaluating

[a] CRi (p)= CR with ANC ≥1000/uL, incomplete platelet recovery
[b] CRi (n)= CR with platelets ≥100,000/uL, incomplete neutrophil recovery
[c] mLFS = morphologic leukemia-free state
[d] Defined as therapy-related AML, AML evolved from prior MDS, or de novo AML with MDS-related cytogenetics

Fathi AT et al. ASH 2015

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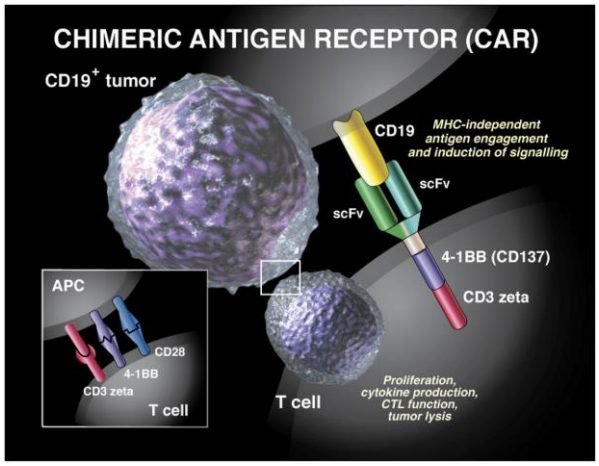
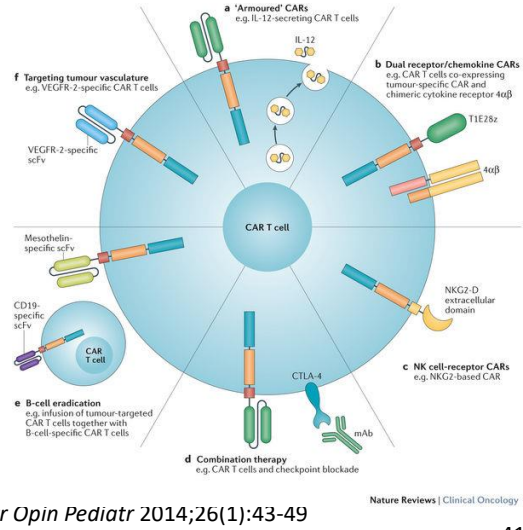
Chimeric Antigen Receptor T (CAR-T) Cells: An Advance for ALL; Will They Be Useful Someday for AML?





Barrett DM et al *Curr Opin Pediatr* 2014;26(1):43-49
Jackson H et al *Nature Reviews Clinical Oncology* 13, 370–383 (2016)

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Immune Checkpoint Inhibitors: A Breakthrough In Solid Tumors, What About AML?

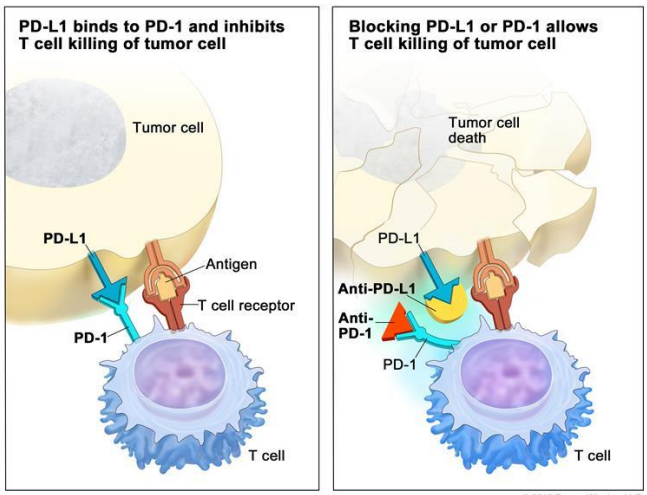

Image Source: NCI

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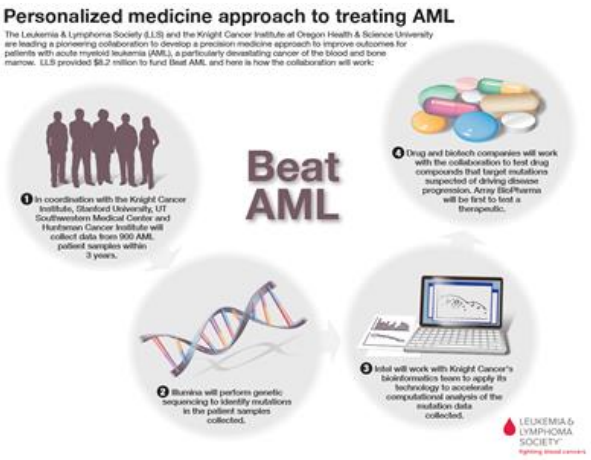
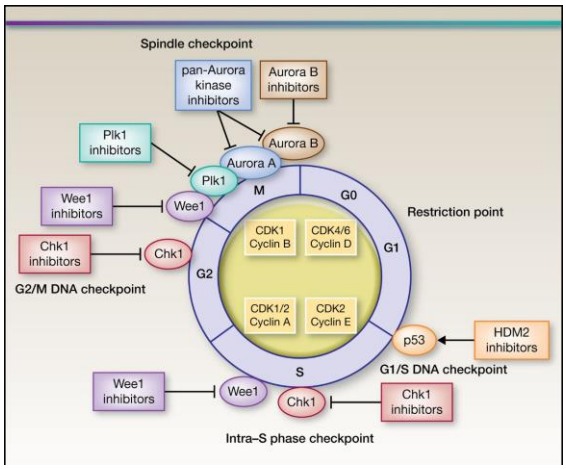
What's Next For AML?
"Personalized" Medicine





Gojo I, Karp J. *Clin Can Res* Dec 2014 43

Stem Cell (Bone Marrow) Transplantation

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Transplant ≈ "Rebooting the System"

www.leadingwithtrust.com

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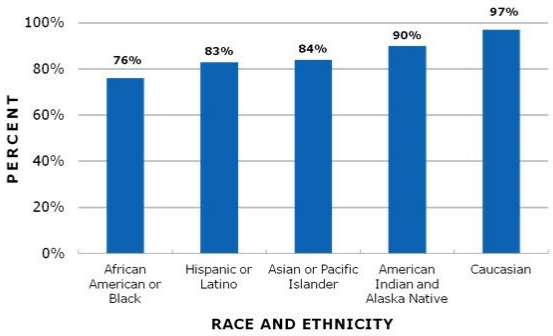
What Needs To Be Done Before Transplant? Donor Identification

Likelihood of Finding a Matching Adult Donor



BE THE MATCH

SOURCE: National Marrow Donor Program / Be The Match 2013 fiscal year reports.

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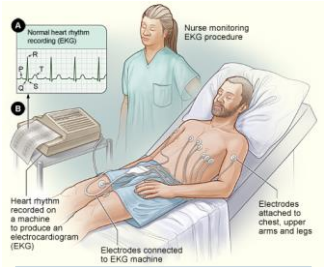
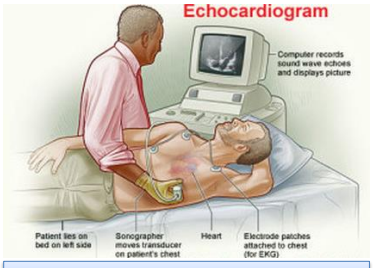
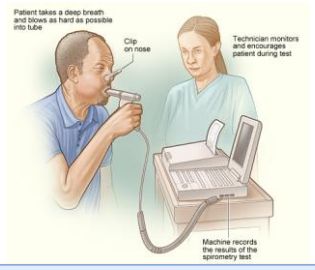
Typical Pre-Transplant Testing



Electrocardiogram (ECG)

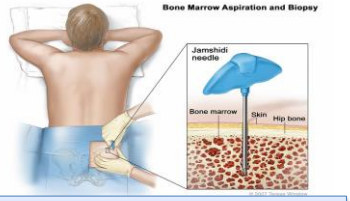


Echocardiogram



Pulmonary function tests (PFTs, spirometry)

Dental exam and cleaning



Updated marrow biopsy

Blood tests: *tissue type, antibodies, blood type, infection markers, organ function*

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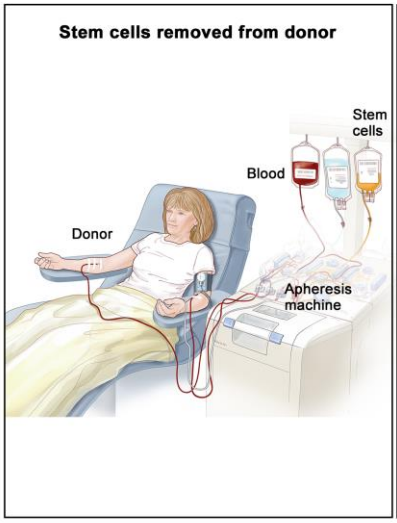
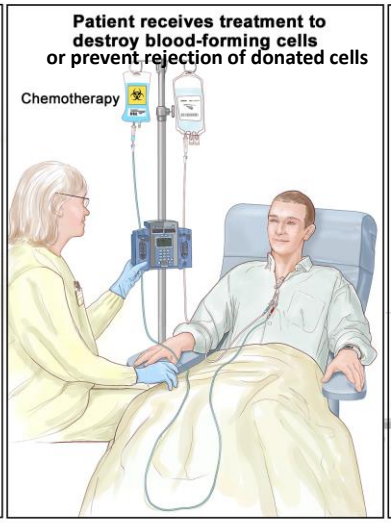
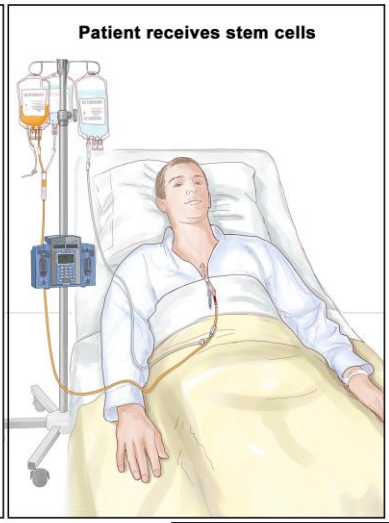
Allogeneic Hematopoietic Stem Cell Transplant (Allo-HSCT)







Source: NCI 48

Transplant Trends

- **Older fit patients** are increasingly considered eligible (up to ~75 years)
- Increasing use of half-matched "**haplo" transplant** (usually parent/child)
  - Randomize transplant of haplo vs cord blood
- Increasing elective use of **bone marrow rather than blood stem cells** as donor source
  - Requires an operation, but may reduce graft-versus-host (GVH)
- Increasing use of post-transplant **preventive or pre-emptive therapy**
  - e.g., sorafenib after FLT3 AML allo-SCT
- Monitoring and treatment of graft-versus-host and infection is improving

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Conclusions

- FDA approval of 4 new AML drugs in 2017!
  - Hopefully the beginning of a wave
- Biological understanding of AML is improving
- More than 300 AML clinical trials ongoing, testing >40 different novel compounds
  - Clinical trials are the only way to move the field forward
- Transplant is more broadly applied, outcomes improving

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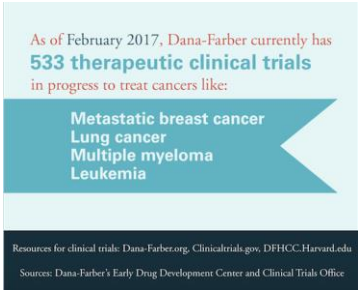
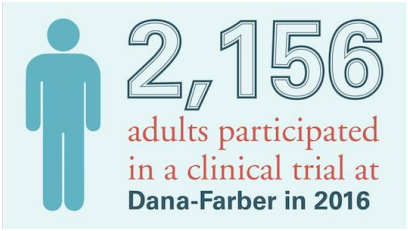
Thank you!

Yawkey Center,
Dana-Farber Cancer Institute

Harvard Medical School quadrangle





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David Frank MD PhD
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What's on the Horizon for Acute Myeloid Leukemia?

LEUKEMIA & LYMPHOMA SOCIETY®

Q&A Session

Ask a question by phone:

- Press star (*) then the number 1 on your keypad.

Ask a question by web:

- Click "Ask a question"
- Type your question
- Click "Submit"

Due to time constraints, we can only take one question per person. Once you've asked your question, the operator will transfer you back into the audience line.

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The Leukemia & Lymphoma Society Offers:

- **Information Resource Center:** Information Specialists, who are master's level oncology professionals, are available to help cancer survivors navigate the best route from diagnosis through treatment, clinical trials and survivorship.
  - **EMAIL: infocenter@LLS.org**
  - **TOLL-FREE PHONE: 1-800-955-4572**
- **Free Education Booklets:**
  - **www.LLS.org/booklets**
- **Free Telephone/Web Programs:**
  - **www.LLS.org/programs**
- **Live, weekly Online Chats:**
  - **www.LLS.org/chat**

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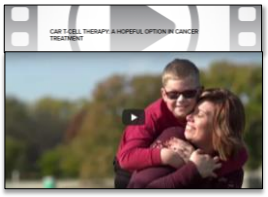
The Leukemia & Lymphoma Society Offers:

- **Support Resources:** LLS Community, discussion boards, blogs, support groups, financial assistance and more: **www.LLS.org/support**
  - ***NEW LLS Podcast, The Bloodline with LLS!*** Listen in as experts and patients guide listeners in understanding diagnosis, treatment, and resources available to blood cancer patients. **www.thebloodline.org**
- **Education Video:** Free education videos about survivorship, treatment, disease updates and other topics**:** **www.LLS.org/educationvideos**
- **Patti Robinson Kaufmann First Connection Program:** Peer-to-peer program that matches newly diagnosed patients and their families: **www.LLS.org/firstconnection**
- **Free Nutrition Consults:** Telephone and email consultations with a Registered Dietitian: **www.LLS.org/nutrition**
- **What to ask:** Questions to ask your treatment team: **www.LLS.org/whattoask**



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We have one goal:
A world without blood cancers

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