

LEUKEMIA &
LYMPHOMA
SOCIETY™ is now
**Blood Cancer
United**

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Blood Cancer United

Welcome and introductions

Lesley Hoerst, BSN, RN

Senior Manager, Professional Education
Blood Cancer United
Washington, DC



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Learning objectives

- Explain the role of genomics and molecular profiling in the diagnosis, prognostication, treatment, and monitoring of blood cancer.
- Describe the psychosocial impact of different blood cancer diagnoses.
- Explore treatment options for blood cancer patients including precision medicine, cellular therapy, and clinical trials.
- List resources for patients with blood cancers and how to access them.



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Speakers



Kelly Stackhouse RN, BSN
Clinical Trial Nurse Navigator
Clinical Trial Support Center
Blood Cancer United



Lynn Steele, LSW, OSW-C
Senior Information Specialist
Information Resource Center
Blood Cancer United



Disclosure information

- Kelly Stackhouse, RN, BSN, has no disclosures
- Lynn Steele, LSW, OSW-C, has no disclosures
- Lesley Hoerst, BSN, RN, has no disclosures



Additional Blood Cancer United planners and others have nothing to disclose.

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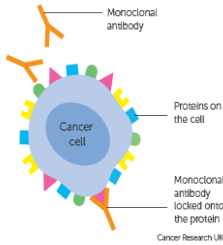
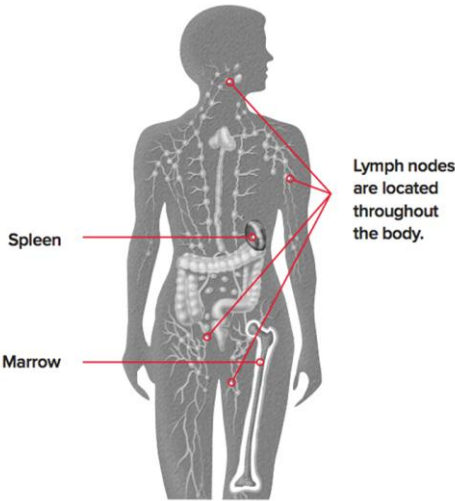
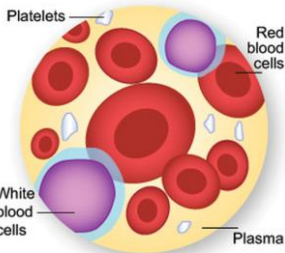


Lynn Steele, LSW, OSW-C
Senior Information Specialist
Information Resource Center
Blood Cancer United



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Remember the basics



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But first we must know...

All cancer is genetic.

- A. True
- B. False



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But first we must know...

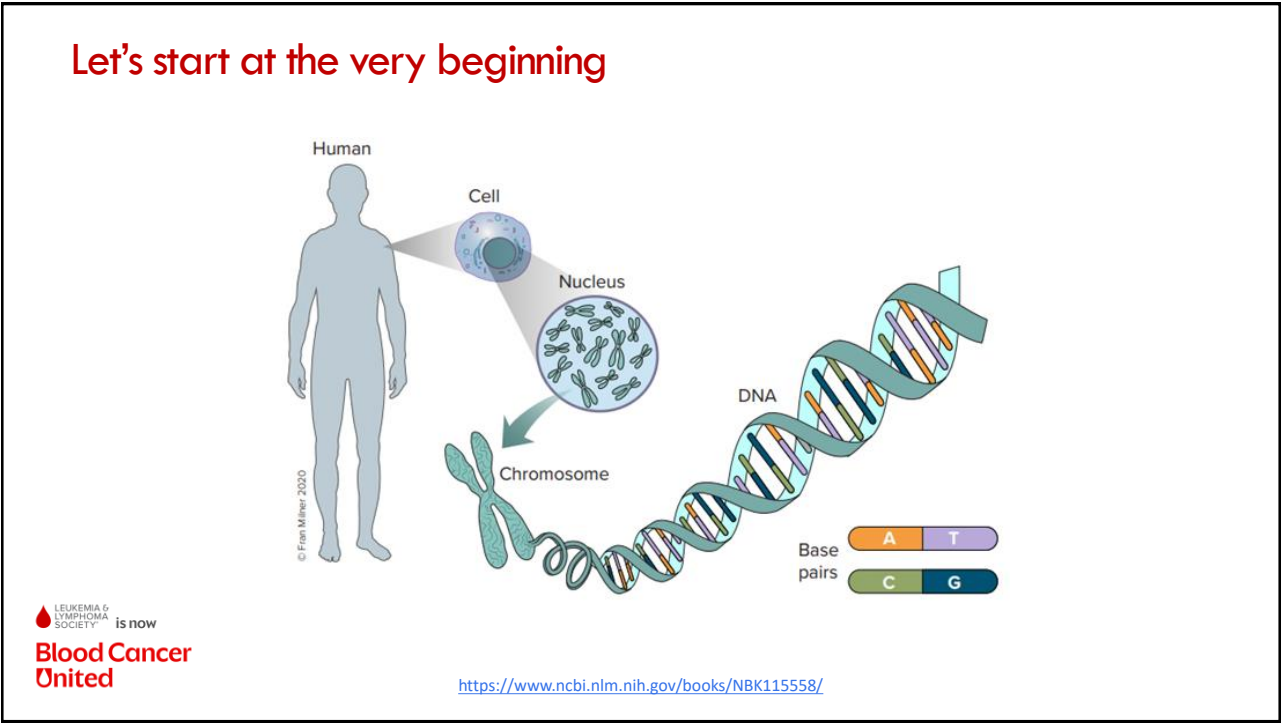
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- A. True
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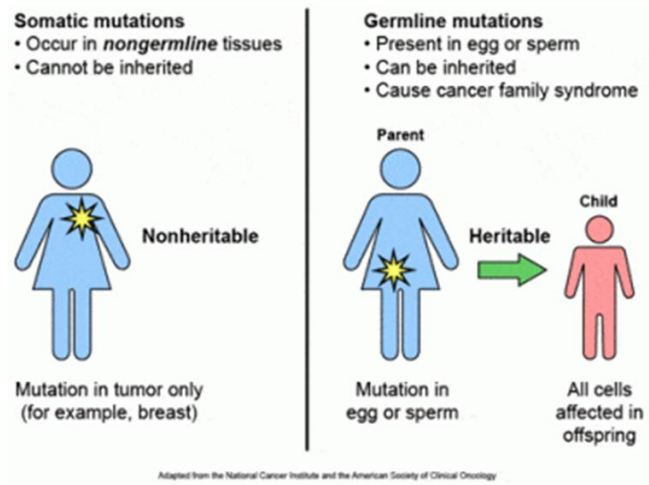
Let's start at the very beginning



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Germline & Somatic Mutations

- All cancer is genetic
- 90% of cancers are caused by **somatic mutations** (error happens after conception)
- 10% of cancers are caused by **germline mutations** (error happens in the egg or sperm)



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What are the differences in genetics & genomics?

Genetics (YOU)	Genomics (YOUR TUMOR/CANCER)
Genetics can help identify your risk of developing cancer	Genomics can help guide your treatment once you have cancer
Genetic testing detects hereditary (from your parents) alterations in DNA that can be passed from one generation to the next through genes	Genomic testing detects acquired (over the course of your life) alterations in DNA; 90% of cancer is acquired
Harmful variants in some genes are known to be associated with an increased risk of developing cancer (contributes to about 5-10% of all cancers) (NIH, 2019)	Once you have cancer, the activity and interaction of certain genes in your tumor tissue influences the behavior of your tumor, including how likely it is to grow or spread
Once you know your genetic risk for cancer, you can take steps to lower that risk (i.e., lifestyle changes)	Once you have the personalized information from the genomic testing, you and your doctor can decide what treatment you need



<https://www.genome.gov/about-genomics/fact-sheets/Genetics-vs-Genomics>

Biomarker testing or molecular profiling

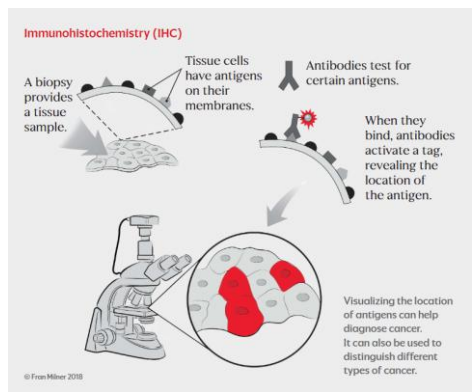
WHAT HAPPENS NEXT?

- There are several different genomic tests that may be ordered depending on the diagnosis
- Some testing will be repeated at specific times & at relapse to see how the cancer is behaving
- Further genomic testing may be indicated based on results of previous testing

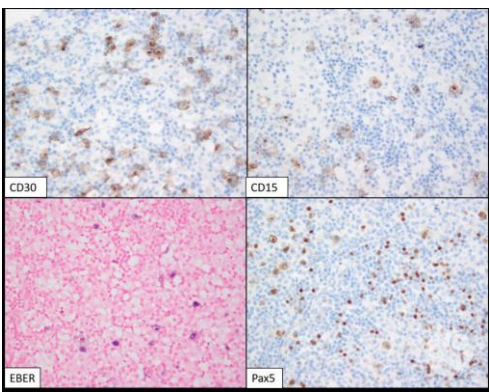


<https://www.cancercenter.com/treatment-options/precision-medicine/advanced-genomic-testing>

Immunohistochemistry (IHC)

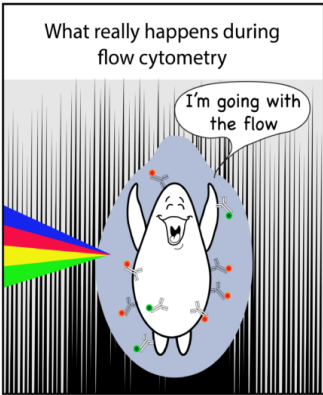
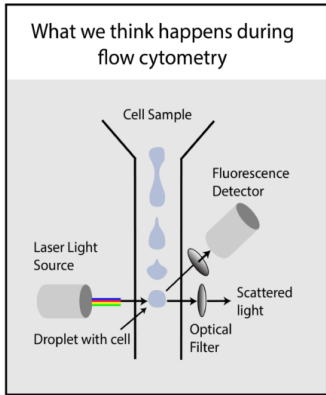


[BloodCancerUnited.org/resources/educational-resources/publications/booklet/lab-and-imaging-tests](https://www.bloodcancerunited.org/resources/educational-resources/publications/booklet/lab-and-imaging-tests)

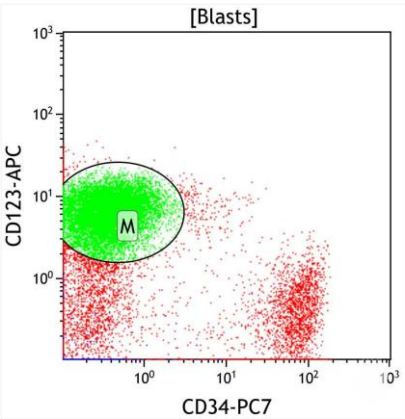


This image was originally published in ASH Image Bank. Mir Alikhan, MD. Classical Hodgkin lymphoma - IHC. ASH Image Bank. 2021; #00063753. © the American Society of Hematology

Flow cytometry

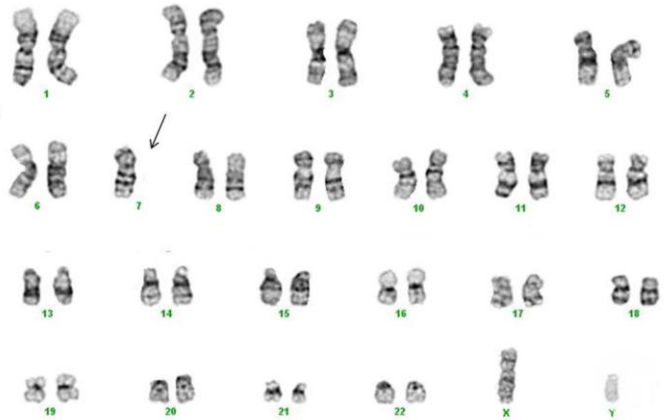
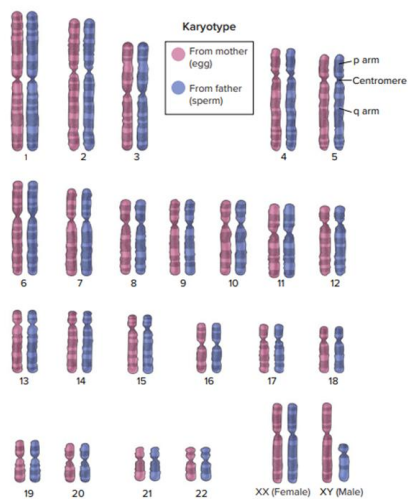


<https://cellcartoons.net>



This image was originally published in ASH Image Bank. Girish Venkataraman, MD, MBBS; John Kennedy Sidney Sir Philip, MD; Sandeep Gurbuxani, MD, PhD. BPD-CN-Flow. ASH Image Bank. 2018; #00061729. © the American Society of Hematology.

Cytogenetics



This image was originally published in ASH Image Bank. Gordana Raca, Ph D. Cytogenetics Monosomy 7. ASH Image Bank. 2016; #00060362. © the American Society of Hematology.

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<https://www.ncbi.nlm.nih.gov/books/NBK115558/>

Fluorescence in situ Hybridization (FISH)

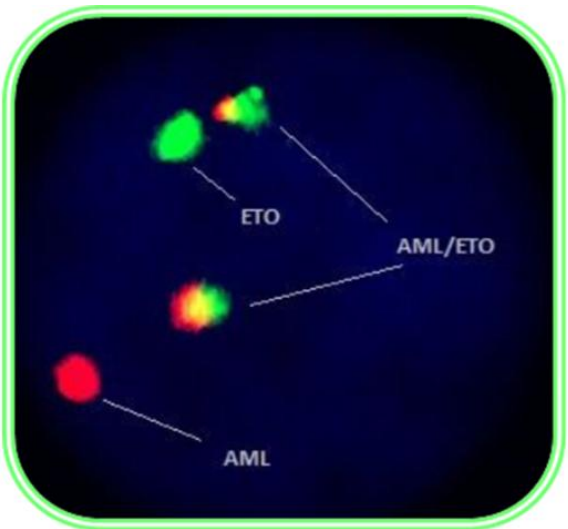
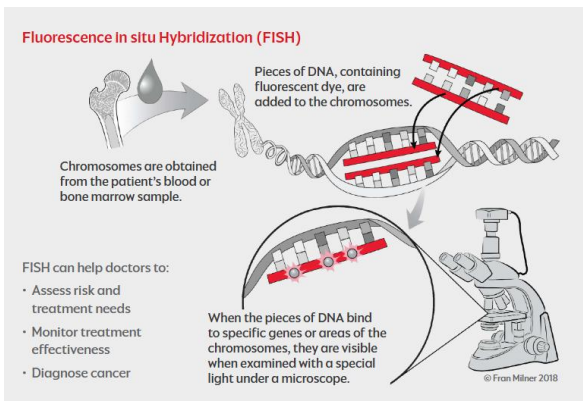
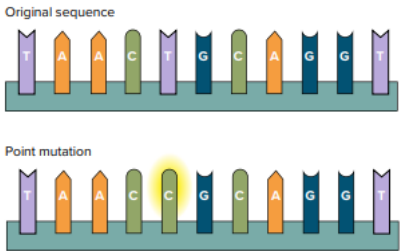
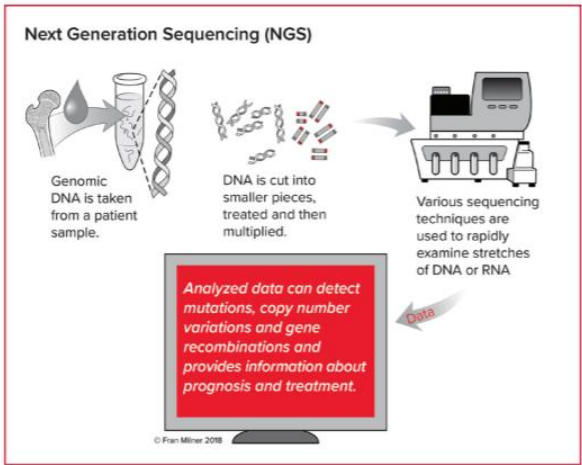


Figure 6. FISH analysis showing AML1/ETO (red and green) fusion signals.

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[BloodCancerUnited.org/resources/educational-resources/publications/booklet/lab-and-imaging-tests](https://www.bloodcancerunited.org/resources/educational-resources/publications/booklet/lab-and-imaging-tests)

Next generation sequencing

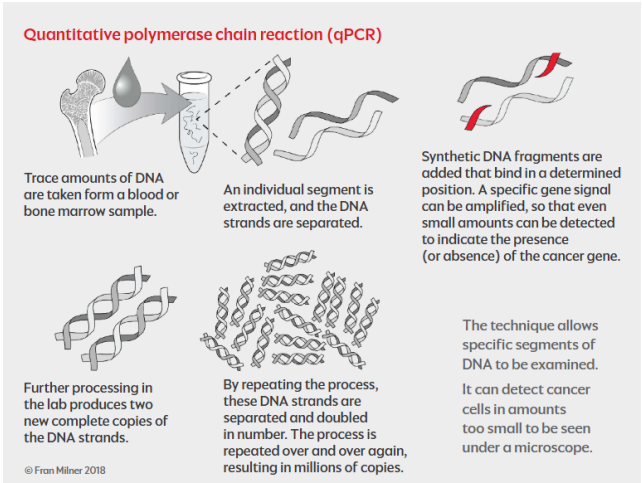


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BloodCancerUnited.org/resources/educational-resources/publications/booklet/biomarker-testing-cancer-treatment

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Polymerase Chain Reaction (PCR) testing



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BloodCancerUnited.org/resources/educational-resources/publications/booklet/lab-and-imaging-tests

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Biomarker testing for blood cancer monitoring

Measurable/Minimal Residual Disease

Acute Lymphoblastic Leukemia • Standard clinical practice • Used to predict outcomes and guide therapy	Acute Myeloid Leukemia • More complicated as disease may not be stable over time	Multiple Myeloma • Prognostic value is established, but not enough evidence to alter treatment based on MRD	Chronic Myeloid Leukemia • Testing is easier since disease driven by well-characterized genetic abnormality • Testing is necessary to gauge response, inform prognosis, and alter treatment
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MRD resources

For HCPs

BloodCancerUnited.org/HCPBooklets

Category: Minimal Residual Disease (MRD)

CART Today and Tomorrow: Clinical Decision-Making and Patient Support

Tom Gregory, MD, Colorado Blood Cancer Institute, Denver, CO and Jay Spiegel, MD, Sylvester Comprehensive Cancer Center, Miami, FL

Understanding MRD: Insights for clinical practice and patient care

October 10, 2023

Rahul Banerjee, MD, FACP, Fred Hutchinson Cancer Center, Seattle, WA

Podcast: TreatingBloodCancers.org

Facts About Measurable Residual Disease (MRD)

Introduction

Patients who achieve complete remission after treatment for blood cancer often harbor residual cancer cells in the bone marrow or peripheral blood that can result in relapse. These cells are present in much lower numbers than at diagnosis. Measurable residual disease (MRD) refers to the presence of cancer cells in blood or bone marrow after treatment. Detecting MRD early can show the presence of cancer cells in blood or bone marrow after treatment. Detecting MRD early can show the presence of cancer cells in blood or bone marrow after treatment. Detecting MRD early can show the presence of cancer cells in blood or bone marrow after treatment.

Highlights

- MRD testing is used to monitor blood cancer patients after treatment.
- MRD testing can help predict outcomes and guide therapy.
- MRD testing can help identify patients who may need further treatment.
- MRD testing can help identify patients who may be eligible for clinical trials.

For patients & caregivers

Measurable Residual Disease (MRD)

What is Measurable Residual Disease (MRD)?

MRD is the small number of cancer cells that remain in the body after treatment. It is a sign that the cancer is still present, even if it is not causing symptoms. MRD testing can help doctors see if the cancer is still present and if treatment is working.

MRD Testing in Specific Blood Cancers

- Acute Lymphoblastic Leukemia (ALL)
- Acute Myeloid Leukemia (AML)
- Chronic Myeloid Leukemia (CML)
- Multiple Myeloma (MM)

Tests Used

- Polymerase chain reaction (PCR)
- Flow cytometry
- Next-generation sequencing (NGS)

Minimal Residual Disease

Diagram showing the process of MRD testing and its importance in monitoring blood cancer.

**WHICH PATIENTS NEED
MOLECULAR
PROFILING OR
BIOMARKER
TESTING?**

- A. Patients with relapsed AML
- B. Patients with newly diagnosed CLL
- C. Patients with multiple myeloma
- D. All of them!



**WHICH PATIENTS NEED
MOLECULAR
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- A. Patients with relapsed AML
- B. Patients with newly diagnosed CLL
- C. Patients with multiple myeloma
- D. All of them!



Importance of biomarker testing

- Understand underlying genomic drivers of cancer
- Guides surgical and treatment decisions
- Aids in the process of making a precise diagnosis and selecting the best therapy
- Determines eligibility and access to clinical trials



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NCCN Guidelines *Diffuse Large B-Cell Lymphoma*

To access NCCN guidelines for treating blood cancers, please
visit: www.NCCN.org

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Case study # 1

- 57-year-old female, employed with employer group insurance
- Chronic Myeloid Leukemia (CML) diagnosis
- Was hospitalized and needs to begin treatment right away
- Wondering about getting a second opinion
- Insurance coverage issues – medication initially denied
- Concerns about coping with chronic nature of CML



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Psychosocial resources

- Learning about her disease and treatment
- Navigating her healthcare coverage and financial support
- Finding peer support
- Developing coping strategies to deal with the chronic nature of her disease



Blood Cancer United

Home

Online Chats

Have medical debt?
Blood Cancer United may be able to help.

Our case managers work directly with blood cancer patients, their caregivers, and healthcare professionals to assist patients in managing their medical debt.

By phone: 1-833-507-8036
Monday to Friday: 8:30 a.m. to 5:00 p.m. EST
Visit BloodCancerUnited.org/MedicalDebt
Scan the QR code to go directly to the enrollment form >

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How do I choose a Treatment Center, blood cancer specialist, or get a second opinion?

Questions to ask:

- Is care at the treatment center covered by my insurance plan?
- Does my primary care doctor or hematology-oncologist have confidence in this treatment center?
- What type of accreditation does the treatment center have? Do the treatment center and staff have experience treating my specific type of blood cancer?
- Does the center offer the most current treatments available?
- Does the center participate in clinical trials (research studies) related to my diagnosis?
- Are adequate support staff (nurses, social workers, case managers, patient advocates) available?
- Will I see the same support staff members at each visit?
- Is there a pharmacy on the premises or nearby?
- If a stem cell transplant is part of the treatment plan, is this center experienced in performing the type of stem cell transplant I will need?
- Can I speak to other cancer patients who are being treated or were treated at this center?



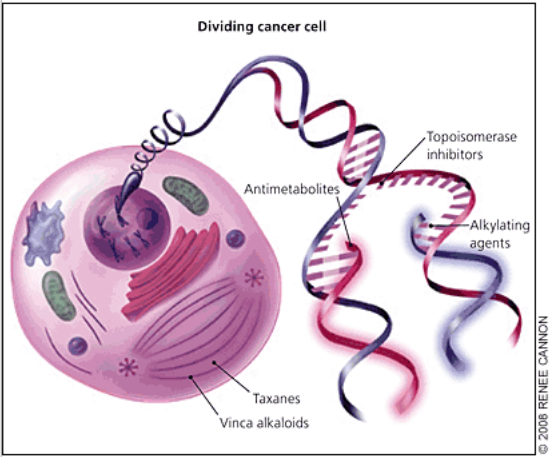
Question Guide: [BloodCancerUnited.org/blood-cancer-care/adults/communicating-your-blood-cancer-specialist-care-team/question-guides](https://www.bloodcancerunited.org/blood-cancer-care/adults/communicating-your-blood-cancer-specialist-care-team/question-guides)

Treatment approaches



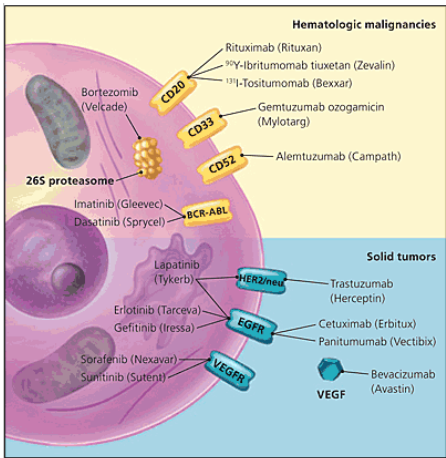
“Sledge Hammer Approach” with Conventional Chemotherapy

- Can be curative
- Acute side effects
- Long-term side effects that affect quality of life
- Usually IV meds



<https://www.aafp.org/aafp/2008/0201/p311.html>

Treatment approaches



“Targeted/Pinpoint Approach” with Precision Medicine

- Can be curative
- Fewer side effects both acutely & long term
- Oral or IV meds
- Allows for combinations

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<https://www.aafp.org/afp/2008/0201/p311.html>

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Precision medicine

Biomarkers Significant for Study and Treatment of Blood Cancers (not all inclusive)

This table lists some of the biomarkers that are currently known to be significant for the study and treatment of blood cancers.

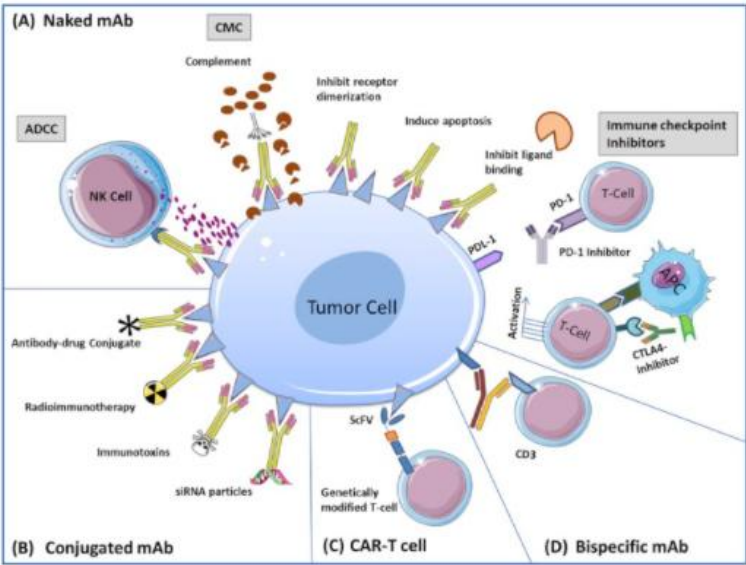
Biomarkers (Chromosome and Gene Alterations)	Associated Cancer	Test Required	Targeted Therapies Associated
Philadelphia chromosome t(9;22) (translocation between chromosomes 9+22)	Chronic myeloid leukemia (CML), acute lymphoblastic leukemia (ALL)	FISH, qPCR, cytogenetics	Responds to imatinib (Gleevec [®]), dasatinib (Sprycel [®]), nilotinib (Tasigna [®]), bosutinib (Bosulif [®]), ponatinib (Iclusig [®]), and asciminib (Scemblix [®])
IDH2 (R140 or R172) mutations	Acute myeloid leukemia (AML)	qPCR, NGS	Responds to enasidenib (Idhifa [®])
IDH1 (R132) mutations	AML, myelodysplastic syndrome (MDS)	NGS, qPCR	Responds to ivosidenib (Tibsovo [®]) and olutasidenib (only approved for AML, Rezlidhia [®])
JAK2, CALR, MPL mutations	Myeloproliferative neoplasms (MPNs): polycythemia vera (PV), myelofibrosis (MF)	qPCR, NGS	Responds to ruxolitinib (Jakafi [®])
PDGFRB rearrangement	Myelodysplastic/myeloproliferative syndromes	FISH	Responds to imatinib (Gleevec [®])
PML-RARA rearrangement	Acute promyelocytic leukemia (APL)	NGS	Responds to all-trans retinoic acid (ATRA), arsenic trioxide (Trisenox [®])
FLT3-ITD mutations	AML	qPCR, NGS	Responds to midostaurin (Rydapt [®]), gilteritinib (Xospata [®]), and quizartinib (Vanflyta [®])
ALK rearrangement	Anaplastic large-cell lymphoma (ALCL)	FISH, IHC, qPCR	Responds to crizotinib (Xalkori [®])
BRAF V600E mutation	Hairy cell leukemia*	NGS	Responds to vemurafenib (Zelboraf [®])*

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FISH: fluorescence in situ hybridization; IHC: immunohistochemistry; NGS: next-generation sequencing; qPCR: quantitative polymerase chain reaction.
*This drug is not FDA approved for this indication.
Adapted from Rack KA. *Leukemia*. 2019; Taylor J. *Blood*. 2017; and Malone E. *Genome Med*. 2020.

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Precision medicine



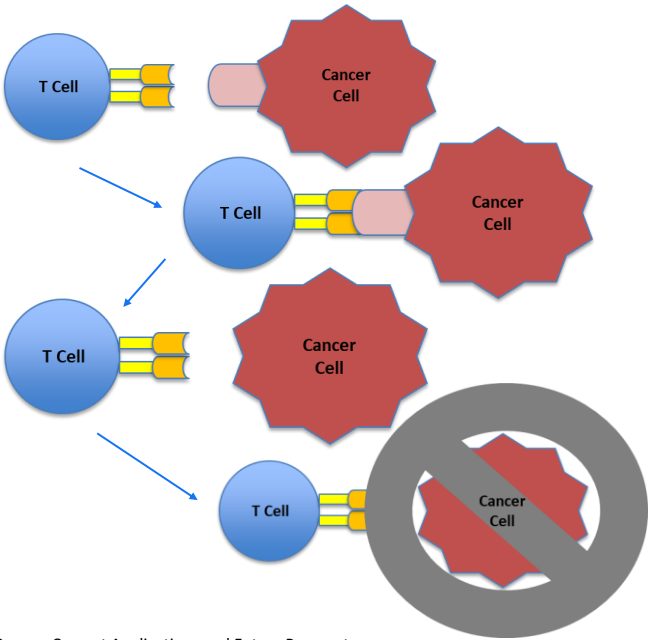
[https://www.exphem.org/article/S0301-472X\(17\)30656-2/fulltext](https://www.exphem.org/article/S0301-472X(17)30656-2/fulltext)

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Immunotherapy

- **Chimeric Antigen Receptor T-cell Therapy (CAR-T):** engineering T cells with a receptor that can recognize and attack tumor cells with specific markers on their surface
- Once inside the body the CAR T cell will find the specific target on the cancer cell and attach and kill the cancer cell



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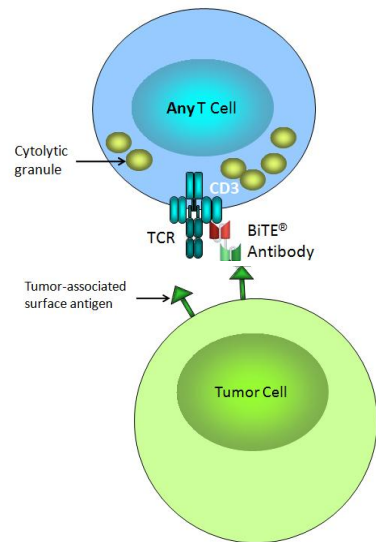
Precision Medicine in Pediatric Cancer: Current Applications and Future Prospects
<https://www.ncbi.nlm.nih.gov/pubmed/30551569>

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Immunotherapy

- **Bispecific T-cell Engager (BiTE):** this antibody attaches to two targets the T cell and the tumor cell.
- *Examples of FDA-approved BiTE therapy:*
 - *Blinatumomab (B-cell ALL)*
 - *Glofitamab (diffuse large B-cell lymphoma)*
 - *Epcoritamab (diffuse large B-cell lymphoma)*
 - *Talquetamab (multiple myeloma)*
 - *Elranatamab (multiple myeloma)*

These are examples of FDA-approved therapies. There are additional FDA-approved bispecific agents, as well as therapies currently being studied in clinical trials. Please refer to the Blood Cancer United website for more detailed information and any additional approvals.



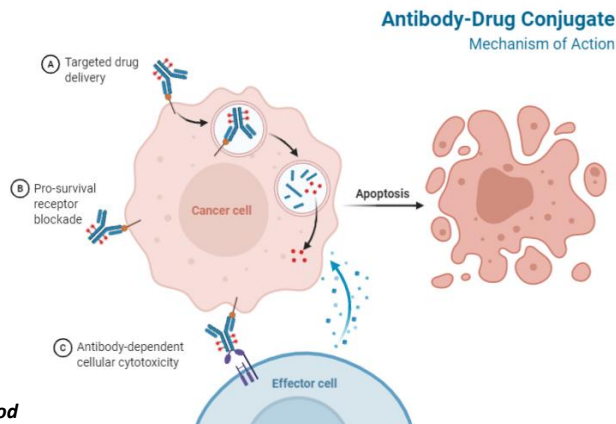
US Food and Drug Administration. June 14, 2024. Accessed April 10, 2025. <https://www.fda.gov/drugs/resources-information-approved-drugs/fda-approves-blinatumomab-consolidation-cd19-positive-philadelphia-chromosome-negative-b-cell>.
Lawrence L. Blood Cancers Today. February 8, 2024. Accessed April 10, 2025. <https://bloodcancerstoday.com/post/string-of-recent-approvals-puts-spotlight-on-bispecifics>.

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Immunotherapy

- **Antibody Drug Conjugate (ADC):** an antibody is linked to a toxic payload (chemotherapy drug) which is released into the tumor once attached
- *Gemtuzumab for AML, Inotuzumab for ALL, and Brentuximab for HL, are FDA-approved ADC therapy*

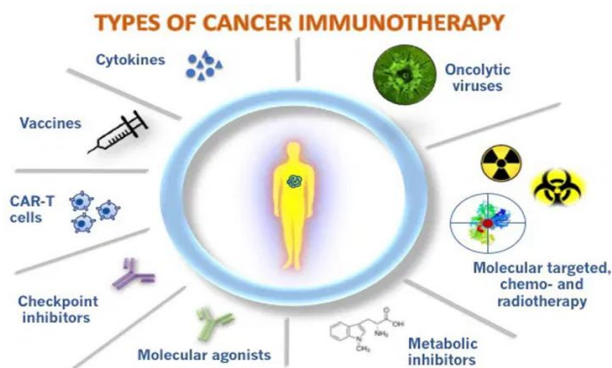
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Precision Medicine in Pediatric Cancer: Current Applications and Future Prospects
<https://www.ncbi.nlm.nih.gov/pubmed/30551569>

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Immunotherapy clinical trials for blood cancer patients



Adult
Immunotherapy
Trials (1,586)

- Immunomodulatory (105)
- CAR's (197)
- BiTE's (160)
- Checkpoint inhibitors (464)
- Gene therapy (20)
- Immunotherapy (640)

Pediatric
Immunotherapy
Trials (236)

- Immunomodulatory (6)
- CAR's (56)
- BiTE's (12)
- Checkpoint inhibitors (52)
- Gene therapy (3)
- Immunotherapy (107)

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www.clinicaltrials.gov

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Phases of Clinical Trials



Phase I

- Investigates for safety, side effects, dosage, and best way to give treatment

• 20 or more participants



Phase II

- Determines effectiveness and safety

• 100-300 participants



Phase III

- Looks at effectiveness, side effects and safety in comparison with other treatments

• 300-3,000 participants



Phase IV

- Gathers more information after FDA approval & drug is on market

• > 3,000 participants

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Clinical Trial Myths

I can only join a clinical trial if I have exhausted all other options Clinical trials are available throughout the disease process.	Clinical trials are not safe and I will not benefit from them Drug development is a process that starts in the lab and is regulated by FDA in the US.	I might get a placebo or a sugar pill instead of a real drug if I join a clinical trial Regulations require patients to know if placebo is a possibility. Placebos are rarely used in serious or life-threatening diseases.	Clinical trials are free The drug that is being studied is free. Patient is responsible for standard of care therapy, admission to hospitals, physicians and other associated costs.
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Understanding costs associated with clinical trials

Sponsor	Insurance Carrier (Private, Medicare or Medicaid)	Patient
Cost of treatment and treatment administration	Standard of care tests and treatment.	Co-pays, deductibles, out-of-network costs
Travel and lodging are sometimes included. This is study specific—you should always ask!!	Cost of complications of treatment.	Travel or lodging for patient and/or caregiver.
Extra tests, interventions or office visits that are required by the trial.	May or may not cover phase 1 trials.	Food and other incidentals.
	May or may not cover trials that take place of out-of-network or out of state.	Loss of employment income for patient and/or caregiver
		Child care, pet boarding and home maintenance costs.



Case study # 2

- 37-year-old female working presently, but needs a stem cell transplant and will be losing her job and healthcare coverage
- Acute Lymphoblastic Leukemia (ALL) diagnosis
- Single mother
- Financial concerns
- Insurance concerns
- Support resources
- Childcare concerns



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Psychosocial resources

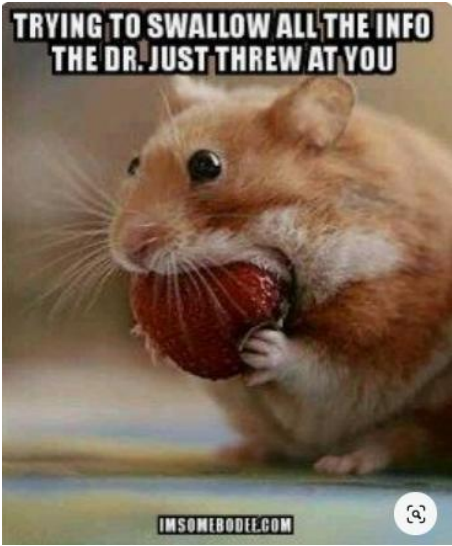
- Seeking and securing healthcare coverage, is COBRA an option?
- Resources for talking to her child about her diagnosis and treatment
- Financial resources
- Disability – can I apply? Will I be eligible?
- FMLA information
- Utilizing resources from her present healthcare team
- Finding support/family resources



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Key points to leave with:

- All cancer is genetic, but genetic changes are mostly acquired through your lifetime, few are inherited
- Patients and caregivers benefit from being connected with support and resources prior to diagnosis, throughout treatment, and into survivorship
- Biomarker testing is ESSENTIAL to accurate, complete and thorough diagnosis
- Each patient and caregiver has a unique lived experience and the care we provide should be tailored to their needs - physical, emotional, financial, psychosocial, cultural.
- Precision medicine is changing the way we treat blood cancer.



Blood Cancer 201: Moving Beyond the Basics of Disease, Treatment, and the Role of the HCP

Resources for Healthcare Professionals

- ❑ Free CME & CE courses: BloodCancerUnited.org/CE
- ❑ Fact Sheets for HCPs: BloodCancerUnited.org/HCPbooklets
- ❑ Podcast Series for HCPs: BloodCancerUnited.org/HCPpodcast
- ❑ HCP Patient Referral Form: BloodCancerUnited.org/HCPreferral
- ❑ Blood Cancer United Other Helpful Organizations: BloodCancerUnited.org/OHO

Clinical Trials and Research

- ❑ Clinical Trials: Learn more about clinical trials: BloodCancerUnited.org/ClinicalTrials
- ❑ Research: Focused on finding cures and driving research: BloodCancerUnited.org/Research



Blood Cancer 201: Moving Beyond the Basics of Disease, Treatment, and the Role of the HCP

Resources for Patients

- ❑ **Information Specialists** – Personalized assistance for managing treatment decisions, side effects, and dealing with financial and psychosocial challenges. BloodCancerUnited.org/IRC
- ❑ **Clinical Trial Nurse Navigators** – RNs and NPs provide a personalized service for patients seeking treatment in a clinical trial, sift through the information and provide information to bring back to their HC team BloodCancerUnited.org/CTSC
- ❑ **Nutrition Education Services Center (NESC)** – one-on-one free nutrition education and consultations to patients and caregivers of all cancer types with registered dietitians who have expertise in oncology nutrition. BloodCancerUnited.org/Nutrition
- ❑ **Reach out Monday–Friday, 9 am to 9 pm ET**
 - Phone: (800) 955-4572
 - Live chat: BloodCancerUnited.org/InformationSpecialists
 - Email: BloodCancerUnited.org/ContactUs



Blood Cancer 201: Moving Beyond the Basics of Disease, Treatment, and the Role of the HCP

Resources for Patients

- ❑ Telephone and Web Education Programs: BloodCancerUnited.org/Programs
- ❑ Free Mobile Apps: Blood Cancer United Health Manager: BloodCancerUnited.org/Health-Manager
- ❑ Support Resources: BloodCancerUnited.org/Support
 - Blood Cancer United Regions
 - Online Chats
 - One-On-One Nutrition Consultations
 - Blood Cancer United Community (social media platform)
 - Patti Robinson Kaufmann First Connection® Program (peer-to-peer)
- ❑ Financial Assistance
 - Co-Pay Assistance
 - Urgent Need
 - Travel Assistance
 - Referral to Medication Access programs
 - Medical Debt Case Management: work with patients one-on-one to identify financial concerns, provide resources, assist with insurance plan evaluation and enrollment, and navigate insurance benefits, denials of care, and out-of-pocket costs



Blood Cancer 201: Moving Beyond the Basics of Disease, Treatment, and the Role of the HCP

Free guides, booklets, and fact sheets

For patients, caregivers, and professionals
BloodCancerUnited.org/Booklets



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