

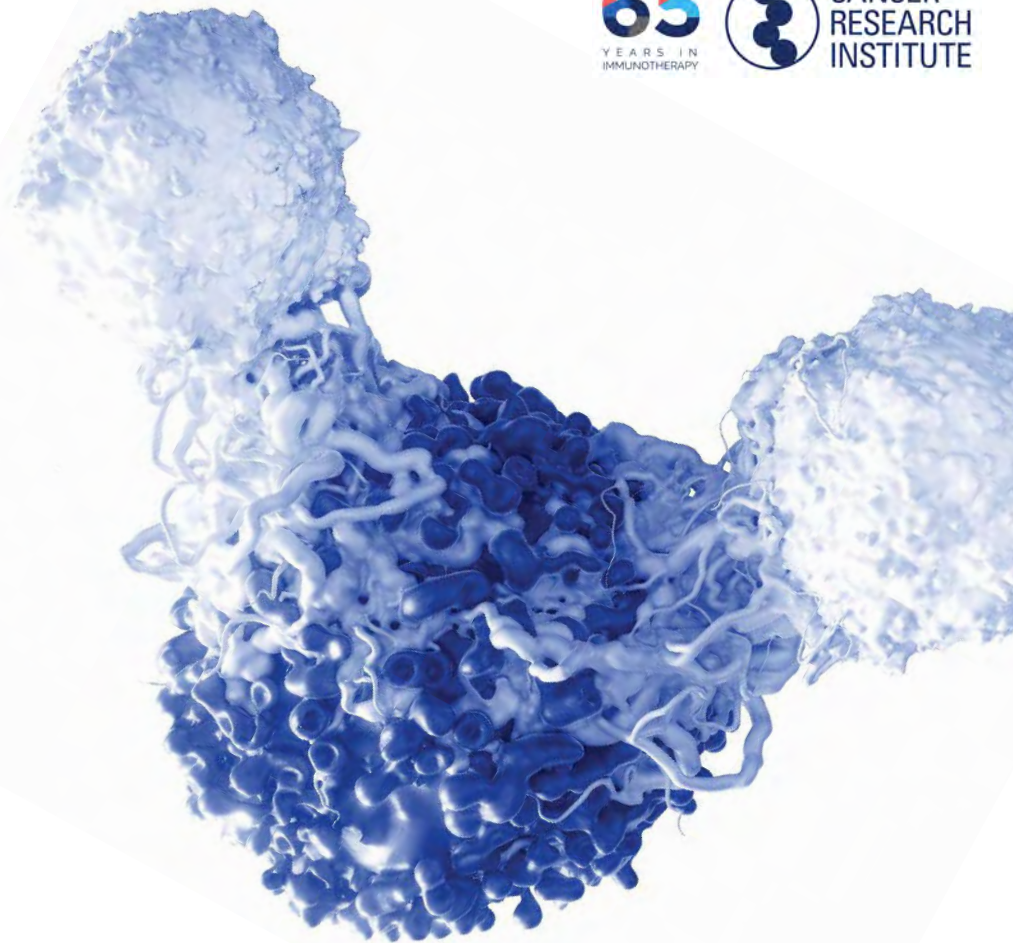
CANCER RESEARCH INSTITUTE

IMMUNOTHERAPY
PATIENT SUMMIT

San Francisco June 30, 2018

Brian Brewer
Cancer Research Institute

WELCOME



Our Sponsors



This event is made possible with generous support from:



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Immunotherapy
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REGENERON



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**IMMUNOTHERAPY
PATIENT SUMMIT**



NOVARTIS

Thank you to those who helped promote the summit

- Alta Bates Summit Comprehensive Cancer Center (Sutter Health)
- Bay Area Cancer Connections
- Cancer Clinical Trials Office at Stanford Medicine
- Cancer Support Community
- C.A.R.E. Program at Zuckerberg San Francisco General Hospital
- Colontown
- Fight Colorectal Cancer
- FORCE
- Imerman Angels
- Latinas Contra Cancer
- Let Life Happen (Barbara Jacoby)
- Lucile Packard Children's Hospital at Stanford Medicine
- Mark M. Davis Lab at Stanford Medicine
- Parker Institute of Cancer Immunotherapy
- ThyCa Support Group of Fresno, California
- Women's Cancer Resource Center
- UCSF Helen Diller Family Comprehensive Cancer Center

Speakers



Scientific Experts

Lewis Lanier, Ph.D.

University of San Francisco, California

Kara Davis, D.O.

Stanford University Medical Center

Terence Friedlander, M.D.

University of San Francisco, California

David Miklos, M.D., Ph.D.

Stanford University Medical Center

Katy Tsai, M.D.

University of San Francisco, California

Patient Experts

Sharon Birzer

Diffuse Large B Cell Lymphoma (DLBCL)

Kelly Brooks

Melanoma

Kristin Kleinhofer

Acute Lymphoblastic Leukemia (ALL)

Caregiver Perspective

Benny Juarez

Caregiver

Schedule of Events



9:00 am Registration and networking

10:00 am Program commences

WELCOME

Brian Brewer

10:15 am **HEAR FROM THE EXPERTS**

Immunotherapy Basics

Lewis Lanier, Ph.D.

10:30 am **PANEL: RESEARCH UPDATES**

Moderator

Lewis Lanier, Ph.D.

Panelists

Kara Davis, D.O.

Terence Friedlander, M.D.

David Miklos, M.D., Ph.D.

Katy Tsai, M.D.

11:30 am **PATIENT PERSPECTIVE**

Choose Hope, a message from

Kristin Kleinhofer, leukemia survivor

12:00 pm Lunch and networking

1:00 pm **LEARN ABOUT CLINICAL TRIALS**

Brian Brewer

1:15 pm **IMMUNOTHERAPY PATIENT PANEL**

Moderator

Brian Brewer

Panelists

Sharon Birzer

Kelly Brooks

Morey W.

2:15 pm **BREAKOUT SESSIONS**

Your choice of a deeper dive Q&A with our experts

General Immunotherapy

Lewis Lanier, Ph.D.

Pediatric Blood Cancers

Kara Davis, D.O.

Melanoma

Katy Tsai, M.D.

Bladder Cancer

Terence Friedlander, M.D.

3:15 pm Program closes

9:00 am – 4:00 pm **CLINICAL TRIAL NAVIGATOR APPOINTMENTS**

Appointments will be available all day. If you didn't register for an appointment, but you're interested in speaking with a navigator, please check with the registration desk.

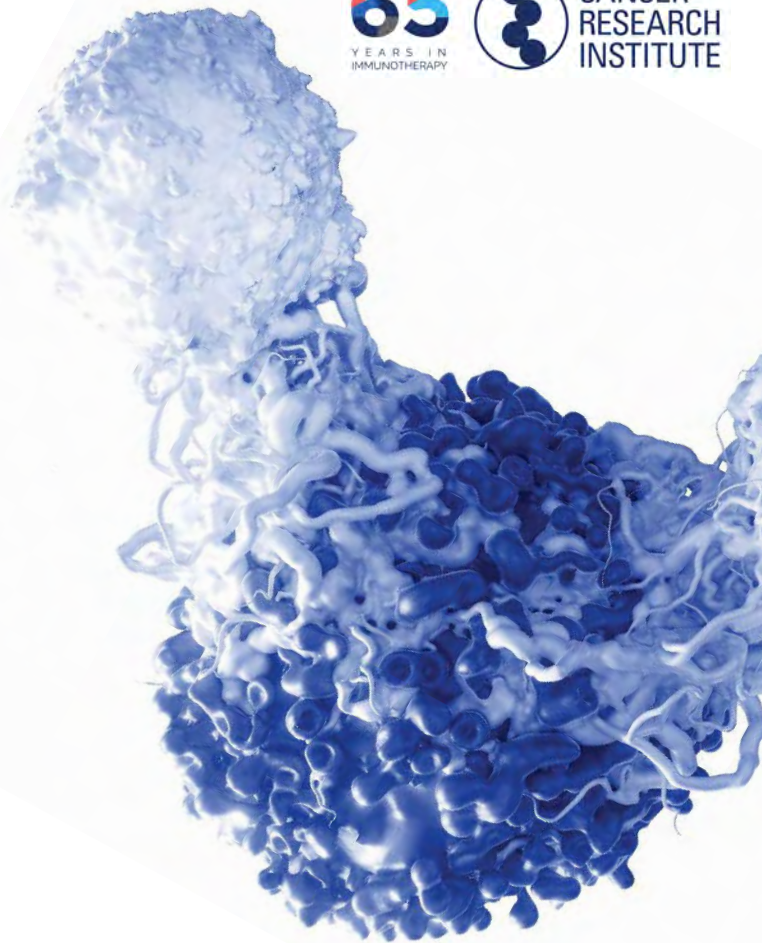
Fundamentals of Cancer Immunotherapy

Lewis L. Lanier, Ph.D.

American Cancer Society Professor and
Chair, Department of Microbiology and Immunology, UCSF
Leader, Cancer Immunology Program, UCSF Helen Diller Family
Comprehensive Cancer Center

J. Michael Bishop, MD, Distinguished Professor in Microbiology
and Immunology, UCSF

Director, Parker Institute for Cancer Immunotherapy, UCSF
Scientific Advisory Council Member, Cancer Research Institute



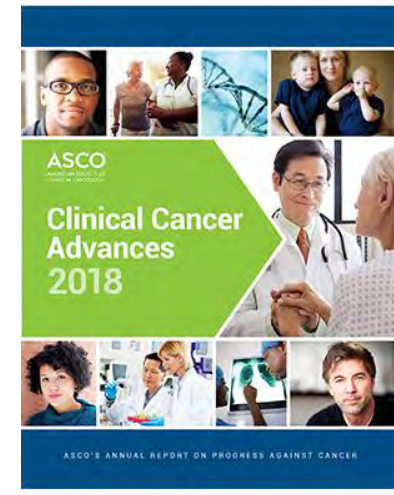
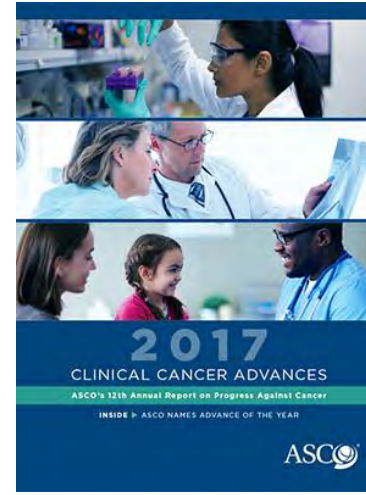
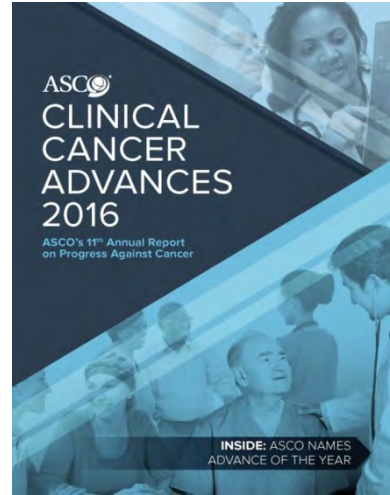
Immunotherapy: The New Darling of Oncology

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*Science's 2013
Breakthrough of the Year*



*ASCO's Top Advance of 2016, 2017, and 2018
(cancer immunotherapy, CAR T cell therapy, and adoptive cell immunotherapy)*



The New York Times

Patient's Cells Deployed to Attack Aggressive Cancer

The Washington Post

Health & Science

**New therapies raise hope for a
breakthrough in tackling cancer**

William B. Coley, M.D.



- Noted a case of sarcoma that became cured due to a bacterial infection
- In 1891, deliberately infected sarcoma patient with *Strep. pyogenes*
- By 1893, had developed a mixture of bacterial toxins rather than live bacteria – “Coley Toxins”
- Considered the first immunologic therapy for cancer

A New Weapon Against Cancer

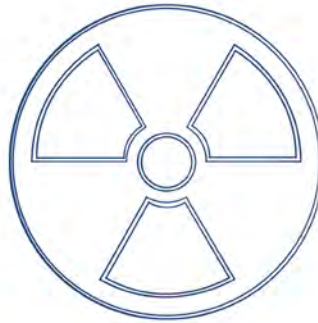
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Cancer



Cut 'em



Burn 'em



Poison 'em

We now have a new weapon against cancer

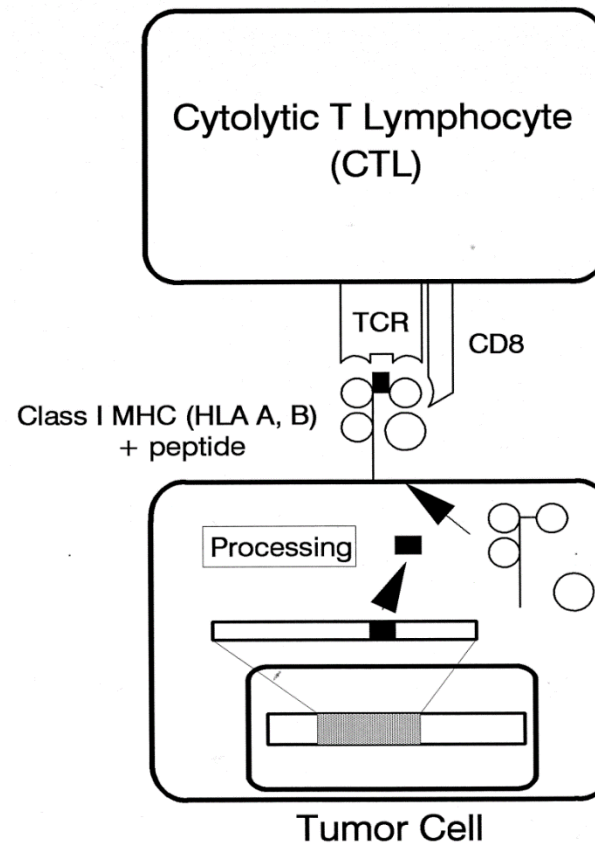
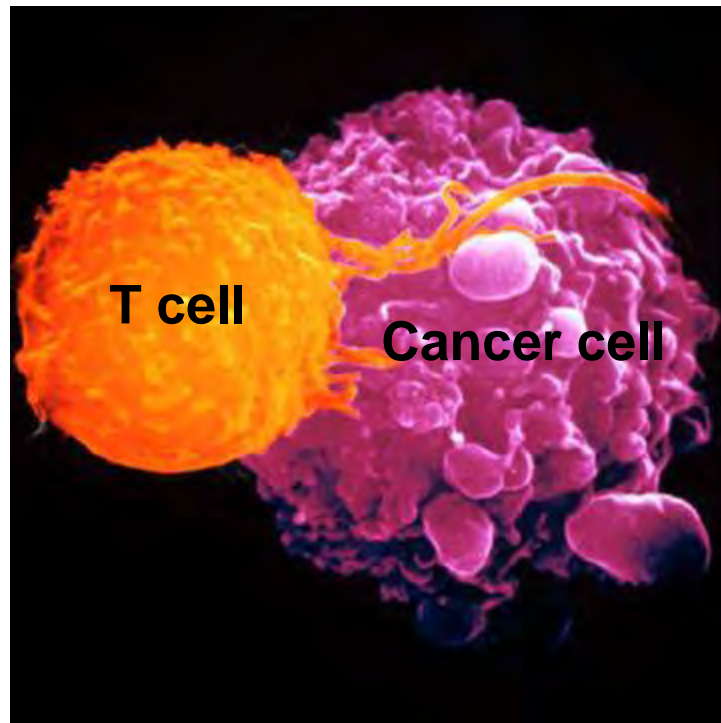
... Your immune system

- **What Are T Cells?**
- **Activating T Cells In Tumors**
- **Activating T Cells Outside of Tumors**
- **Combination Immunotherapy**
- **Biomarkers**

Immune Recognition of Cancer

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Boosting Immune System Offense vs. Overcoming Cancer's Defenses

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Two General Strategies to Help the Immune System to Destroy Cancer

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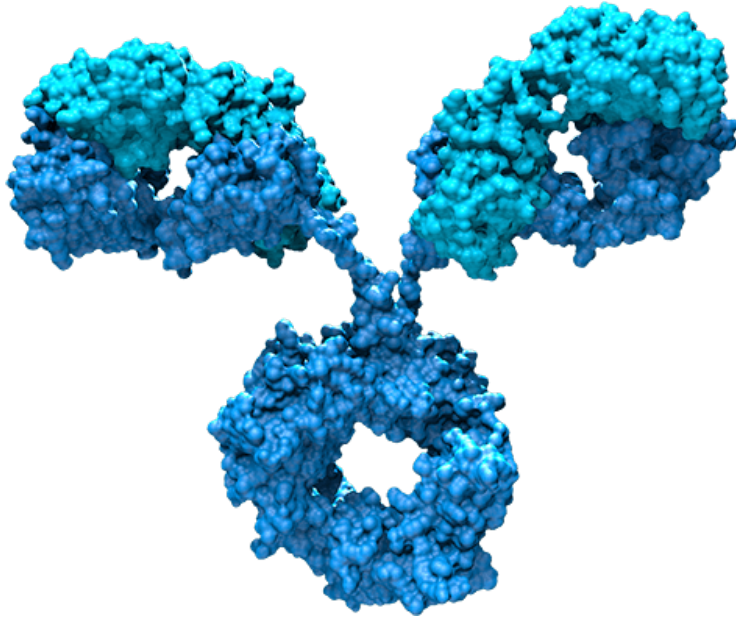
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- **Boost the offense**
 - Increase the number and function of T cells capable of recognizing tumor cells
- **Block the defense**
 - Interfere with inhibitory pathways in the tumor site that resist T cell attack

“Checkpoint Blockade”

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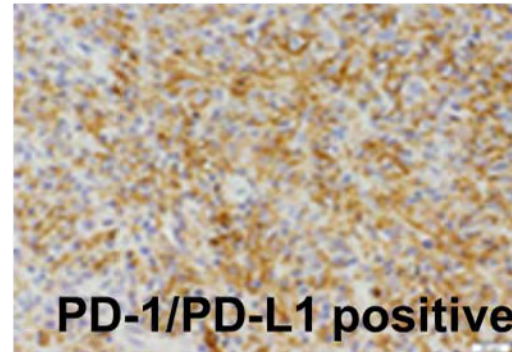
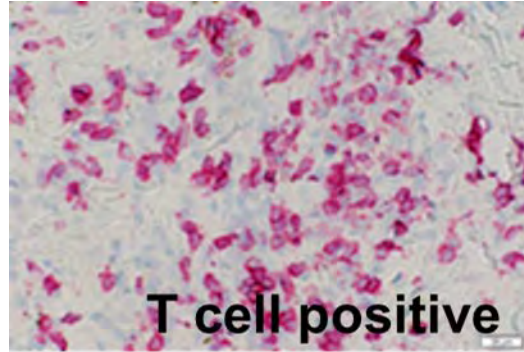


Monoclonal antibodies that block inhibitory receptors on immune cells to enhance their function

They target the immune system – not the cancer

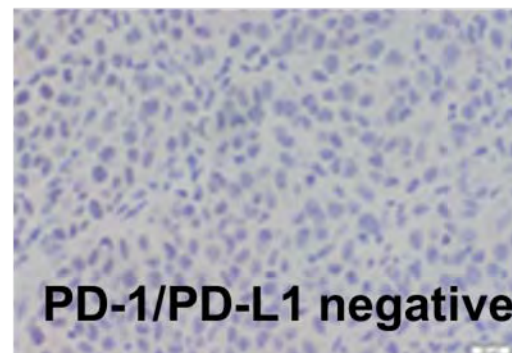
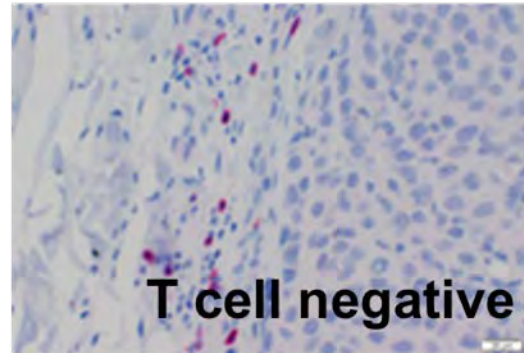
Inhibitory PD-1 receptors on T Cells block their response to tumors by engaging PD-1 ligand in the tumor

"Hot Tumor"
has T cells (red)
infiltrating

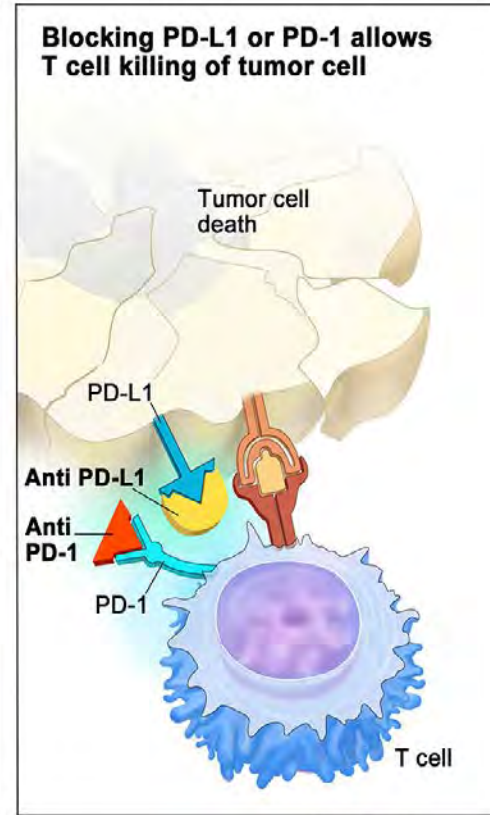
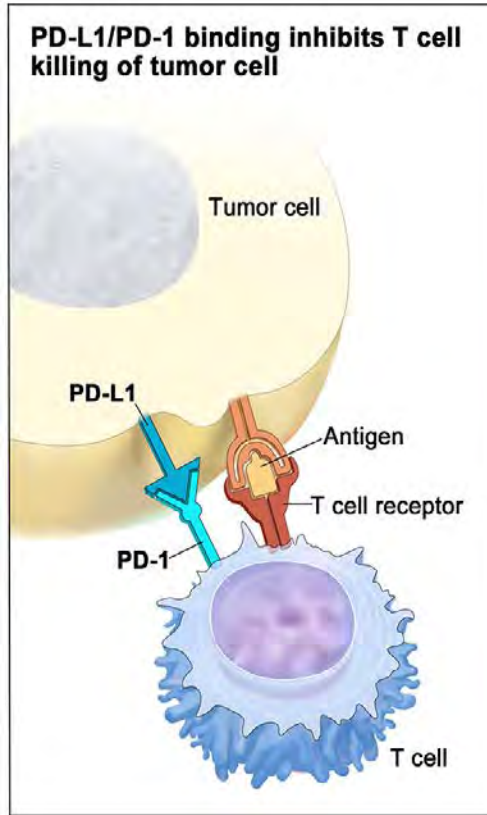


PD-1 ligand in tumors (brown) blocks action of T cells

"Cold Tumor"
No T cells



Checkpoint Inhibitors – Antibodies to PD-1 Receptor on T cells or PD-1 Ligand in Tumor

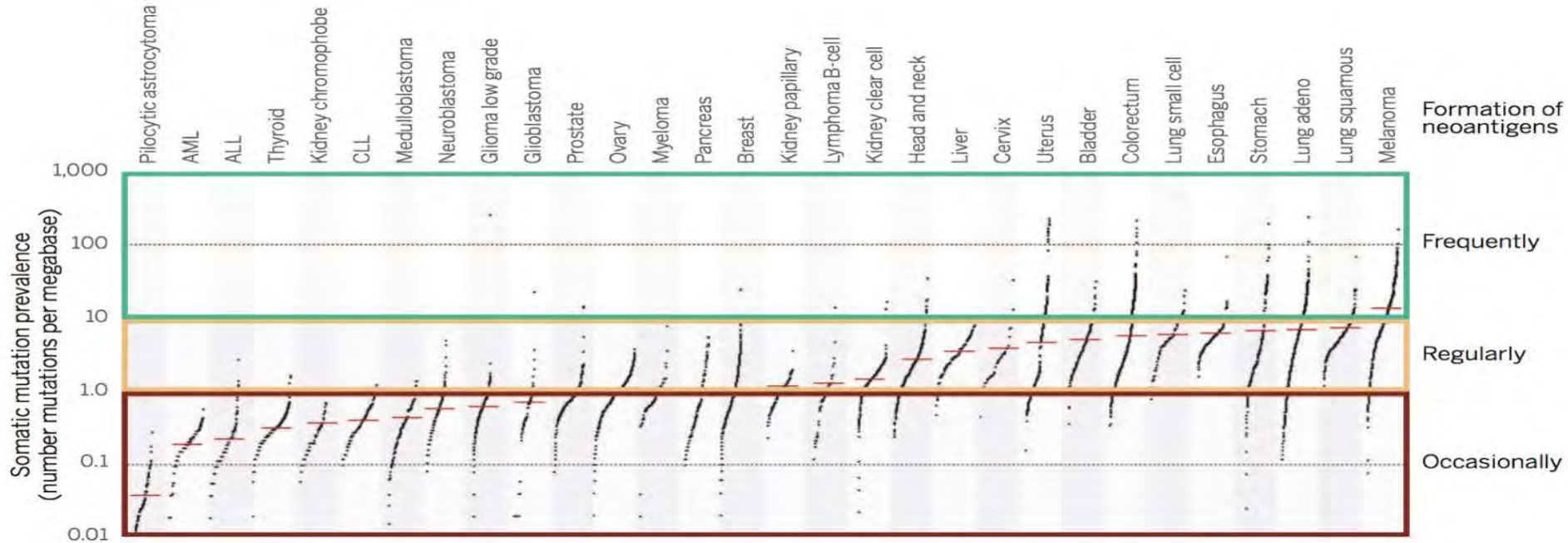


Genetic mutations

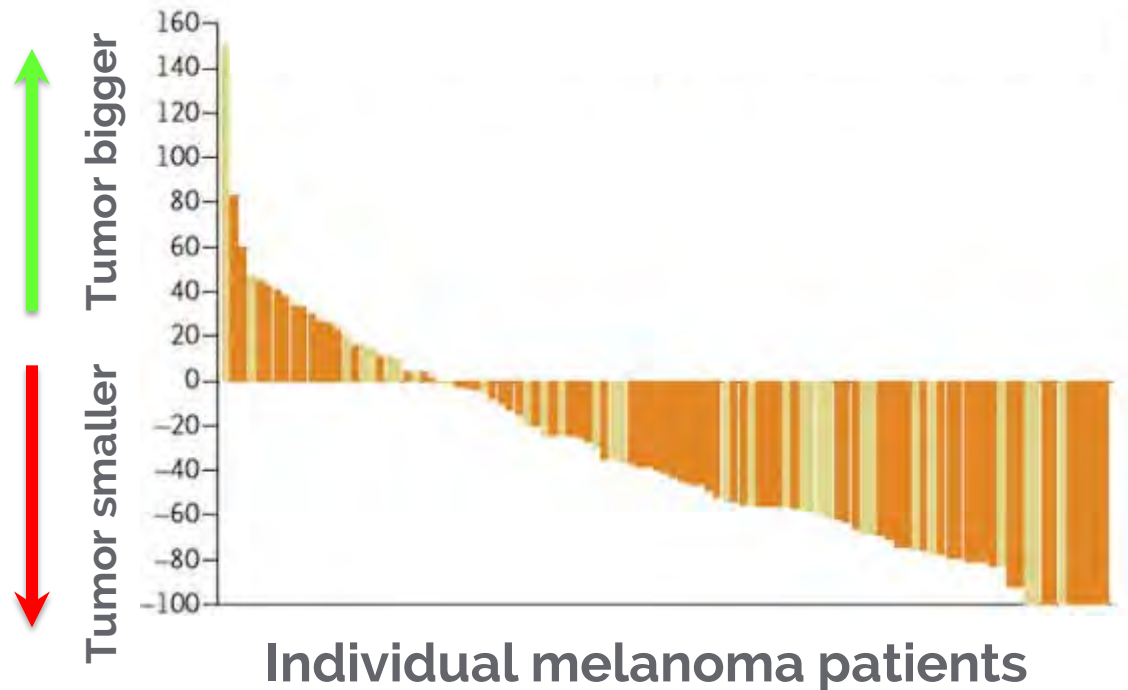
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- Genetic mutations are frequent in some tumors (e.g. melanoma, lung, etc.), and rare in others.
- More mutations → more shots on goal for T cells



Clinical Activity of Anti-PD-1 in Metastatic Melanoma



- FDA approved in 2014 for melanoma
- Now in many cancer types (lung, bladder, kidney, cervical, stomach, head and neck, lymphoma,) and counting

Checkpoint Blockade Success!

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New immunotherapy drug behind Jimmy Carter's cancer cure

Former president given pembrolizumab, one of the most promising new drugs in the treatment of cancer



What are Biomarkers?

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Diagnostic

What type does the patient have?

Prognostic

What is the patient's expected outlook?

Predictive

Is the patient likely to respond to immunotherapy?

Therapeutic

Is the immunotherapy working?

Safety

Have side effects arisen?

Long-Term Monitoring

Is the cancer in the process of relapsing?

T Cell-Infiltrated Tumors Contain MULTIPLE Inhibitory Pathways

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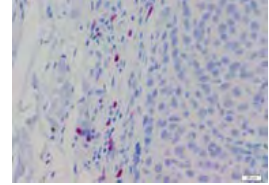
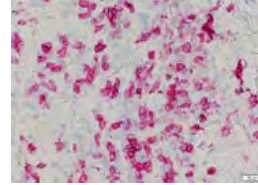
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- Multiple “defense” pathways are blocked by tumors once T cells enter
- Suggests that blocking two pathways together might be superior

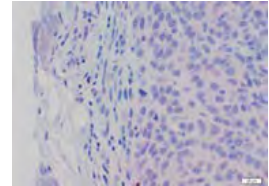
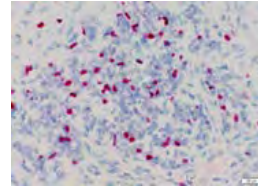
“Hot Tumor”

“Cold Tumor”

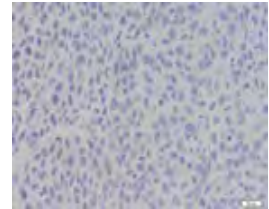
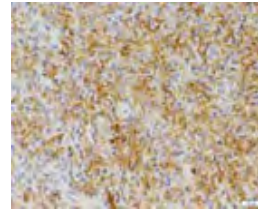
**Cytotoxic
CD8⁺ T cells**



**Suppressor
FoxP3⁺ T cells**



**PD-L1 ligand in
tumor – binds
PD-1 inhibits
T cells**

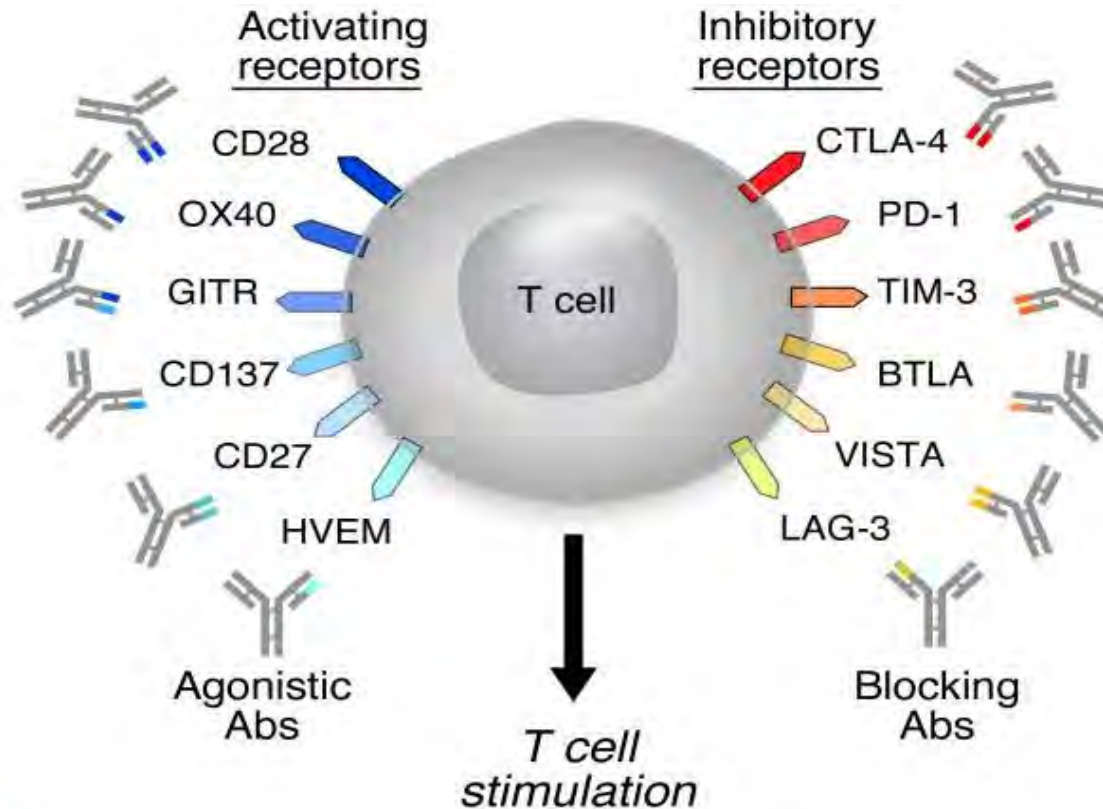


So Many Targets, So Little Time!

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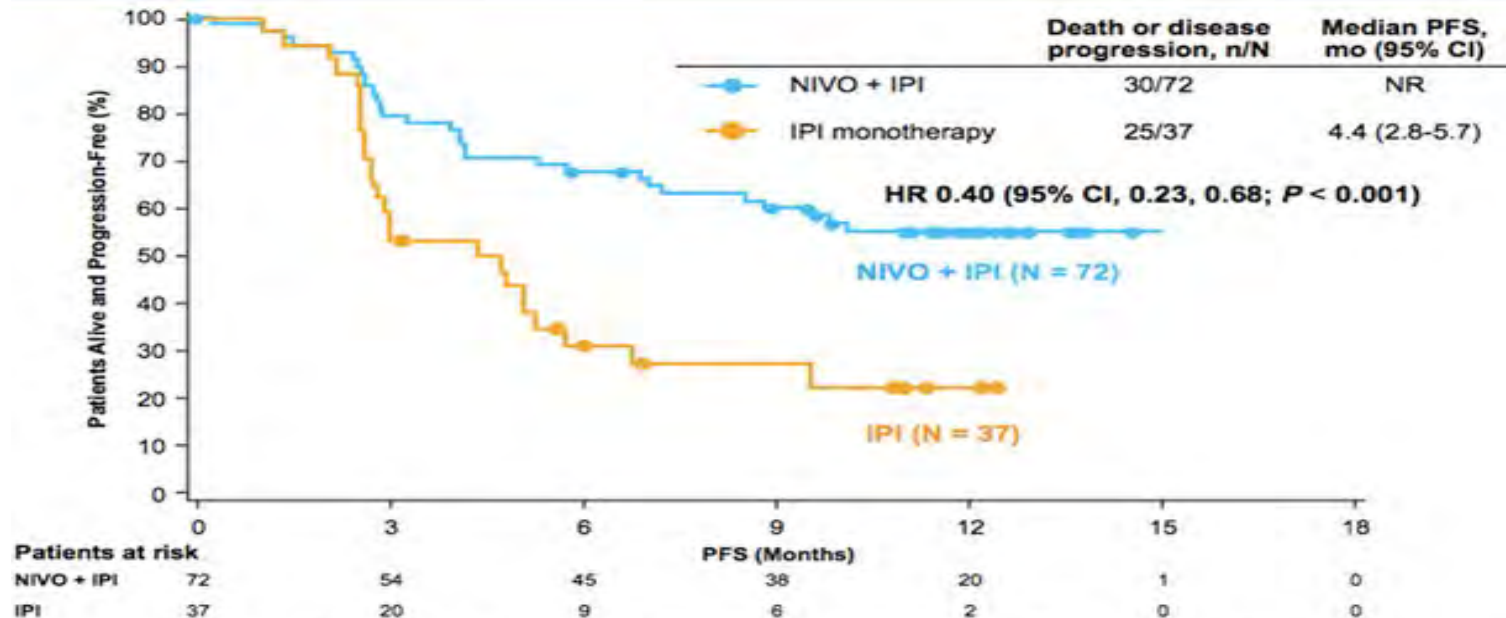
Hit the
Gas!



Block the
Brakes!

Increasing Responses By Combination Therapy

Combined PD-1 and CTLA-4 checkpoint blockade in melanoma patients



* PFS among BRAF MT patients (8.5 mo for NIVO + IPI, 2.7 mo for IPI monotherapy) was similar to that observed among BRAF WT patients

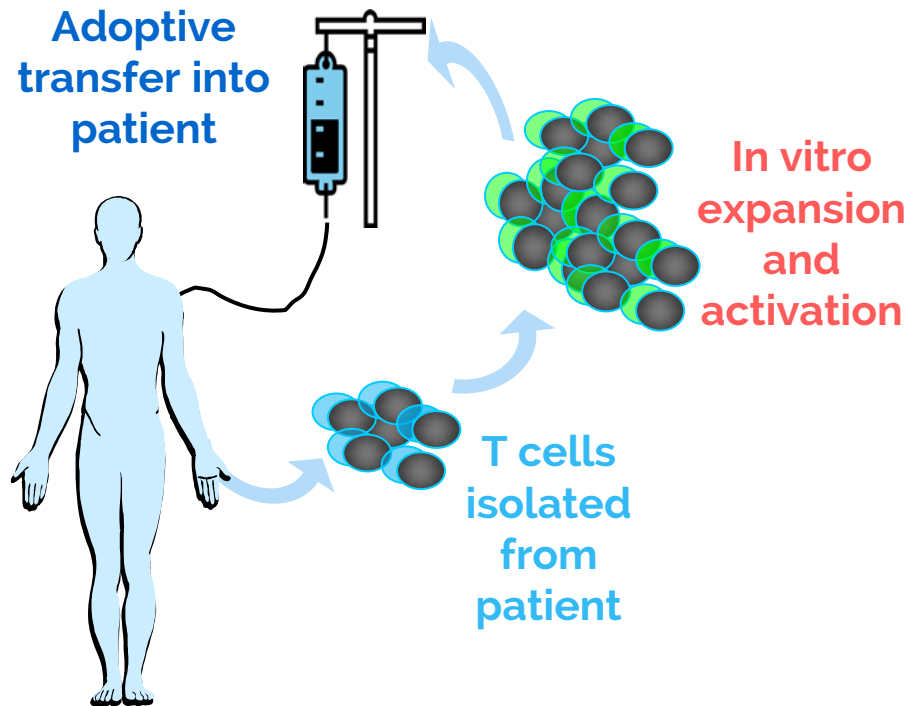
HR = hazard ratio

Database lock: January 30, 2015

T Cell Adoptive Transfer for Cancer Therapy

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- T cells are isolated from tumor site or blood
- Expanded in laboratory
- Can be engineered to recognize new targets
- T cells are re-introduced back to the patient, usually with other agents

Yee C. 2009 ASCO Educational Book

Adoptive “CAR” T Cell Therapy

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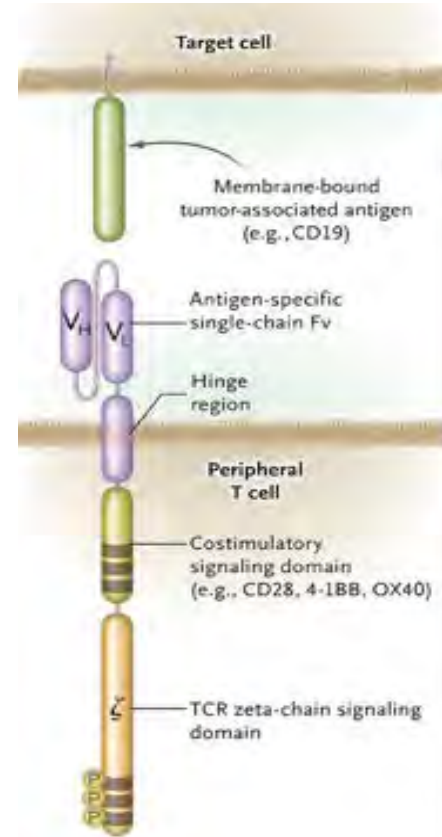
ORIGINAL ARTICLE

BRIEF REPORT

Chimeric Antigen Receptor–Modified T Cells in Chronic Lymphoid Leukemia

David L. Porter, M.D., Bruce L. Levine, Ph.D., Michael Kalos, Ph.D., Adam Bagg, M.D., and Carl H. June, M.D.
N Engl J Med 2011; 365:725-733 | [August 25, 2011](#)

- Isolate patient's peripheral blood T cells
- Lentivirus transduced with “CAR” (chimeric antigen receptor)
- CAR – anti-CD19 antibody fragment fused to intracellular domains of potent T cell signaling subunits
- Re-infuse “CAR”-modified T cells into patient
- Successful for treating children with B cell malignancies



HEALTH

In Girl's Last Hope, Altered Immune Cells Beat Leukemia

By DENISE GRADY DEC. 9, 2012



Emma Whitehead, with her mother, Kari. Last spring, Emma was near death from acute lymphoblastic leukemia but is now in remission after an experimental treatment at the Children's Hospital of Philadelphia.

Jeff Swensen for The New York Times

Successful Preventative Vaccination Against Virus-Induced Cancers

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- Vaccine to feline leukemia virus for cats
- Vaccine to herpes virus (Marek's virus) in chickens
- Vaccine to hepatitis B in humans to prevent liver carcinoma
- Vaccination to human papillomavirus prevents cervical cancer

A decade on, vaccine has halved cervical cancer rate

🕒 29 August 2016 [Australia](#)



Share



Useful resources about cancer immunotherapy

What is Immunotherapy

cancerresearch.org/patients/what-is-immunotherapy

cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy.html

Immunotherapy by Cancer Type

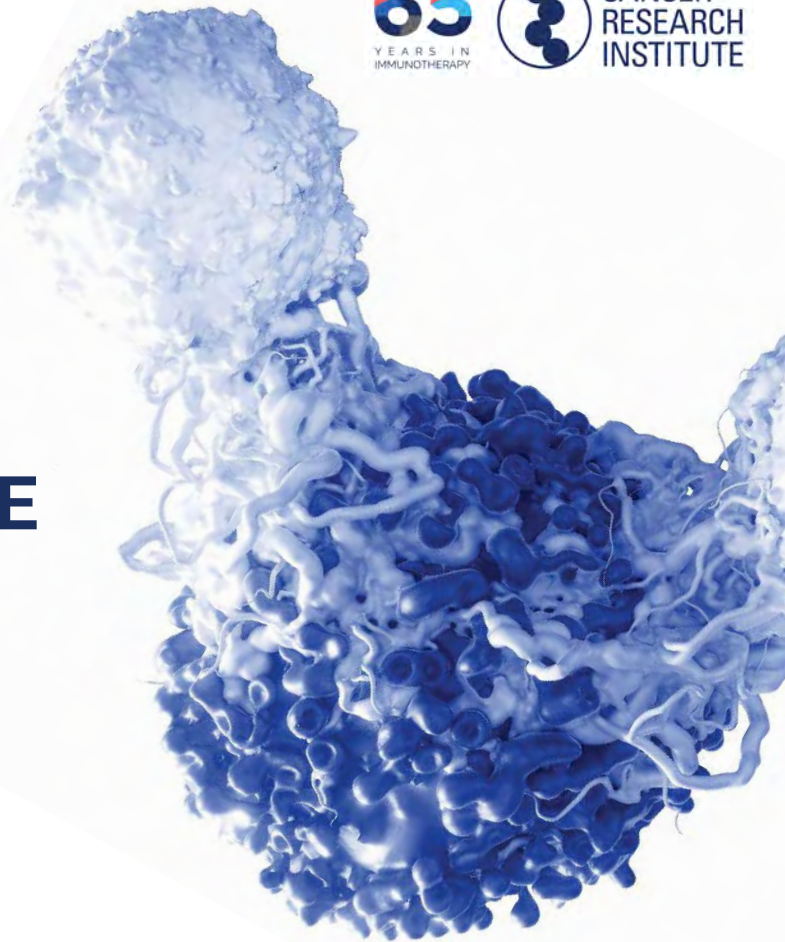
cancerresearch.org/immunotherapy/cancer-types

Local Support Services

bcconnections.org/

Panel Discussion

LATEST RESEARCH UPDATE



Moderator

Lewis Lanier, Ph.D.

Panel

Kara Davis, D.O.

Pediatric Blood Cancers

Terence Friedlander, M.D.

Bladder Cancer

David Miklos, M.D., Ph.D.

Blood Cancers

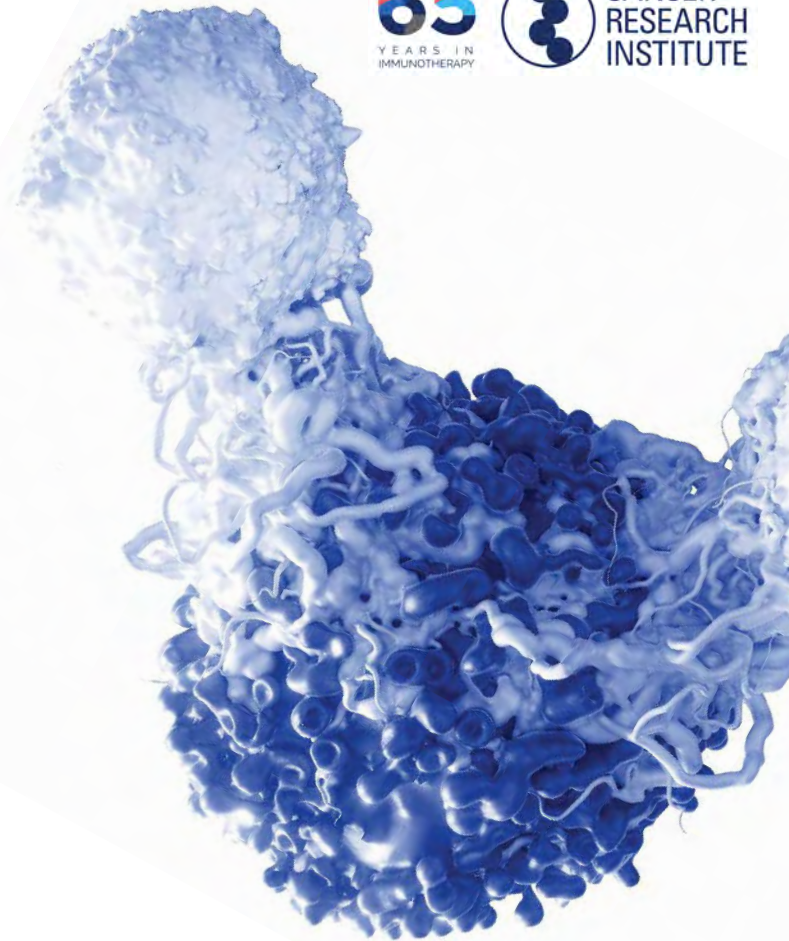
Katy Tsai, M.D.

Melanoma

Kristin Kleinhofer

Leukemia Survivor

PATIENT PERSPECTIVE



My Journey of HOPE



How did I get to Immunotherapy?



2010

August



Enjoying Life.....

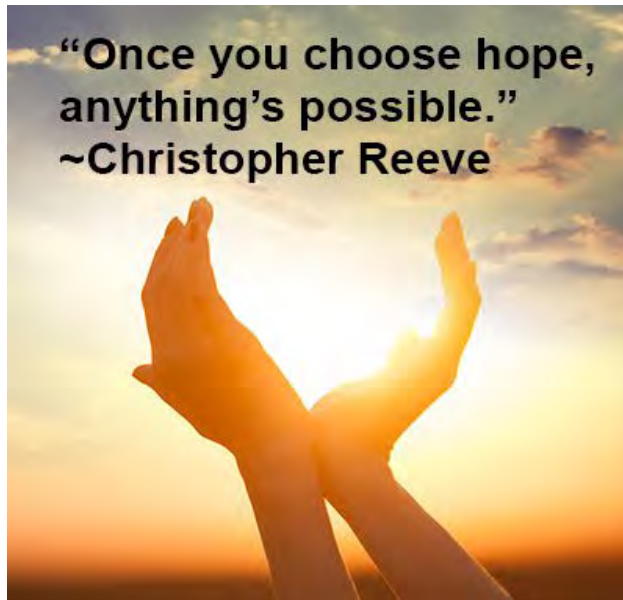




2014



February & March

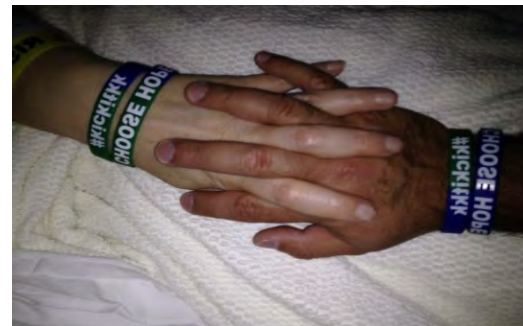


Now, What to Do?



2014

April



Stanford
HEALTH CARE
STANFORD MEDICINE

Now, What to Do?

2014

May



FRED HUTCH
CURES START HERE™





2014

June - August





2014



September & October





2014



November & December Immunotherapy Treatment



FRED HUTCH
CURES START HERE™

27 out of 29 (93%) A.L.L. patients Experience Sustained Remissions





2015



January & February Transplant Journey Begins...

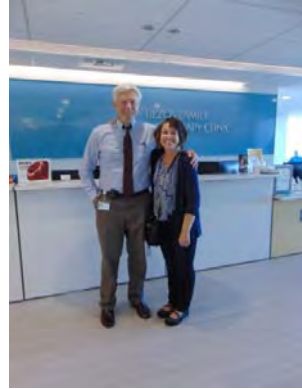


FRED HUTCH
CURES START HERE™



Seattle
Cancer Care
Alliance

Fred Hutch · Seattle Children's · UW Medicine



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CURES START HERE™



UNIVERSITY OF WASHINGTON
MEDICAL CENTER
UW Medicine

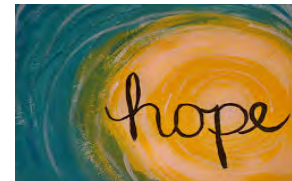
Bucket List Continues...

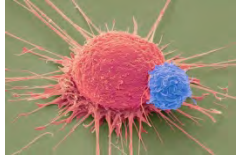




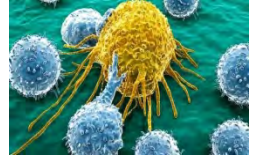
How to Make it Through the Dark Times?

- Choose How We Want to Live Each Day
- Take It Day by Day, Live in the Present
- Gratitude for Life's Blessings
- Positive Attitude
- Acceptance
- Knowledge is Power
- Close Partnership with your Medical Team
- Strong Support System, Stronger Together
- Inner Strength & Resilience to Push Forward
- Faith, Spiritual Life
- Humor
- Cancer Resources
- Choosing





Immunotherapy Treatments offer HOPE



- Clinical Trials are where Revolutionary Breakthroughs Begin
- Standard Treatments Exhausted or No Longer Work
- Possible Gift of More Time
- Furthering Research to Help Future Cancer Patients
- Less Toxicity & More Targeted Therapy
- Changing the Cancer Treatment Landscape
- Profound Impact on what Cancer Care will mean in Coming Years
- Exciting time as more Discoveries are made and Perfected

IMAGINE the Day.....

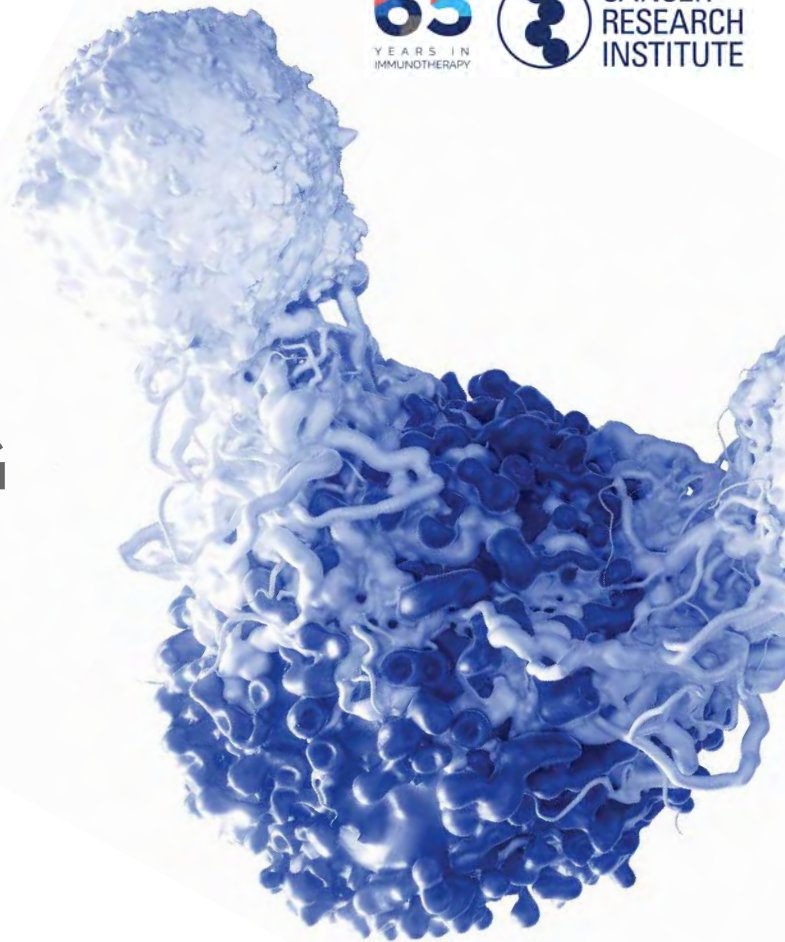
Cancer will not be a Word we are afraid of. No more harsh side effects, no more relapses, just our body's immune system being led to harness its wisdom to conquer Cancer through Immunotherapy.

Just Imagine.

"Once you Choose Hope, Anything is Possible."



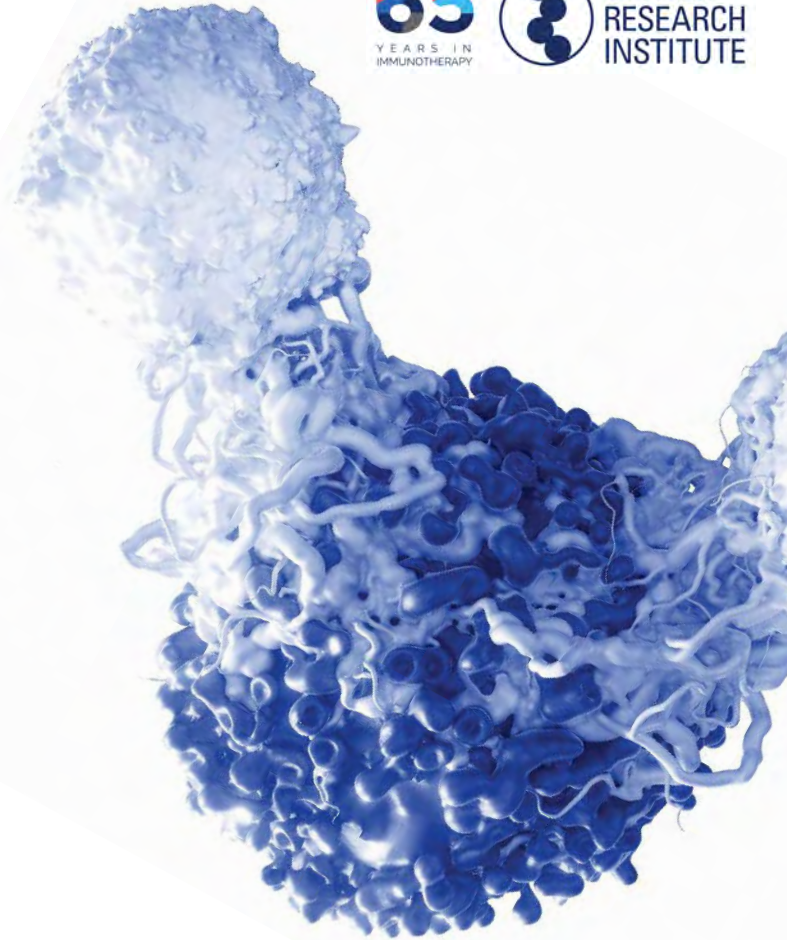
LUNCH AND NETWORKING



Brian Brewer

Cancer Research Institute

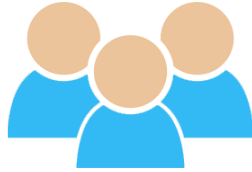
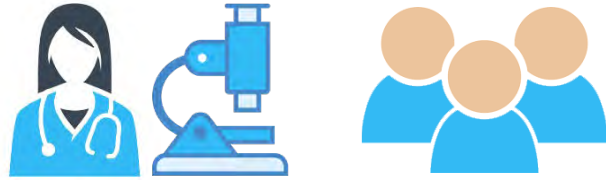
LEARN ABOUT CLINICAL TRIALS



What Are Clinical Trials?

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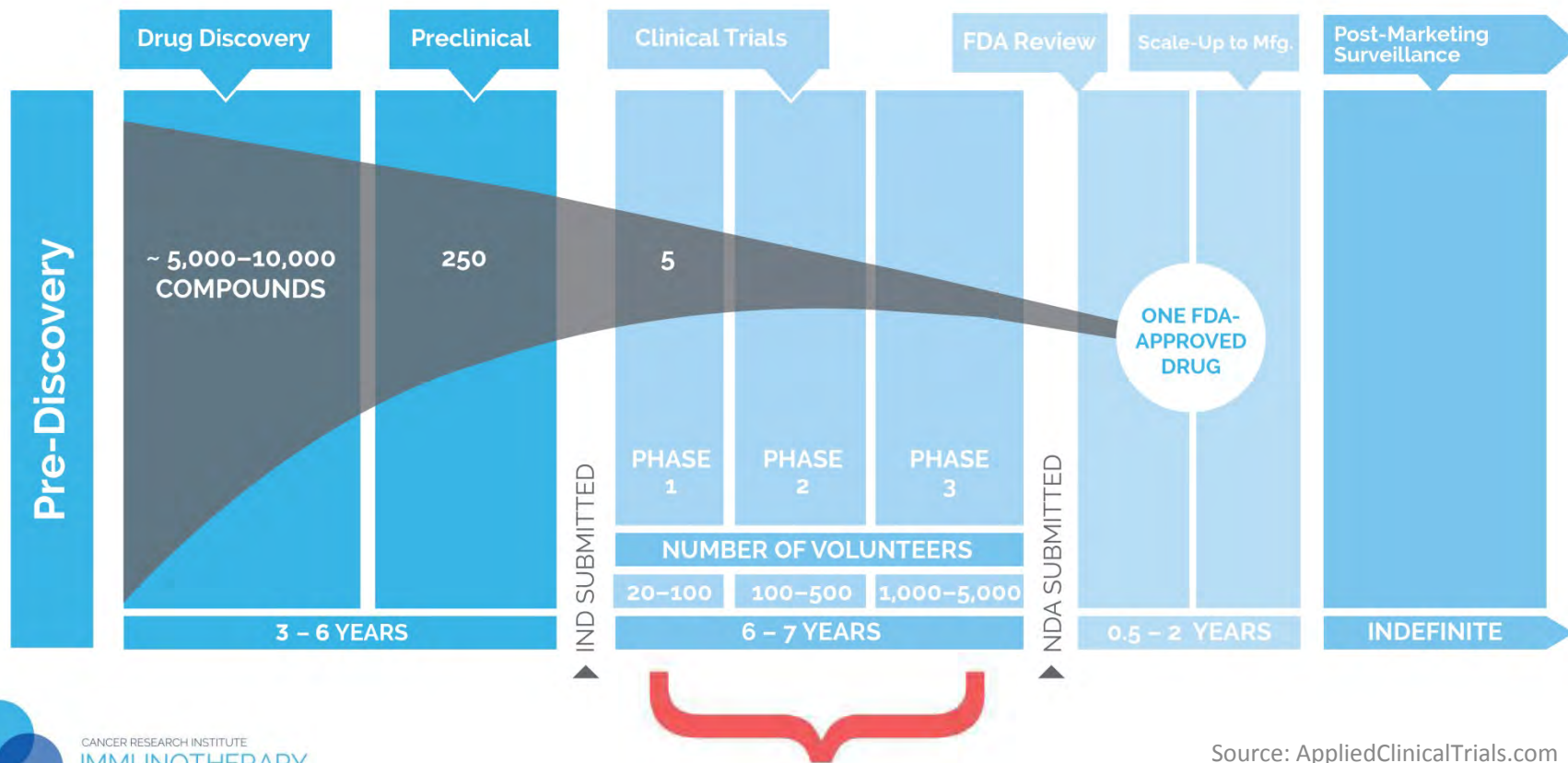


- Research studies that involve people
- Designed to answer specific questions about new and existing treatments
- Aim to improve treatments and the quality of life for people with disease

Getting from Discovery to Approval

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What Are Clinical Trial Phases?

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Phase
1



Is the treatment safe?

Purpose:

- First study in humans
- Find best dose, delivery method, and schedule
- Monitor for side effects
- Determine safety

Number of people: 20-100

Phase
2



Does it work?

Purpose:

- Look for effect on specific type(s) of cancer
- Continue monitoring for side effects and safety

Number of people: 100-500

Phase
3



Does it work better?

Purpose:

- Compare new treatment (or new use of a treatment) with current standard treatment
- Determine risk vs. benefit

Number of people: 1,000-5k+

Pros and Cons of Clinical Trials



Potential Advantages	Potential Disadvantages
Access to best possible care	Unknown side effects or risks
Receiving new drugs before they're widely available	Unknown benefits—drugs may not work as intended
Close monitoring by medical team	Not all patients may benefit
Chance to play active role in healthcare and research	Frequent tests and clinic visits
Help future generations	Possible need to travel to trial sites

Patient Resource, "Understanding Clinical Trials: A Guide for Patients and Their Families"

Questions to Ask Before Volunteering



- Why is this trial being done?
- Why is it believed that the treatment being studied may be better than the standard treatment?
- What are my other options (standard treatments, other trials)?
- How did patients do in any previous studies of this treatment?
- How will the doctor know if treatment is working?
- How long will the trial last?

Questions to Ask Before Volunteering



- Can I continue to receive this treatment after the trial ends?
- What kinds of procedures or tests are involved?
- What impact with the trial have on my daily life?
- Will I have to travel for treatment? Will I be compensated?
- How often will I need to travel to receive treatment?
- Will I be hospitalized as part of the trial?
- What costs (if any) will be my responsibility to pay?

Getting into a Clinical Trial Isn't Always a Given



Trials are designed to ask specific questions, and must adhere strictly to entry criteria to ensure data is accurate and meaningful.

This also helps ensure patients who could be made worse by treatment are not exposed to the risk.

Common criteria include:

- **cancer type or stage**
- **treatment history**
- **genetic factors**
- **age**
- **medical history**
- **current health status**

Clinical Trials: Myth versus Fact

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MYTH

I might only get placebo
("sugar pill") instead of treatment.

FACT

Placebos are rarely used and never given
in the absence of some form of treatment.

Clinical Trials: Myth versus Fact

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MYTH

Trials are only for people who have run out of treatment options (a “last resort”).

FACT

Clinical trials are designed for people with cancer of all types and stages.

Clinical Trials: Myth versus Fact

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MYTH

I need to travel to a large hospital or cancer center to participate in a clinical trial.

FACT

Trials take place at local hospitals, cancer centers, and doctors' offices in all parts of the country, in both urban and rural areas.

Clinical Trials: Myth versus Fact

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MYTH

My health insurance doesn't cover the cost of care in a clinical trial.

FACT

Doctor visits, hospital stays, and certain testing procedures may be covered by insurance. Research costs are typically covered by the trial sponsor.

Clinical Trials: Myth versus Fact

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MYTH

Signing a consent form “locks” me into staying in a trial.

FACT

Fact: You are free to change your mind for any reason about participating in a trial anytime before or during a trial.

Clinical Trials: Myth versus Fact

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MYTH

I will be made to feel like a
“guinea pig” experiment.

FACT

Fact: The overwhelming majority of trial participants say they were treated with dignity and respect, and report having had a positive experience in a trial.

Clinical Trials: Myth versus Fact

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MYTH

Clinical trials aren't safe.

FACT

Fact: Safeguards including an Institutional Review Board, Data and Safety Monitoring Board, and an ongoing informed consent process ensure patients' rights and safety are protected.

A Word About Informed Consent



Informed consent = having all the facts before and during a trial

- Study purpose
 - Length of time of the study
 - Predictable risks
 - Possible benefits
 - Expectations
 - Patient's rights
 - Treatment alternatives
 - Patient health monitoring
 - Safeguards in place
 - How to withdraw from study
- Be bold in asking for details.
It's YOUR treatment plan.**

How Can I Find a Clinical Trial?

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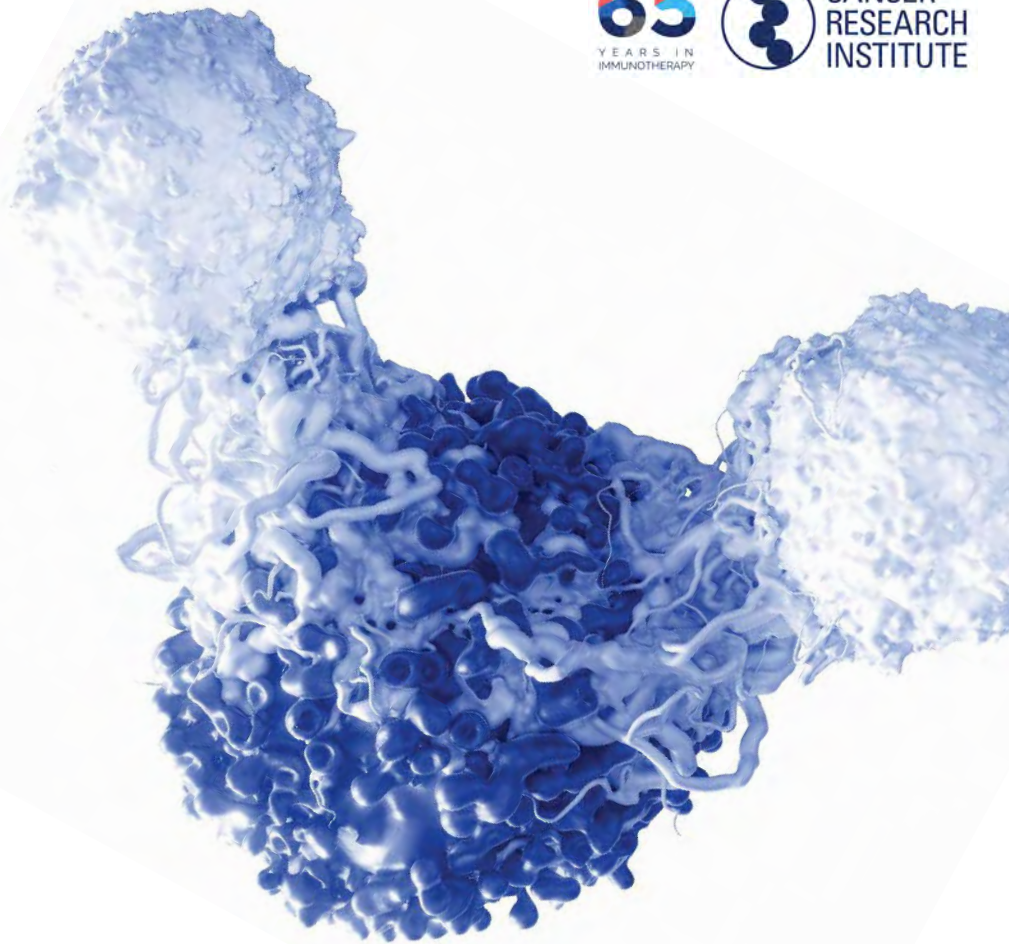
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- Ask your doctor
- Ask another doctor if necessary...
- Contact a patient advocacy organization
 - Seek assistance from a clinical trial navigator, if offered
 - CRI Clinical Trial Finder: 1 (855) 216-0127
- Search online
 - <https://www.cancerresearch.org/patients/clinical-trials>
 - <https://clinicaltrials.gov/>



Panel Discussion

IMMUNOTHERAPY CLINICAL TRIALS



Moderator

Panel

Brian Brewer

Sharon Birzer

Lymphoma

Kelly Brooks

Melanoma

Benny Juarez

Caregiver

BREAKOUT SESSIONS

Breakout Rooms

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Pediatric Blood Cancers Kara Davis, D.O.	Continental 1
Melanoma Katy Tsai, M.D.	Continental 2
Bladder Cancer Terence Friedlander, M.D.	Continental 3
General Immunotherapy Lewis Lanier Ph.D.	Continental 4 (Here)

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Thank you to those who helped promote the summit

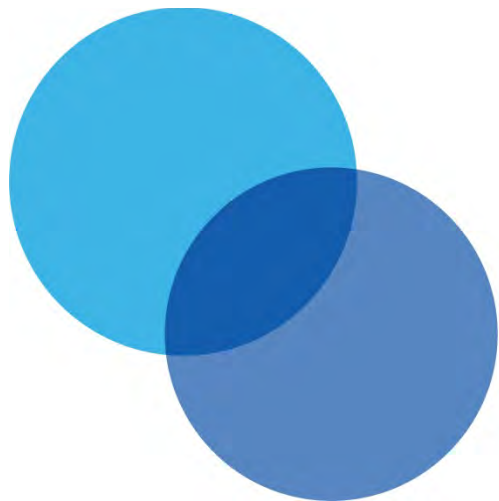
- Alta Bates Summit Comprehensive Cancer Center (Sutter Health)
- Bay Area Cancer Connections
- Cancer Clinical Trials Office at Stanford Medicine
- Cancer Support Community
- C.A.R.E. Program at Zuckerberg San Francisco General Hospital
- Colontown
- Fight Colorectal Cancer
- FORCE
- Imerman Angels
- Latinas Contra Cancer
- Let Life Happen (Barbara Jacoby)
- Lucile Packard Children's Hospital at Stanford Medicine
- Mark M. Davis Lab at Stanford Medicine
- Parker Institute of Cancer Immunotherapy
- ThyCa Support Group of Fresno, California
- Women's Cancer Resource Center
- UCSF Helen Diller Family Comprehensive Cancer Center

Thank You!



You will receive two emails after the summit:

1. **A survey** to share your feedback on the summit as well as insights into future programming.
2. **Information** from the Summit day, including this presentation & instructions on how to use our [Clinical Trial Finder service](#).



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San Francisco June 30, 2018