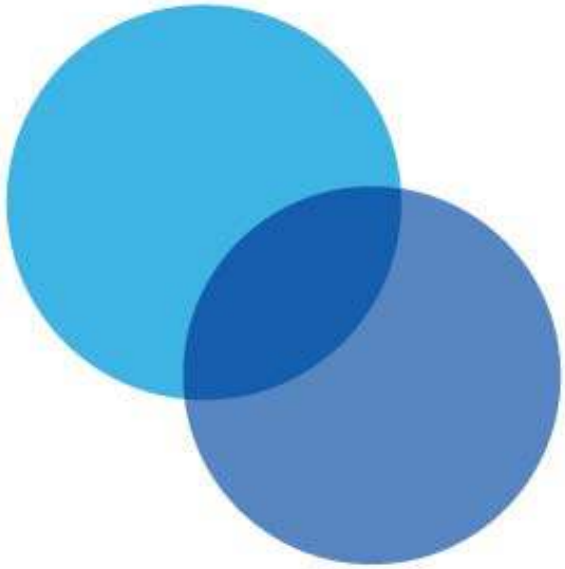

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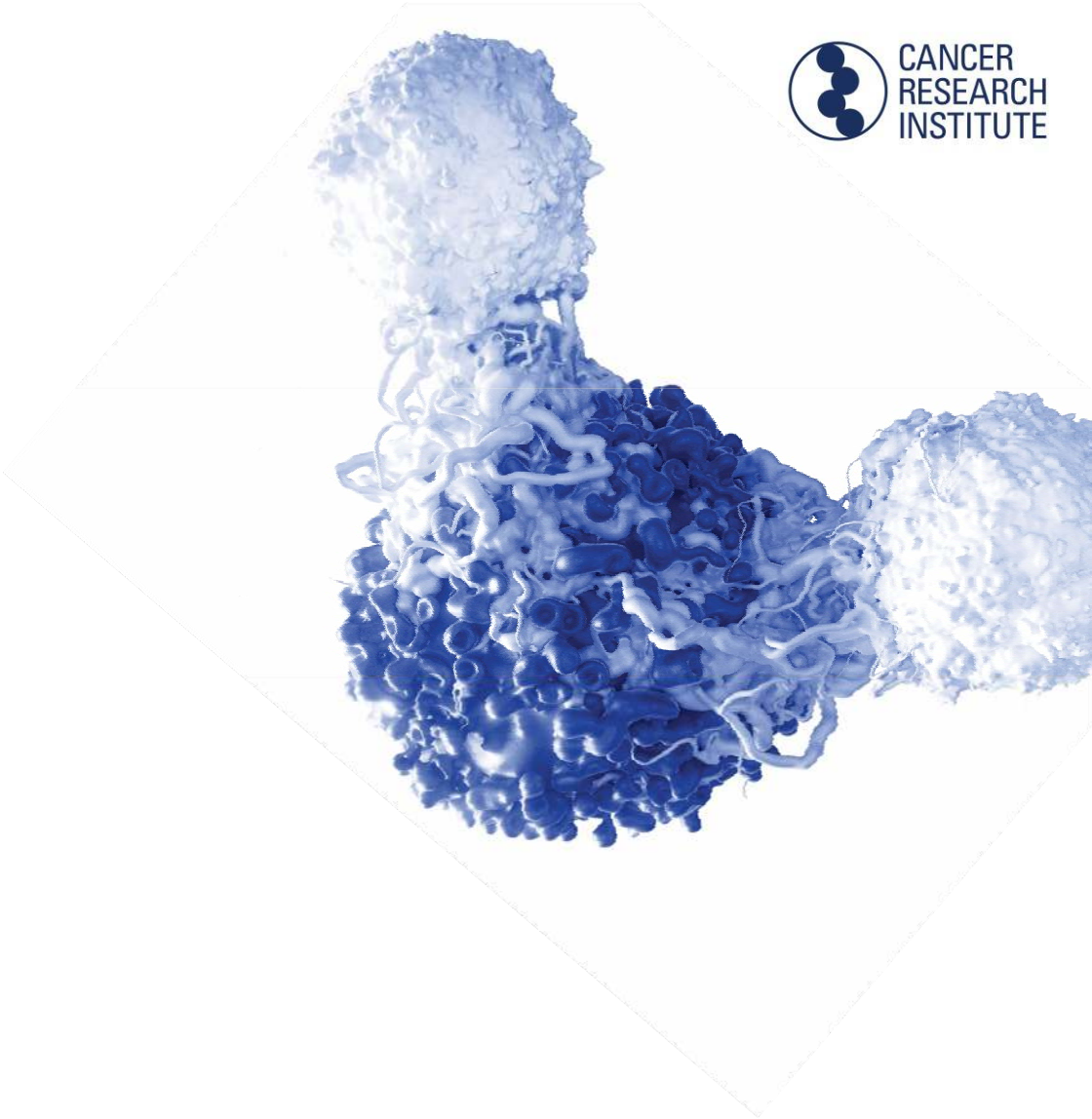
IMMUNOTHERAPY PATIENT SUMMIT

San Francisco • Chicago • New York • Houston • Tampa

New York City September 23, 2017



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Brian Brewer

Cancer Research Institute

WELCOME

CANCER RESEARCH INSTITUTE
IMMUNOTHERAPY
PATIENT SUMMIT

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This event is made possible with generous support from:

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A special thank you to those who helped promote the summit

Addario Lung Cancer Foundation
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Fight Colorectal Cancer
Focused Ultrasound Foundation
FORCE
GI Cancers Alliance
Imerman Angels
Immunotherapy Foundation
Let Life Happen
Melanoma Research Foundation
National Ovarian Cancer Coalition
NYU Langone Health
Patient Empowerment Network

Our Guest Faculty

CANCER RESEARCH INSTITUTE

Scientific Experts

Leena Gandhi, M.D., Ph.D.
NYU Perlmutter Cancer Center

Michael Postow, M.D.
Memorial Sloan Kettering Cancer Center

Robert Vonderheide, M.D., D.Phil.
UPenn Abramson Cancer Center

Dmitriy Zamarin, M.D. , Ph.D.
Memorial Sloan Kettering Cancer Center

Patient Experts

Janie Ferling
Melanoma

Kristin Kleinhofer
Leukemia

Philip Prichard
Kidney Cancer

Johanna Sedman
Prostate Cancer (caregiver)

Schedule of Events

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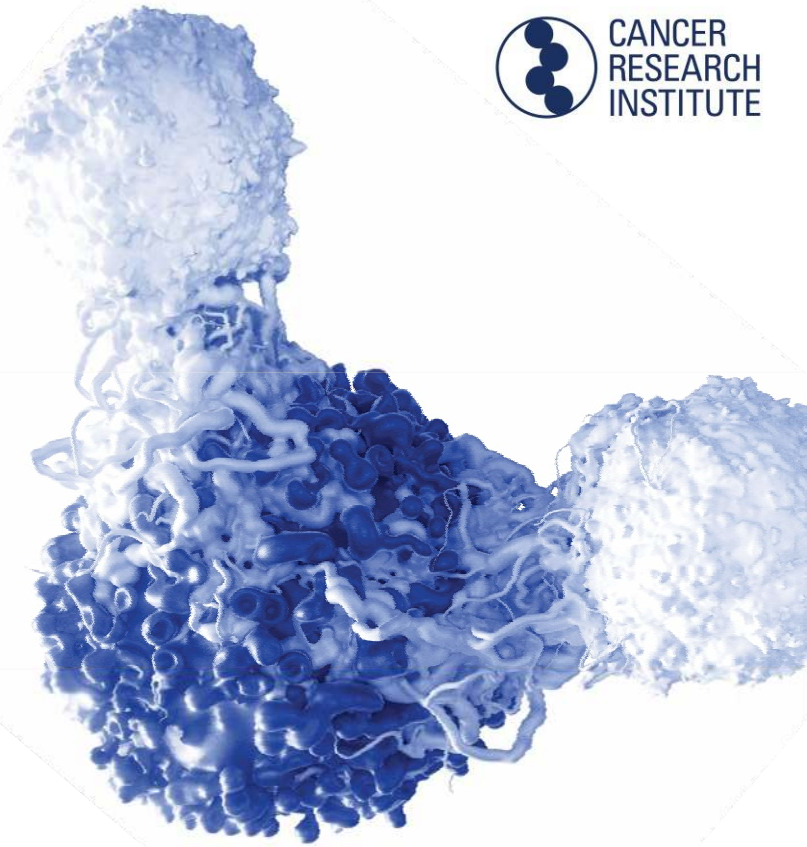
9:00am	Registration and networking
10:00am	Program commences **Welcome** Brian Brewer **Introduction to the Cancer Research Institute** Jill O'Donnell-Tormey, Ph.D.
10:15am	**Hear from the experts** Learn the basics of immunotherapy Leena Gandhi, M.D., Ph.D. Latest research update panel Moderator Leena Gandhi, M.D., Ph.D. Panelists Michael Postow, M.D. Robert Vonderheide, M.D., D.Phil. Dmitriy Zamarin, M.D., Ph.D.
11:30am	**Patient perspective** Hear from a melanoma survivor Janie Ferling
12:00pm	Lunch and networking
1:00pm	**Demystifying clinical trials** Learn about clinical trials and panel discussion Moderator Brian Brewer Panelists Kristin Kleinhofer Philip Prichard Johanna Sedman
2:00pm	Refreshment break
2:15pm	**Breakout sessions** Your choice of moderated discussion with our experts or a general networking session Breast / Pancreatic Cancer Robert Vonderheide, M.D., D.Phil. Gynecologic Cancers Dmitriy Zamarin, M.D., Ph.D. Melanoma Michael Postow, M.D. General Immunotherapy & Networking Leena Gandhi, M.D., Ph.D.
3:15pm	Program closes
9:00am – 4:00pm	**Clinical trial navigator appointments** Appointments will be available all day. If you didn't pre-register, check with the registration desk.



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Jill O'Donnell-Tormey, Ph.D.

Cancer Research Institute

Introducing CRI

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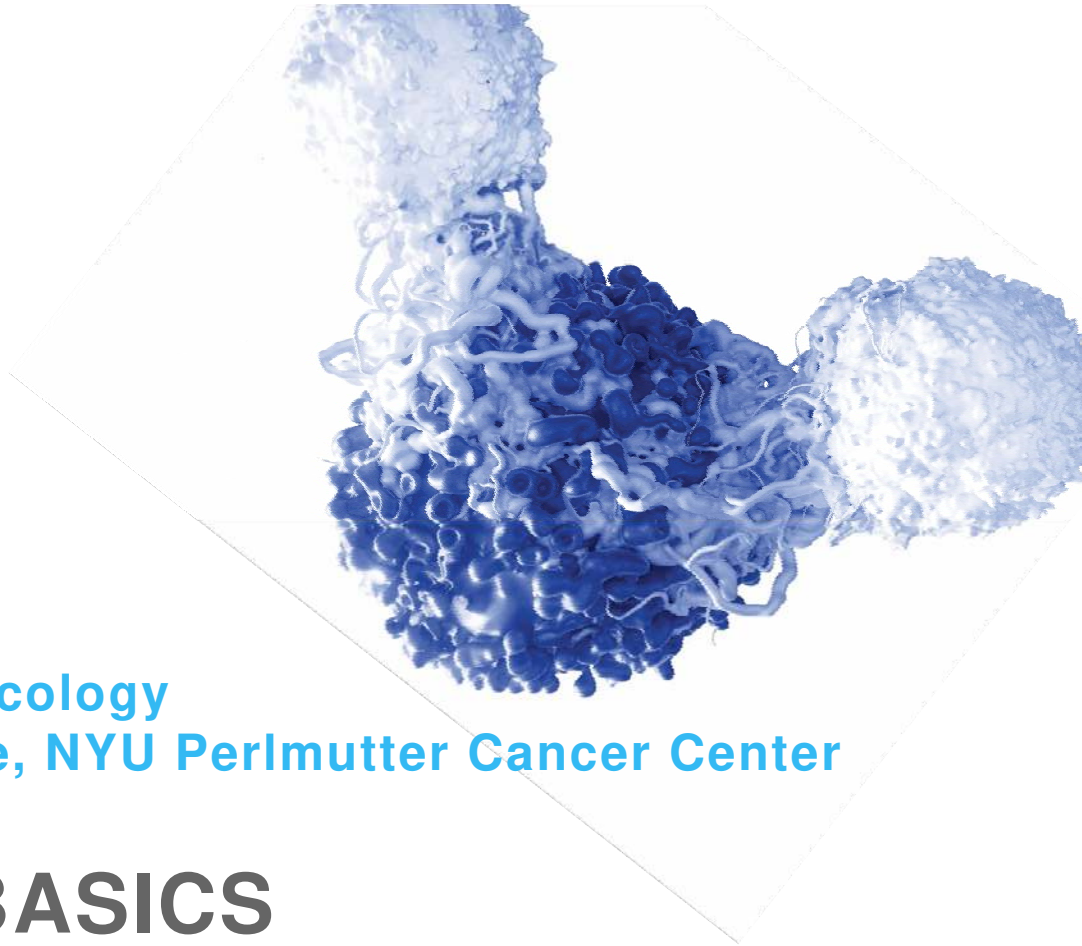

Leena Gandhi M.D. Ph.D.
Director of Thoracic Medical Oncology
Associate Professor of Medicine, NYU Perlmutter Cancer Center

IMMUNOTHERAPY BASICS

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Immune Recognition of Cancer

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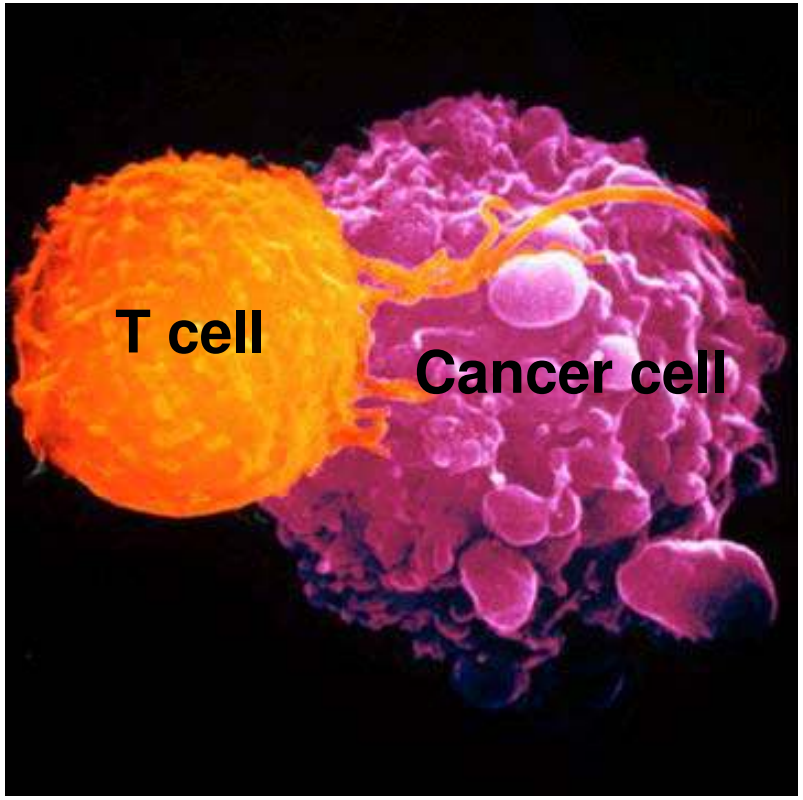

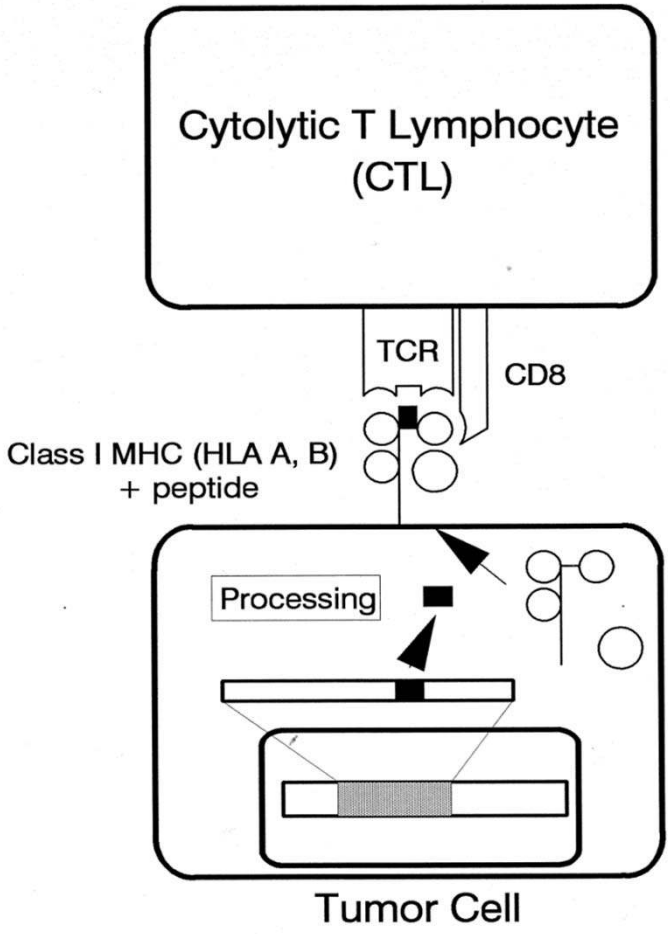

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Two general strategies to promote the immune system to destroy cancer

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- Boost the offense (“Active immunotherapy”)
  - Increase the number and function of T cells capable of recognizing and attacking tumor cells
  - Stimulate T cell activation
  - Cytokines (IL-12), vaccines
- Block the defense (“Passive immunotherapy”)
  - Interfere with inhibitory pathways in the tumor site that resist T cell attack
  - Block T cell inhibition
  - PD-1 inhibitors, CTLA4 inhibitors

Immunotherapy and the Tail of the Curve: IL-12

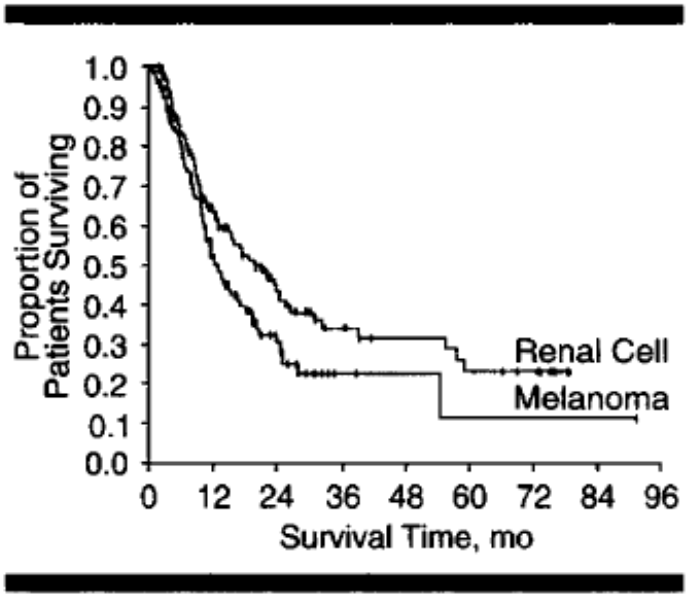

Fig 2.—Survival of patients with metastatic melanoma and renal cell cancer treated with high-dose bolus interleukin 2, as assessed in June 1993.

Rosenberg, SA et al. *JAMA*. 1994;271(12):907-913

Vaccines have been disappointing in cancer therapy

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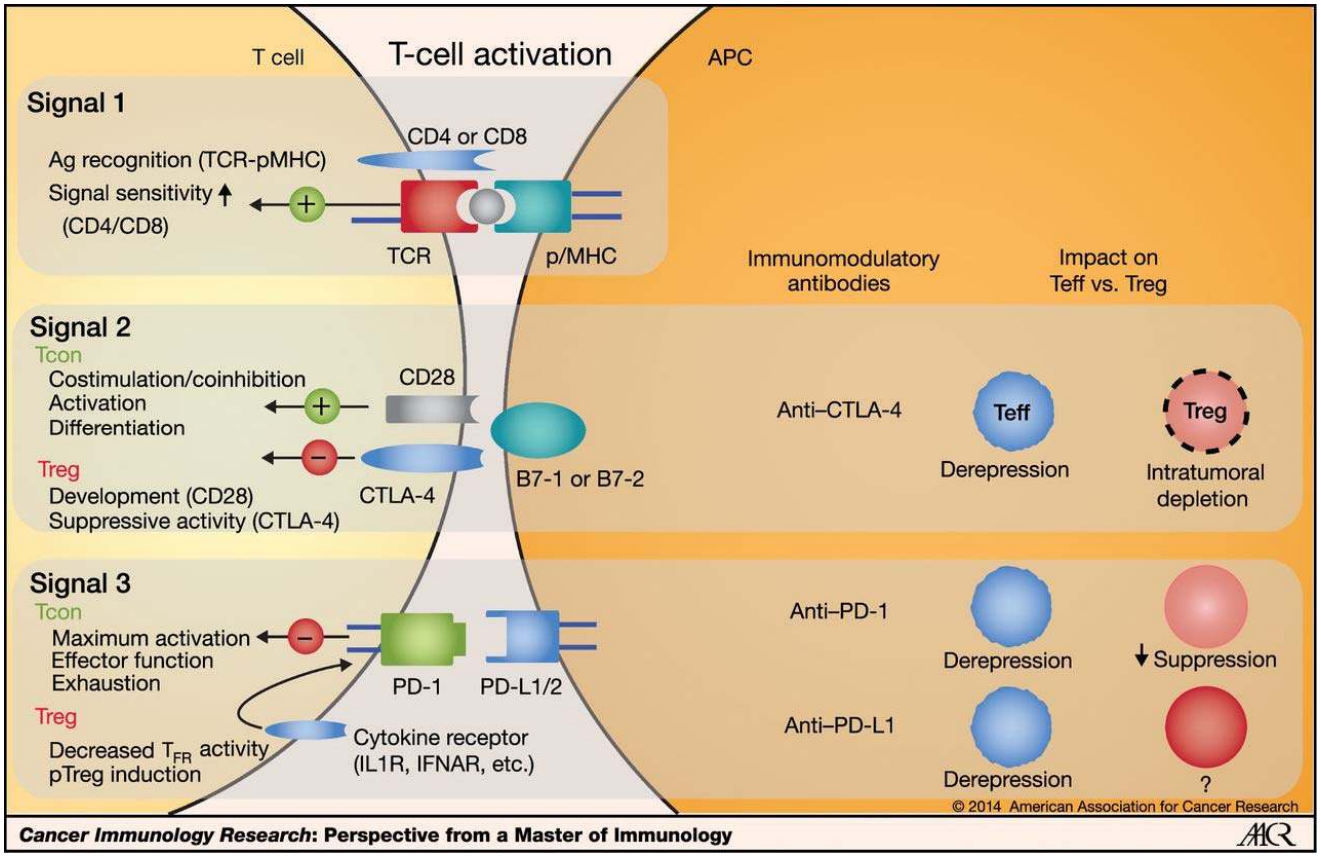
PREVENTION

- Vaccine to hepatitis B in humans to prevent liver carcinoma
- Vaccination to HPV prevents cervical cancer

TREATMENT

- Many trials, few successes

Signals that regulate T cell activation

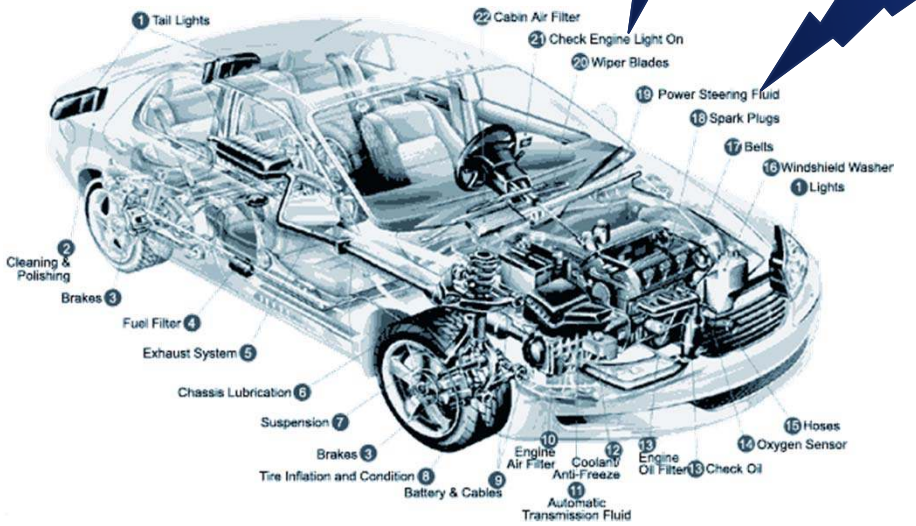


Kim, HJ and Cantor, H Cancer Immunol Res 2014;2:926-936

TARGETED THERAPIES HIT THE ONCOGENIC "DRIVERS"

EGFR inhibitor
ALK/ROS inhibitor
BRAF inhibitor
MET inhibitor

Carboplatin +
Pemetrexed



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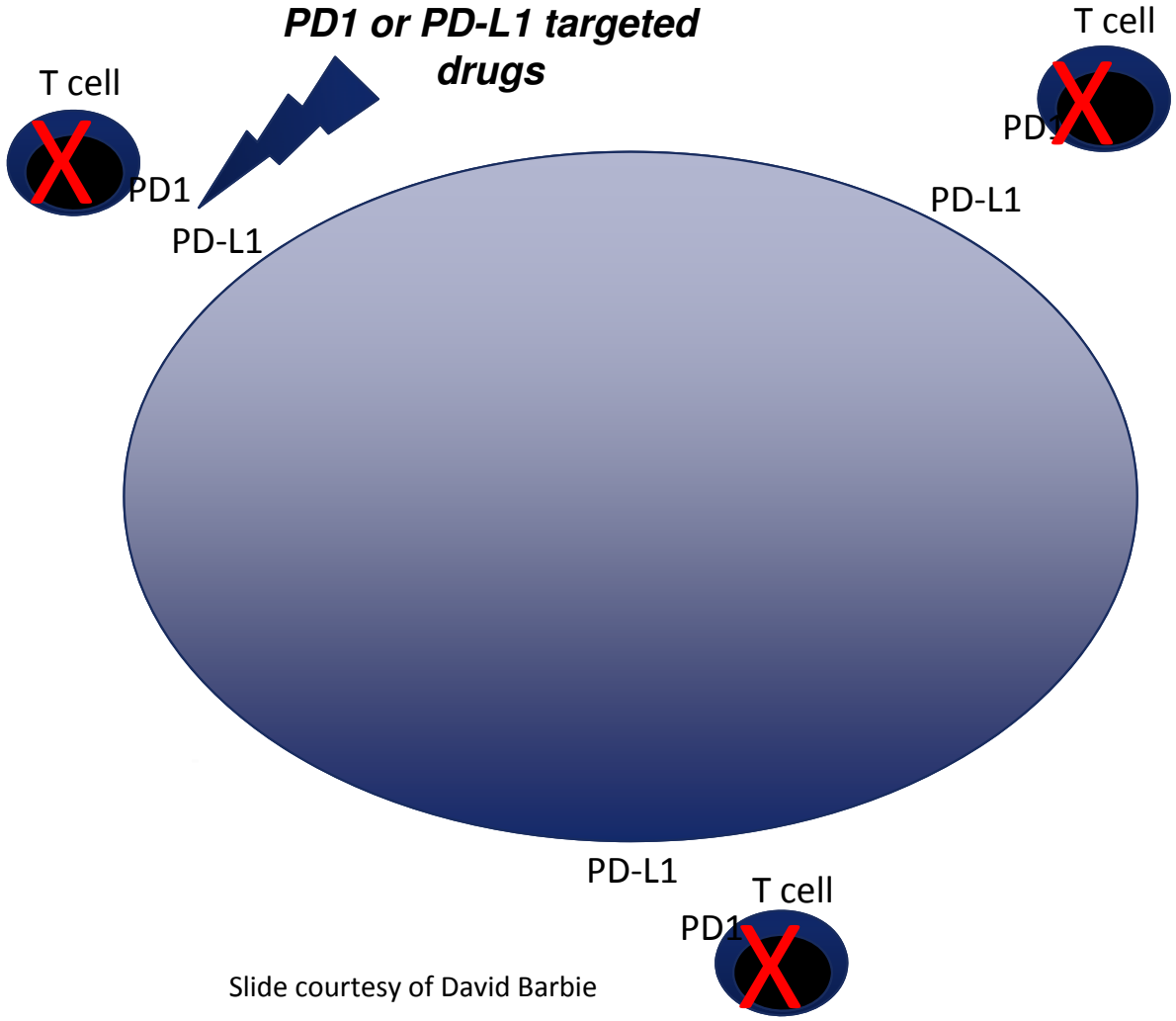
Slide courtesy of D. Barbie



Slide courtesy of David Barbie

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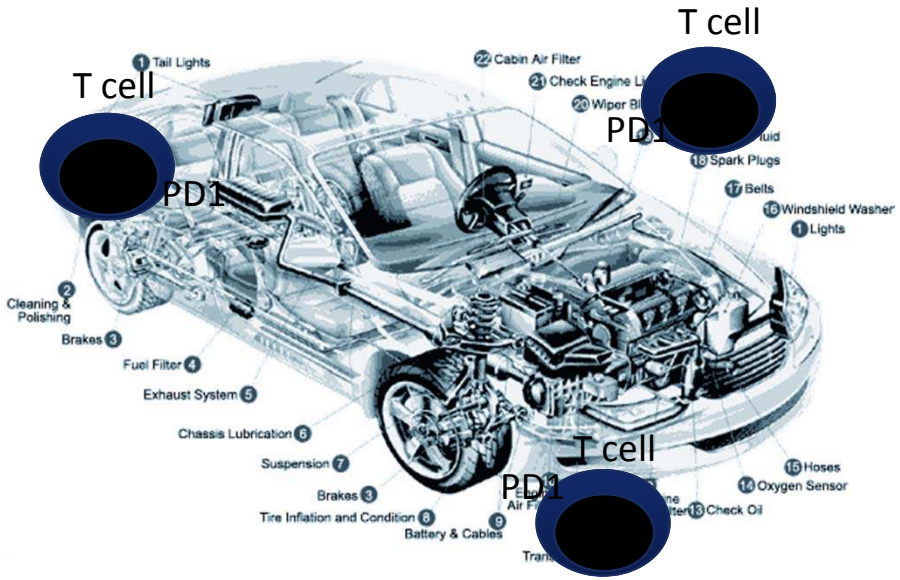

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Slide courtesy of David Barbie

In addition to having activity in multiple cancer types, PD-1 inhibitors overall have less side effects than traditional chemotherapies

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Anti-PD-1/L1 Immunotherapy in Cancer: Works for some, not all

WHO BENEFITS IN LUNG CANCER:

- Smokers
- Those with higher “mutational load” (burden of genetic changes)
- Those with high levels of PD-L1

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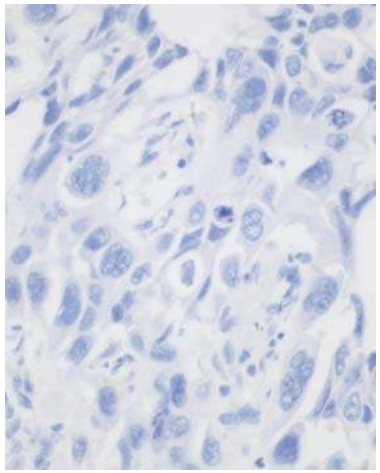
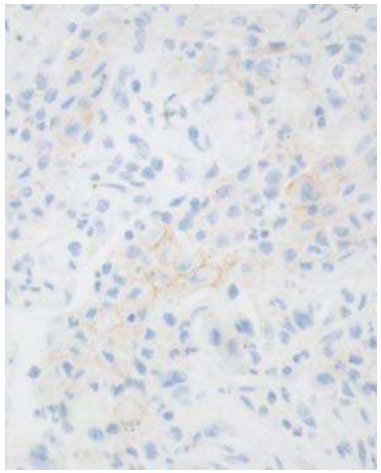
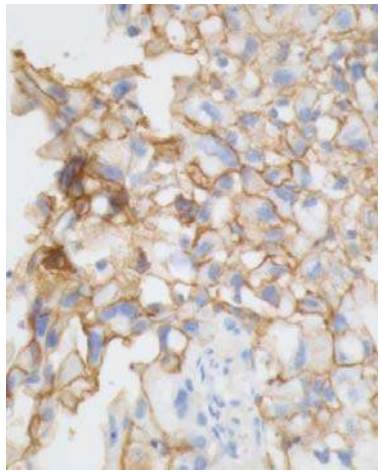
PD-L1
IMMUNOHISTOCHEMICAL STAINING



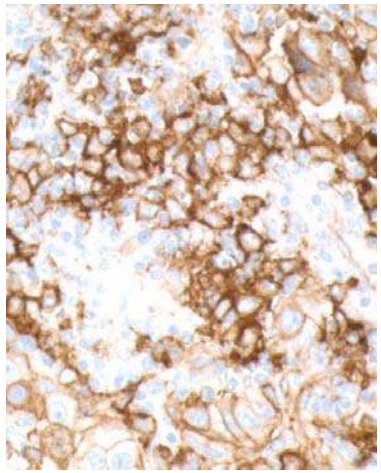
Staining intensity: 0+
PD-L1 = 0% positive



Staining intensity: 1+
PD-L1 = 2% positive



Staining intensity: 2+
PD-L1 = 100% positive



Staining intensity: 3+
PD-L1 = 100% positive

T cell-infiltrated tumors contain MULTIPLE inhibitory pathways

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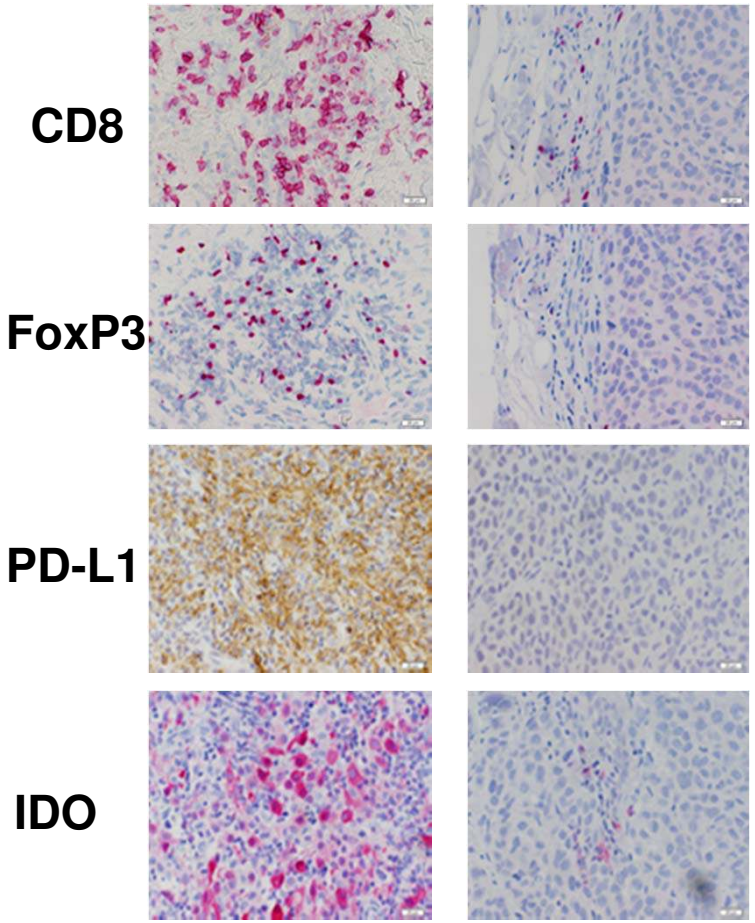
- Multiple “defense” pathways are co-opted in tumors once T cells enter
- Suggests the notion that blocking two together might be superior



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Nivolumab/Ipilimumab vs. nivolumab in Non-Small Cell Lung Cancer (NSCLC): PD-L1 expression

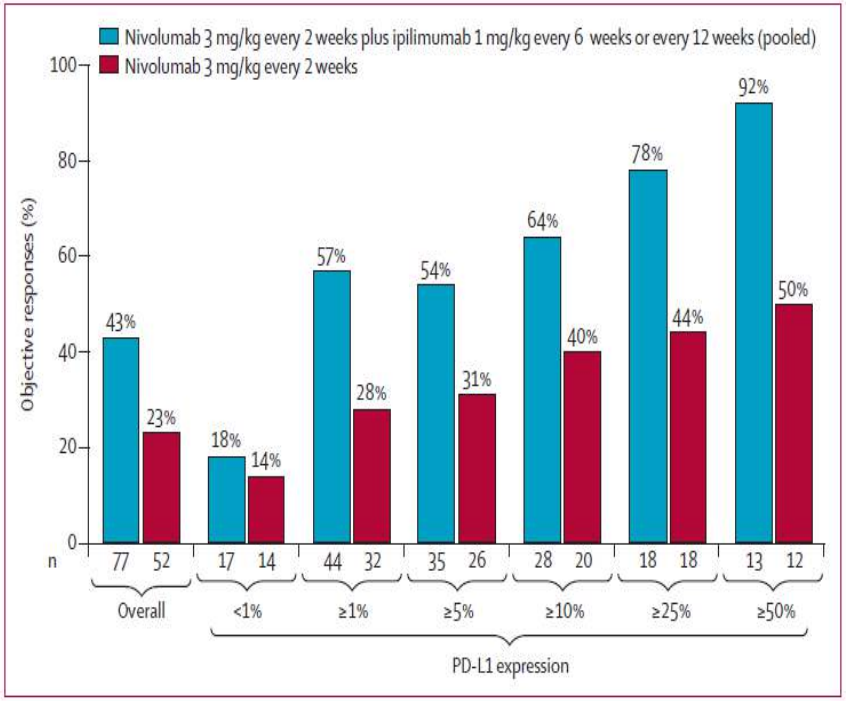
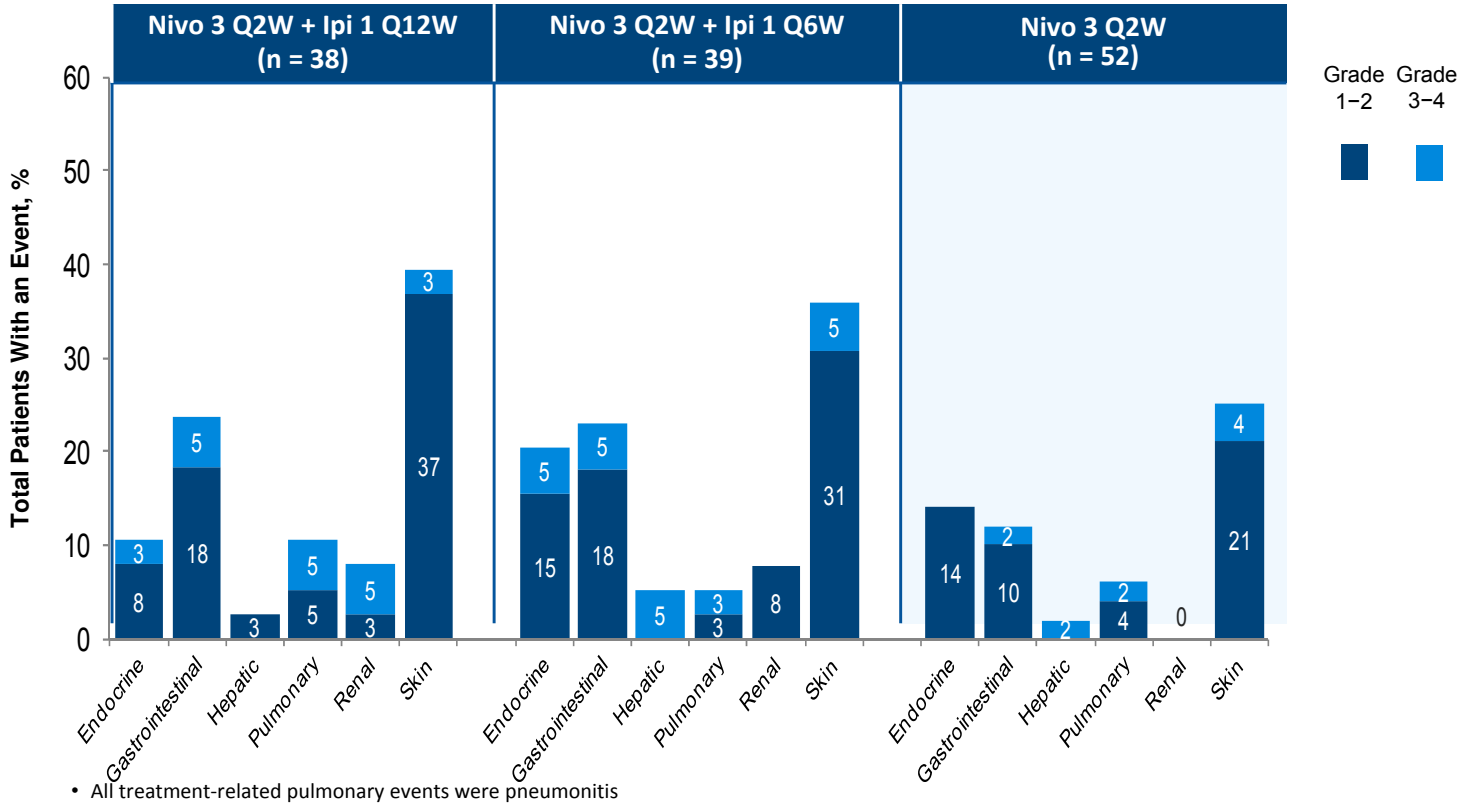


Figure 3: **Objective responses across tumour PD-L1 expression levels**
Combination data based on a Feb 18, 2016, database lock; monotherapy data based on a March 17, 2015, database lock. This trial was not randomised across combination and monotherapy cohorts.

Hellman M et al., Lancet Oncology Jan 2017

Nivolumab Plus Ipilimumab in First-line NSCLC: Treatment-related Adverse Effects



- All treatment-related pulmonary events were pneumonitis
- Grade 1–2 hypersensitivity/infusion reaction occurred in 5% and 6% of patients in the nivo 3 Q2W + ipi 1 Q12W and monotherapy groups, respectively

Combination data based on a February 2016 database lock; monotherapy data based on a March 2015 database lock
Select AEs are those with potential immunologic etiology that require frequent monitoring/intervention

Hellman MD et al., ASCO 2016

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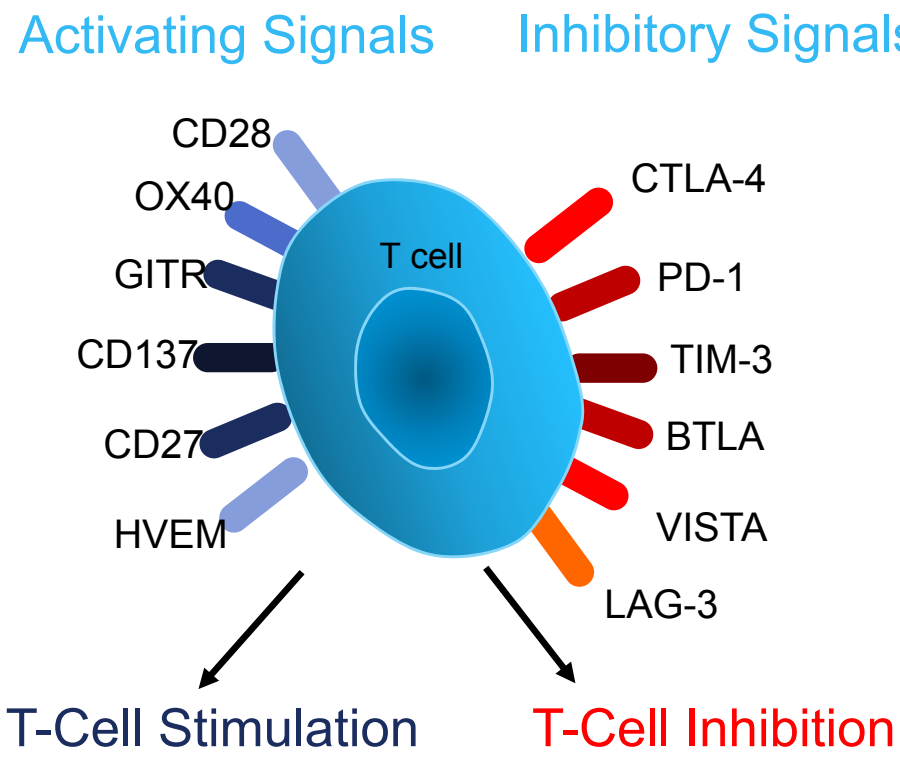
T-Cell Response: Second Signal to Accelerate or Brake



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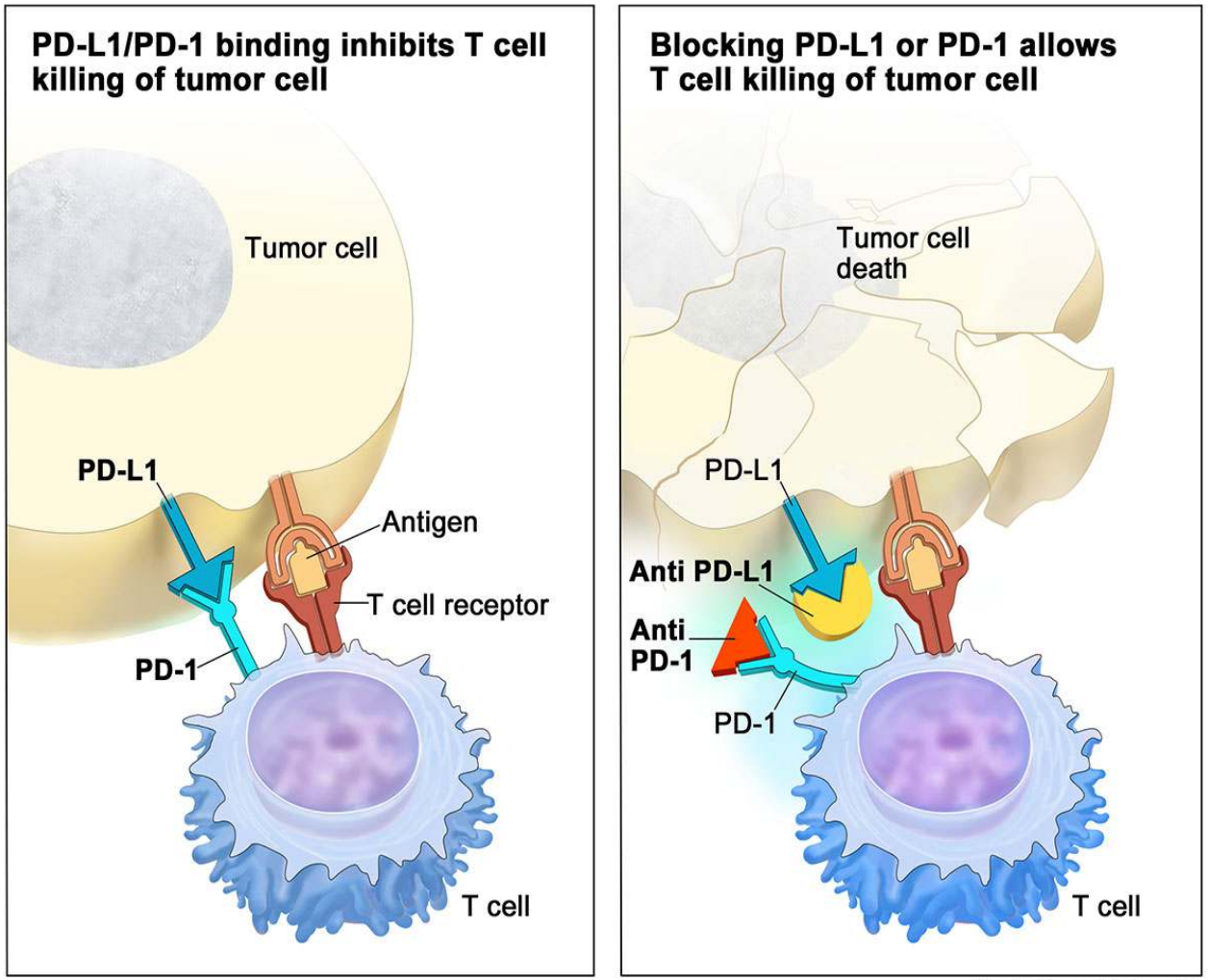
Mellman I, et al. Nature. 2011;480:480-489.

Checkpoint Inhibitors – Combinations with other therapies?

Other strategies to boost inflammation can include:

- Chemotherapy
- Radiation
- Surgery
- Vaccines



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BOOSTING THE POTENTIAL FOR IMMUNE RESPONSE WITH COMBINATION THERAPIES

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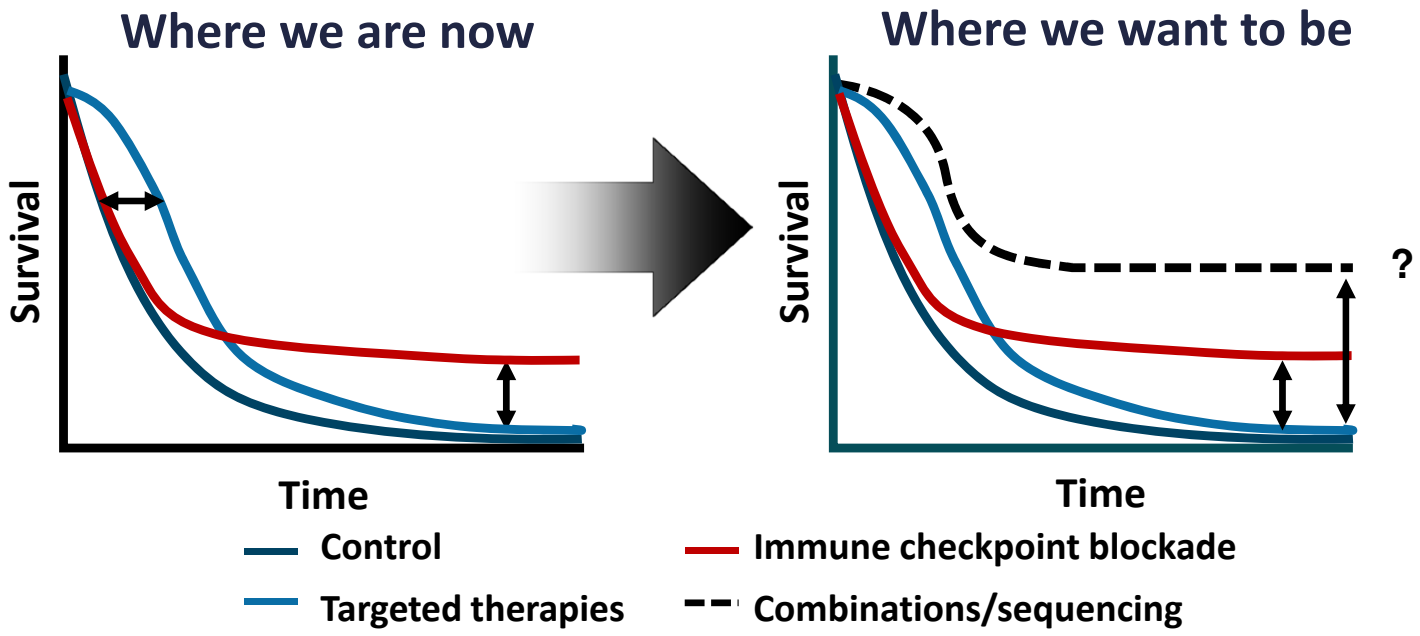

Hypothetical slide illustrating a scientific concept that is beyond data available so far. These charts are not intended to predict what may actually be observed in clinical studies.

Figure is from Ribas A, et al. *Clin Cancer Res*. 2012;18:336-341. doi:10.1158/1078-0432.CCR-11-2323

T cell adoptive transfer

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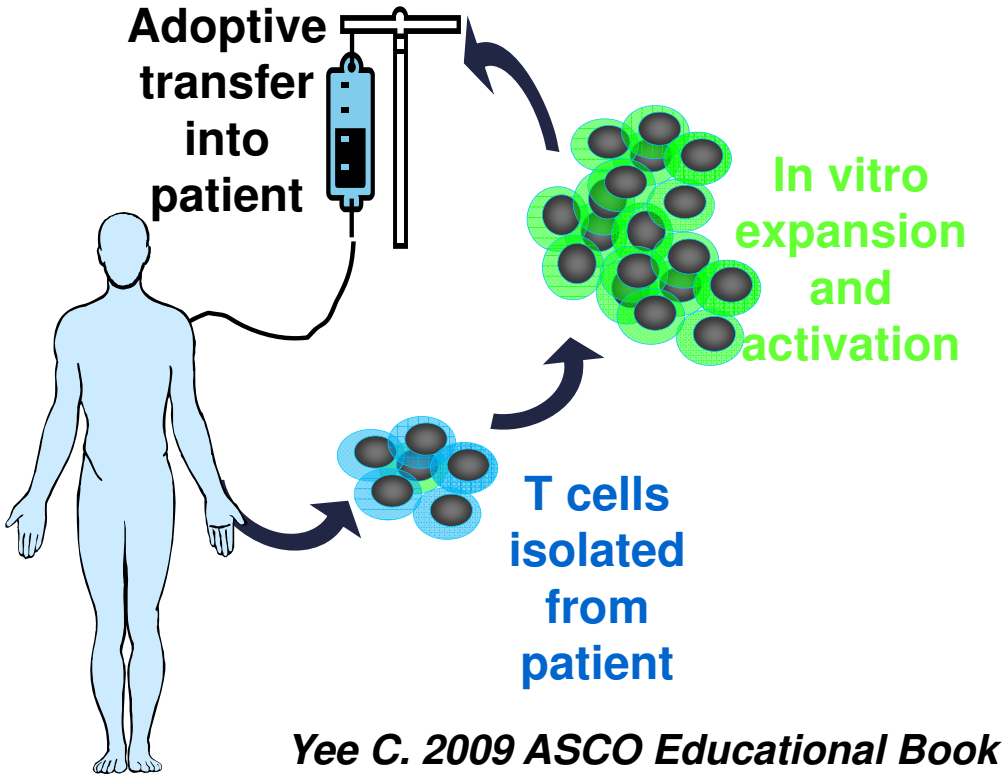

Yee C. 2009 ASCO Educational Book

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

Adoptive “CAR” T cell therapy

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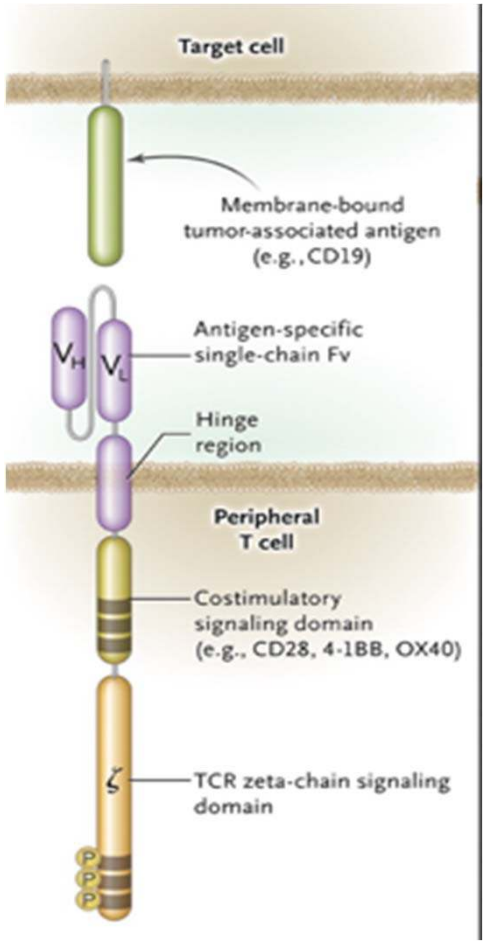
- Isolate patient’s peripheral blood T cells
- Lentivirus transduced with “CAR” (chimeric antigen receptor)
- CAR – anti-CD19 antibody fragment fused to intracellular domains of potent T cell signaling subunits
- Re-infuse “CAR”-modified T cells into patient
- Successful for treating children with B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



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CAR T cells win FDA approval 2017

- 1st CAR T cell therapy approved for acute lymphoblastic leukemia in children and young adults on August 31, 2017
- 1st "living drug" approval
- More to come…..

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Additional Information

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Useful resources about cancer immunotherapy

https://www.cancerresearch.org/patients/what-is-immunotherapy

https://www.pennmedicine.org/cancer/navigating-cancer-care/treatment-types/immunotherapy

https://www.mskcc.org/immunotherapy-msk

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

Panel Discussion

LATEST RESEARCH UPDATE

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Scientific Panel

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Moderator

Leena Gandhi, M.D., Ph.D.

Panel

Michael Postow, M.D.
Melanoma

Robert Vonderheide, M.D., D.Phil.
Pancreatic & Breast Cancer

Dmitriy Zamarin, M.D. , Ph.D.
Gynecologic Cancer

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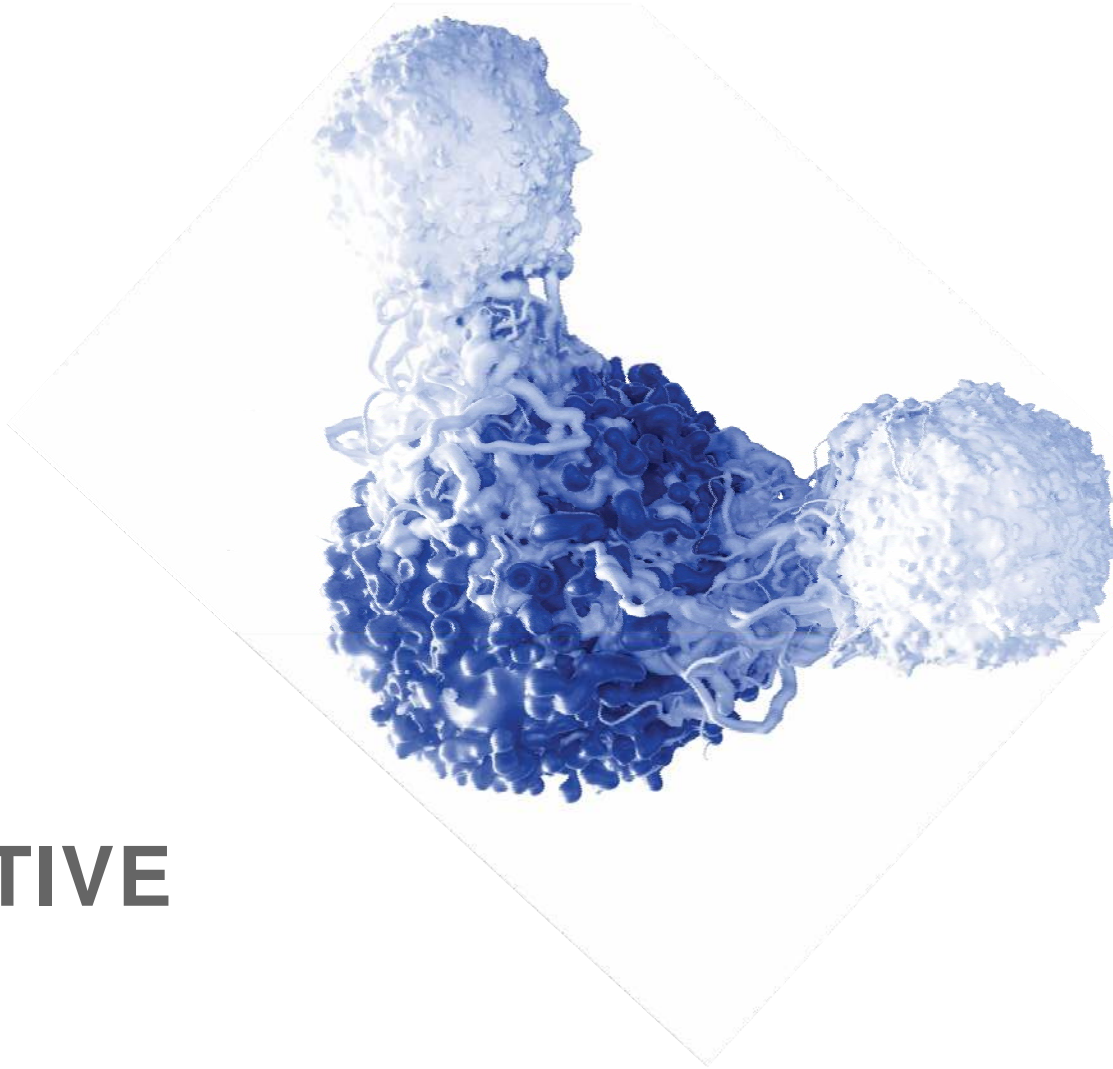

Janie Ferling

Melanoma Survivor

PATIENT PERSPECTIVE

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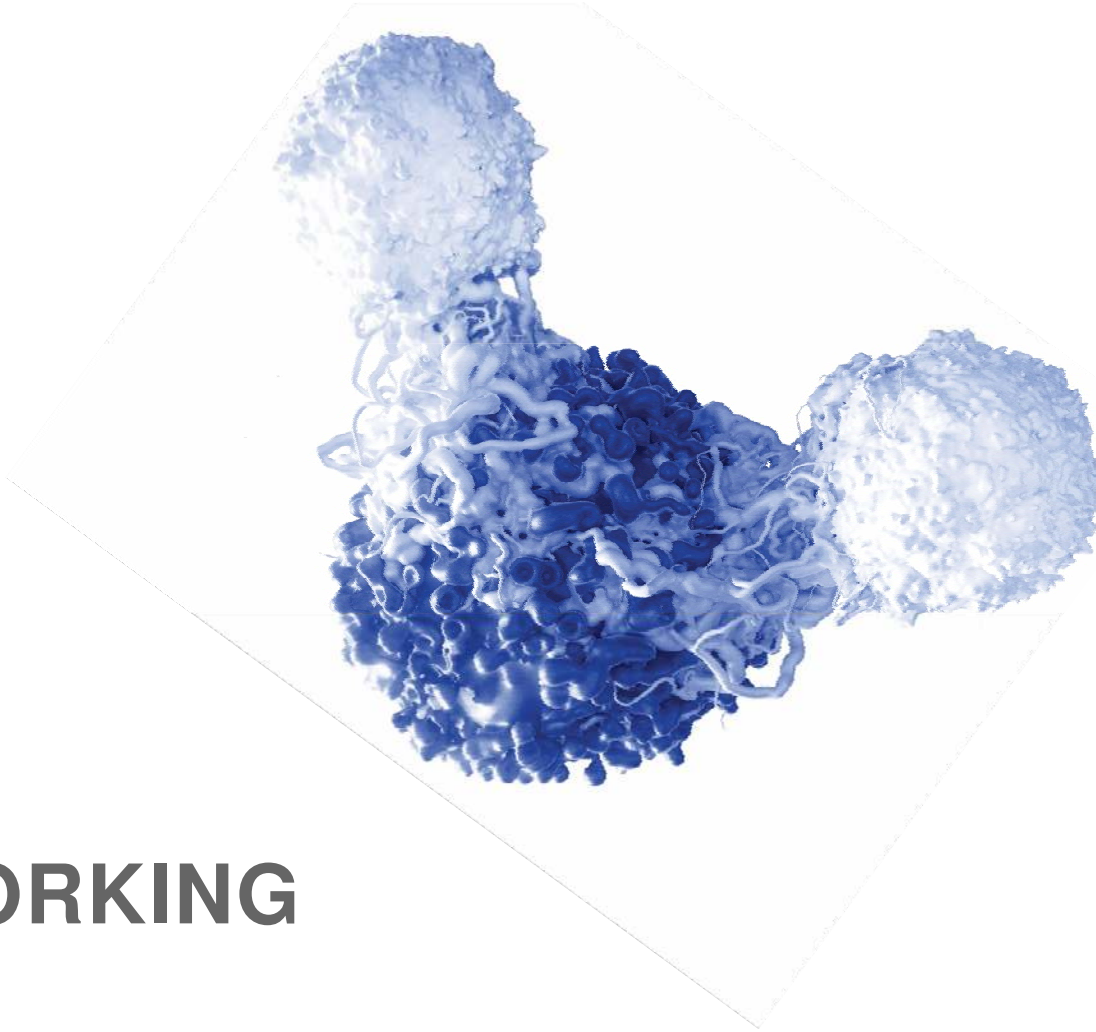

LUNCH AND NETWORKING

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Brian Brewer

Cancer Research Institute

DEMYSTIFYING CLINICAL TRIALS

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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

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Getting from Discovery to Approval

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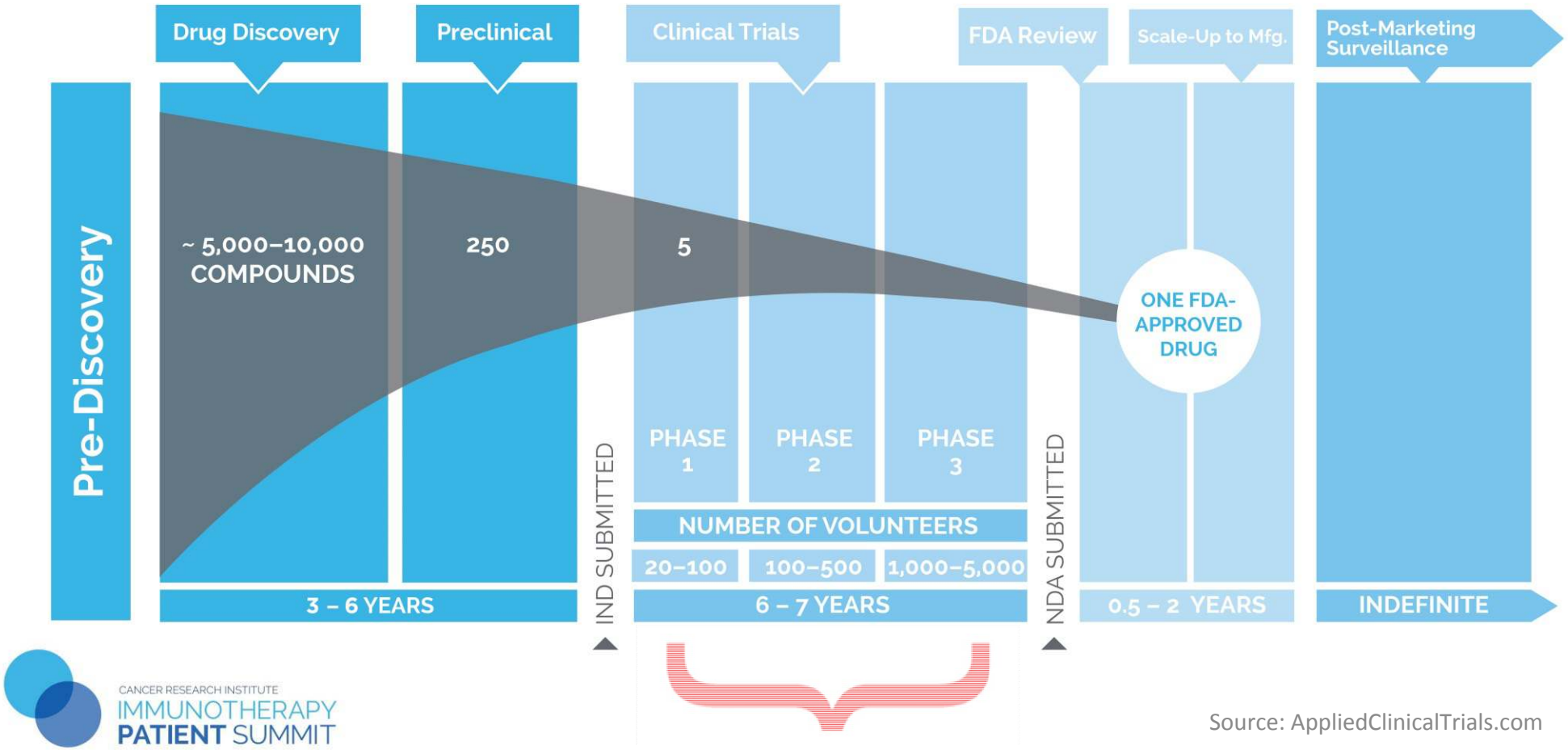

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Source: AppliedClinicalTrials.com

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+

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

Pros and Cons of Clinical Trials

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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

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- 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?

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

Questions to Ask Before Volunteering

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- 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?

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

Getting into a Clinical Trial Isn't Always a Given

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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

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Clinical Trials: Myth versus Fact

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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.

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Clinical Trials: Myth versus Fact

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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.

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Clinical Trials: Myth versus Fact

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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.

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Clinical Trials: Myth versus Fact

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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.

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Clinical Trials: Myth versus Fact

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Signing a consent form "locks" me into staying in a trial.

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

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Clinical Trials: Myth versus Fact

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

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.

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Clinical Trials: Myth versus Fact

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Clinical trials aren't safe.

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.

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A Word About Informed Consent

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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.

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How Can I Find a Clinical Trial?

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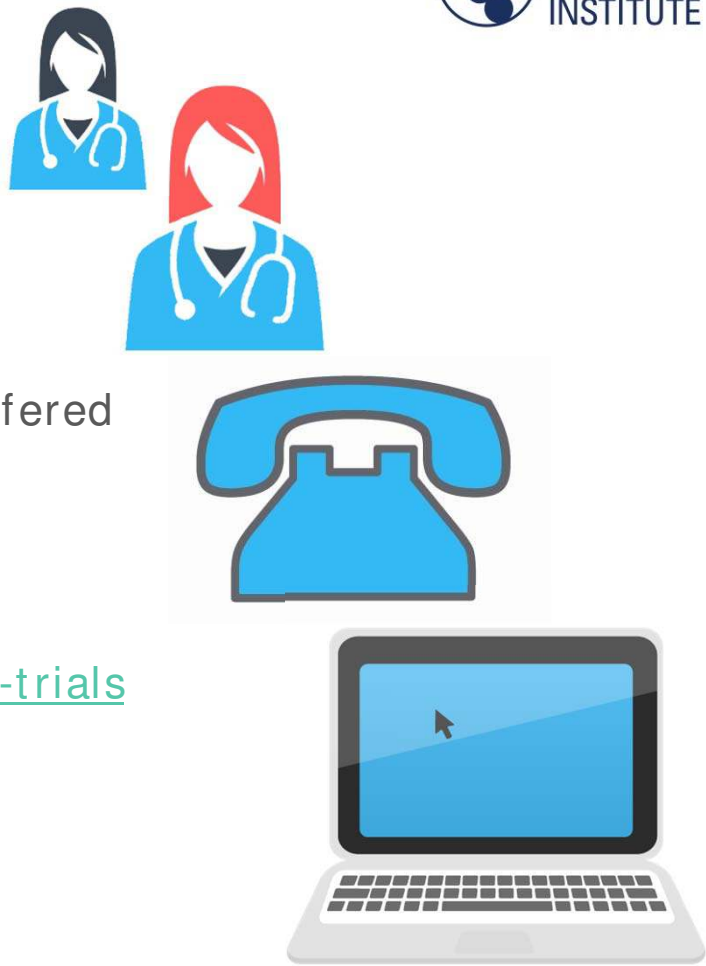
- Ask your doctor
- Ask another doctor if necessary…
- Contact a patient advocacy organization
  - Seek assistance from a clinical trial navigator, if offered
  - CRI Clinical Trial Finder: 1 (855) 216-0127
- Search online
  - https://www.cancerresearch.org/patients/clinical-trials
  - https://clinicaltrials.gov/



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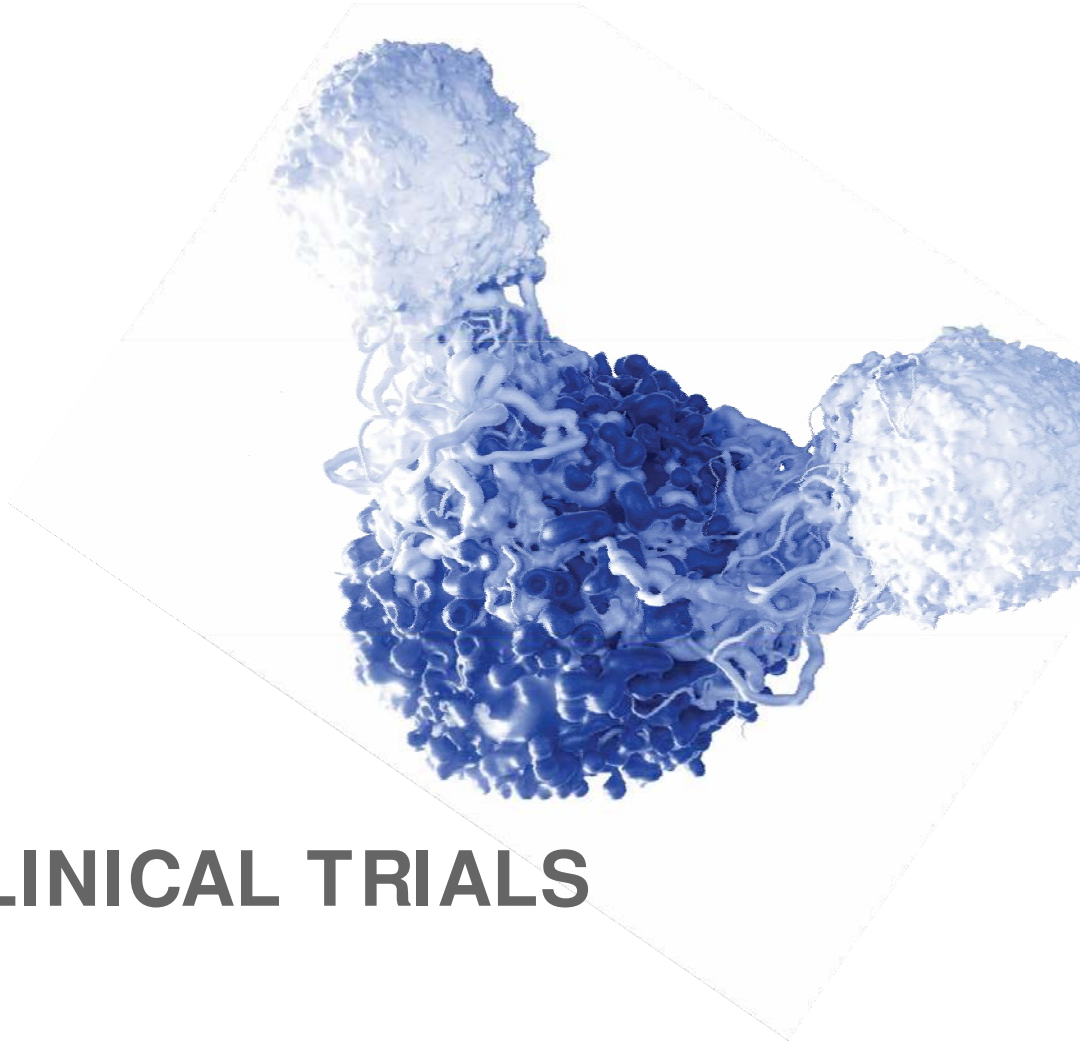

Panel Discussion

IMMUNOTHERAPY CLINICAL TRIALS

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Patient Panel

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Moderator

Brian Brewer

Panel

Kristin Kleinhofer

Leukemia

Philip Prichard

Kidney Cancer

Johanna Sedman

Prostate Cancer (caregiver)

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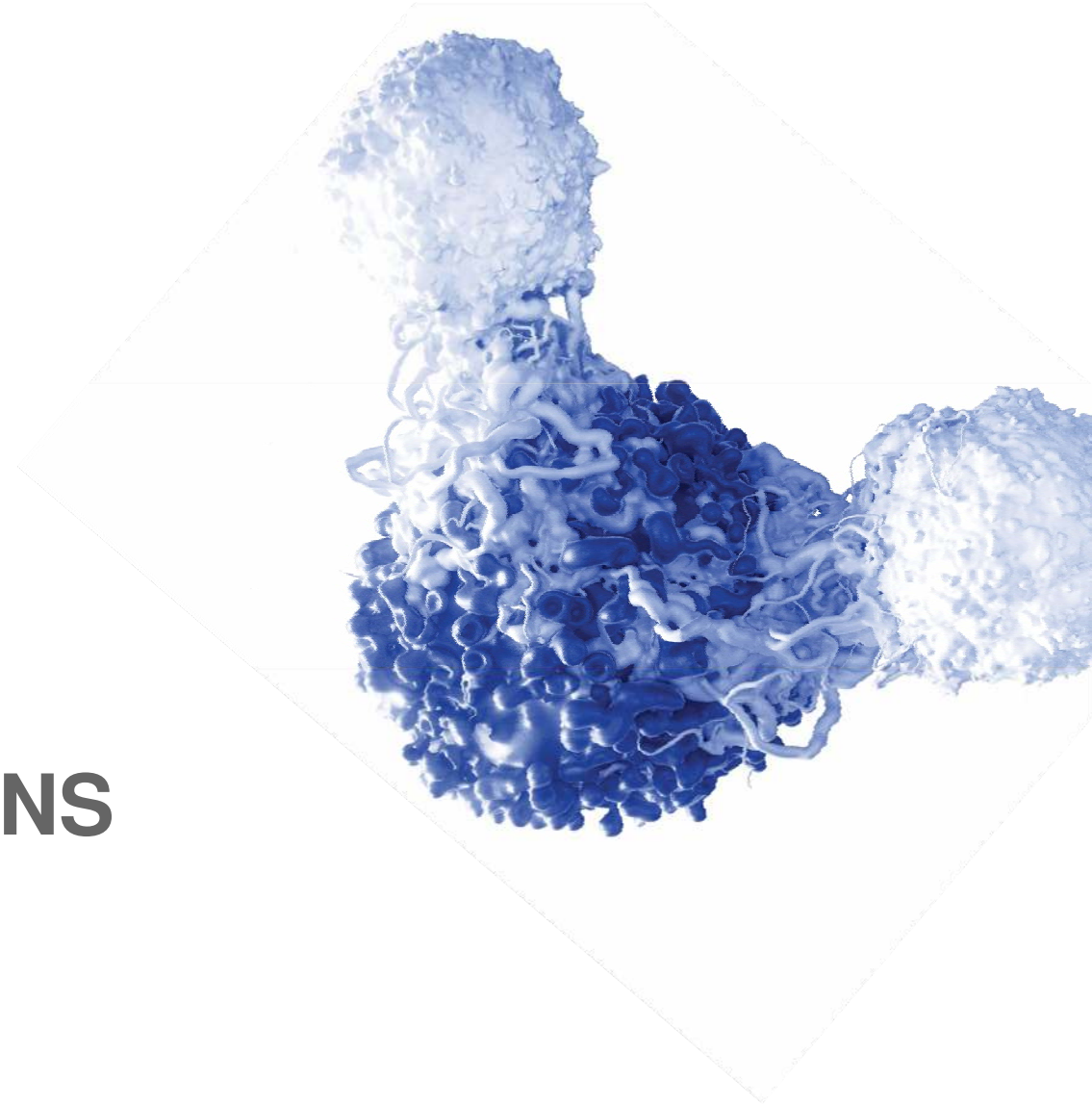

BREAKOUT SESSIONS

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Breakout Rooms

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Melanoma
Michael Postow, M.D.

Riverside Park

Pancreatic & Breast Cancer
Robert Vonderheide, M.D., D.Phil.

Central Park I and II

Gynecologic Cancer
Dmitriy Zamarin, M.D. , Ph.D.

Union Square Park

General Immunotherapy
Leena Gandhi, M.D., Ph.D.

Gotham Ballroom (Here)

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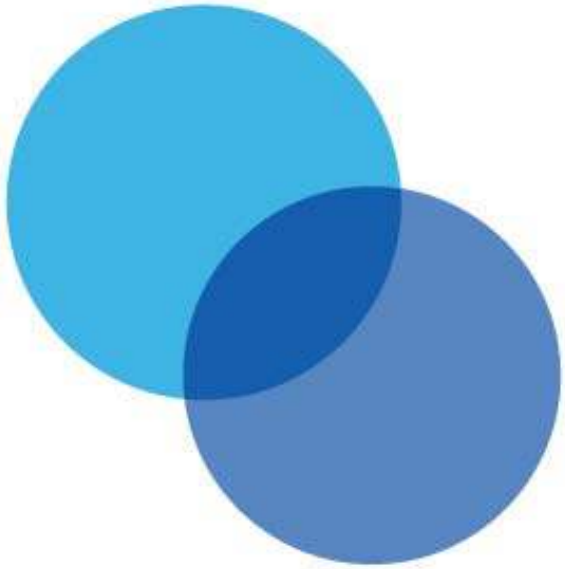
Colon Cancer Alliance
Gilda's Club
Fight Colorectal Cancer
Focused Ultrasound Foundation
FORCE
GI Cancers Alliance
Imerman Angels
Immunotherapy Foundation
Let Life Happen
Melanoma Research Foundation
National Ovarian Cancer Coalition
NYU Langone Health
Patient Empowerment Network



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