



CancerCommons

and



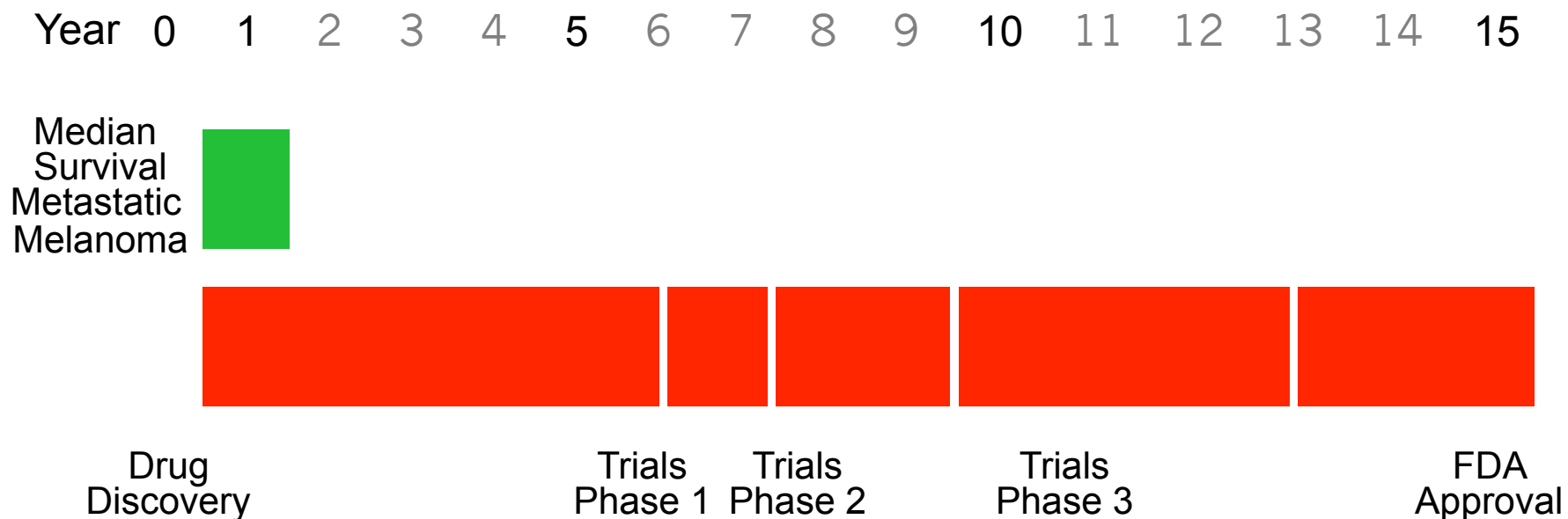
Molecular Med

TRI-CON 2013

Personalized Oncology

Fulfilling the Promise for Today's Patients

Time's Up



The McGraw-Hill Companies

BusinessWeek

MAY 29, 2004

www.businessweek.com

Medical Guesswork

From heart surgery to prostate care, the medical industry knows little about which treatments really work

BY JOHN CAREY (P. 72)



The New York Times

Cancer 'Vaccine' Is Set Back as Treatment Fails in Trial

By [ANDREW POLLACK](#) and TOM WRIGHT

Published: April 7, 2005

LOS ANGELES, April 6 - A cancer treatment that has been under development for more than 40 years failed in the first clinical trial in which it was compared with a placebo. The failure, announced Wednesday, was a blow to the field of so-called cancer vaccines and to the two companies developing the treatment, Serono and [CancerVax](#).

"In melanoma, we are living something incredible"

FDA NEWS RELEASE

For Immediate Release: March 25, 2011

FDA Approves Yervoy (ipilimumab) to treat patients with late-stage (metastatic) melanoma. Yervoy is a monoclonal antibody that blocks a molecule known as CTLA-4....

FDA NEWS RELEASE

For Immediate Release: Aug. 17, 2011

FDA approves Zelboraf for the treatment of late-stage melanoma patients whose tumors express a gene mutation called BRAF....



Partners in Personal Oncology
Aligning the interests of cancer patients and science



Tony Blau, M.D., Founder

Personalized Oncology: The State of the Art

- **Professor of Medicine, University of Washington (UW)**
- **Co-director, Institute for Stem Cell and Regenerative Medicine**
- **Chair, Molecular and Cellular Hematology study section, NIH**



Sarah Greene, Executive Director

Rapid Learning Communities for Cancer: Breaking Barriers to Innovation

- Founder of Current Protocols, *HMS Beagle*, and Praxis.MD
- Co-Founder of Society & Journal of Participatory Medicine
- Former Editor-in-chief of *The Scientist* magazine and Faculty of 1000



Mikhail Gishizky, Ph.D., Director



Cancer Research and Clinical Care: Connecting the Dots

- **Personalized oncology pioneer**
- **Chief Scientist SUGEN and Co-Developer of Sutent**
- **Pre-clinical development of Gleevec at UCLA**



UNIVERSITY OF CALIFORNIA
SANTA CRUZ

**Joshua Stuart, Ph.D., Assoc. Prof.
of Biomolecular Engineering**



Computational and Systems Biology for an “N of 1”

- Expertise: information integration, machine learning, Big Data
- Application: understanding cancer pathways
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Anil Sethi, Consulting CTO

New Age Data Sharing: e-Trials and e-Patients

- **HL7 Pioneer and Health Informatics Entrepreneur**
- **CEO at Pinch Bio (Rx obesity therapeutics)**
- **CEO Glimpse, a Palo Alto patient data exchange startup**

**Jane Reese-Coulbourne, M.S. ChE.,
Executive Director**



Making the System Work for Patients

- **Former Board Chair, Lung Cancer Alliance**
- **Executive Vice President, National Breast Cancer Coalition**
- **Consultant to the Director of the National Cancer Institute**
- **Advanced Breast Cancer Survivor**



**Marty Tenenbaum Ph.D.,
Founder and Chairman**



Creating the Ecosystem for Personalized Oncology

- **A.I. and ecommerce pioneer; cancer survivor**
- **Former consulting professor, Stanford U. and Fellow, AAI**
- **Founder: Enterprise Integration Technologies, CommerceNet, Veo, Webify, and CollabRx; Chief Scientist, Commerce One**
- **Boards: Patients Like Me, PLoS, Efficient Finance, Medstory**



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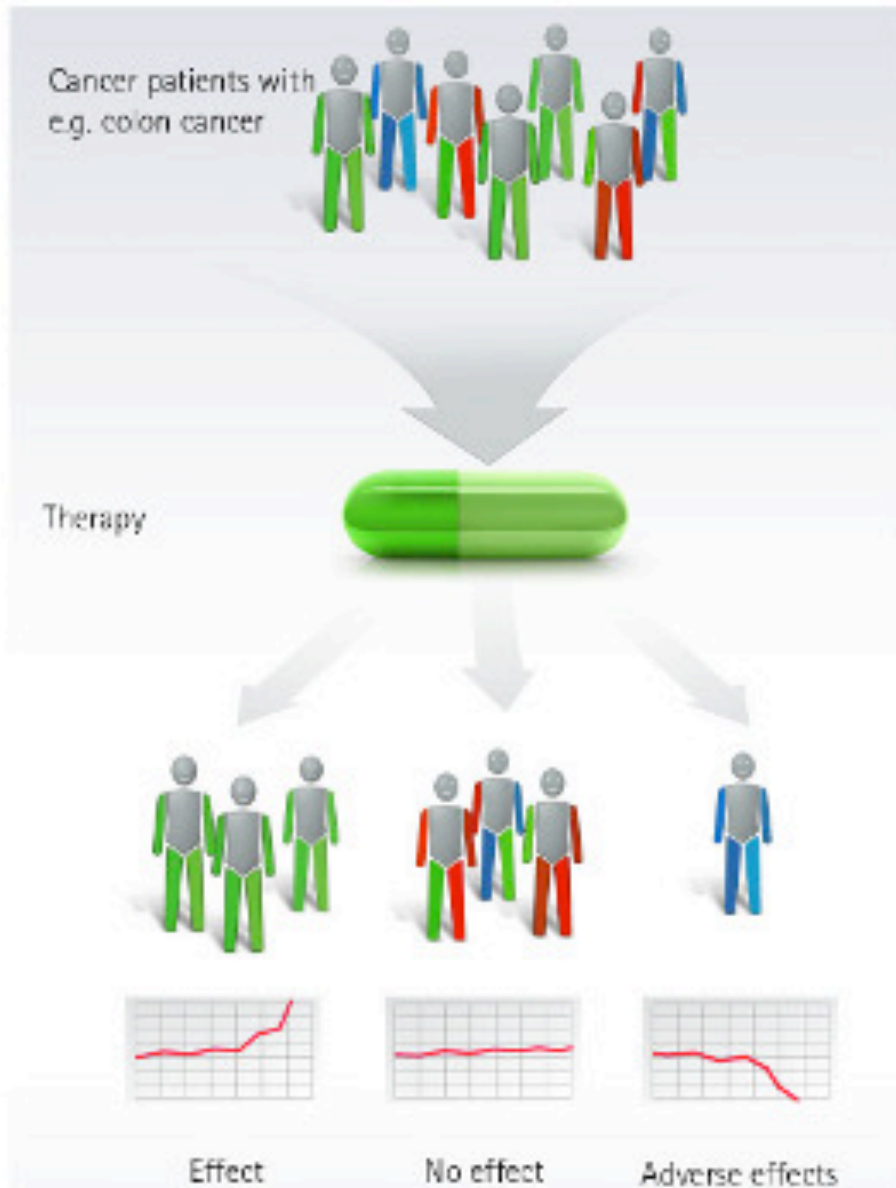
Tony Blau, M.D., Founder

Personalized Oncology: The State of the Art

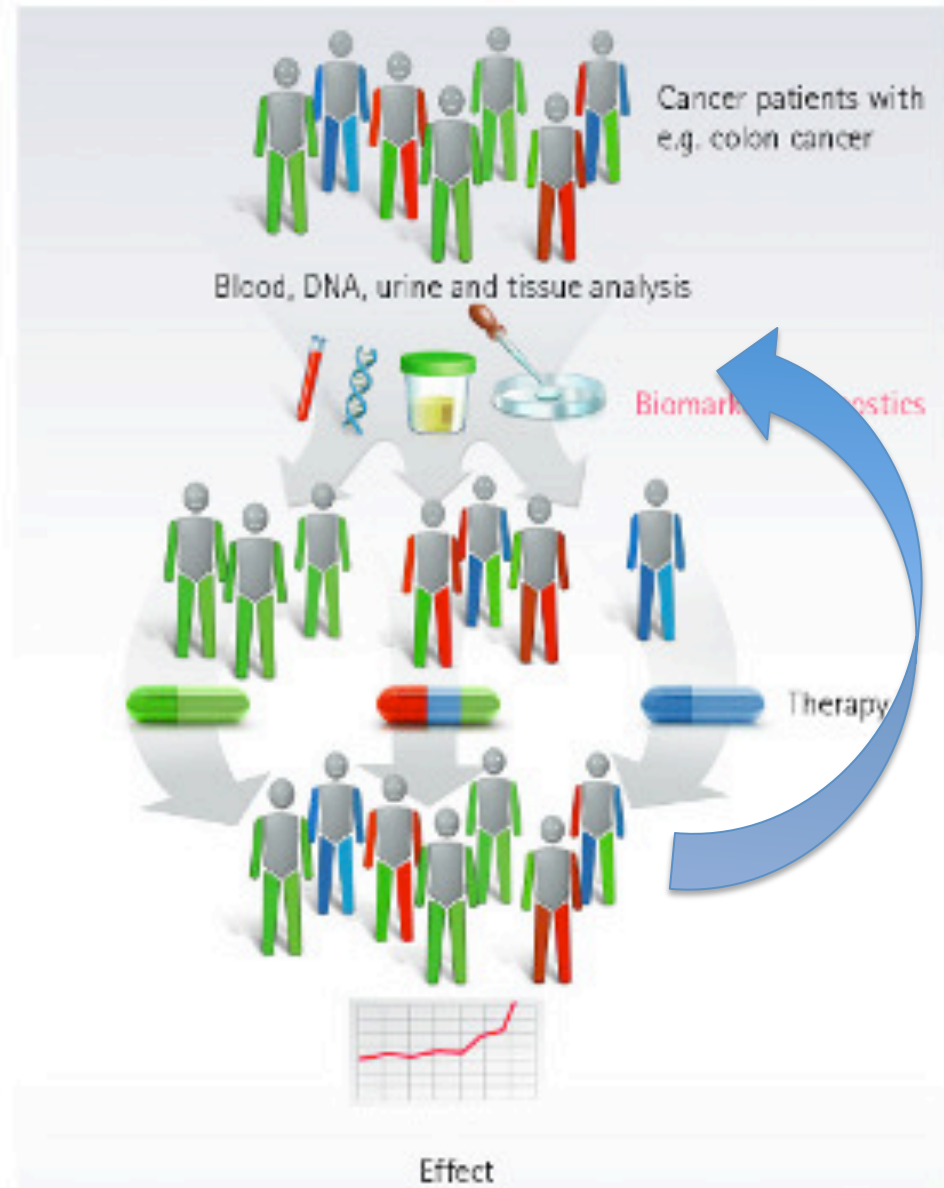
- **Professor of Medicine, University of Washington (UW)**
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- **Chair, Molecular and Cellular Hematology study section, NIH**

Personalized medicine: tailored treatments

Medicine of the present: one treatment fits all

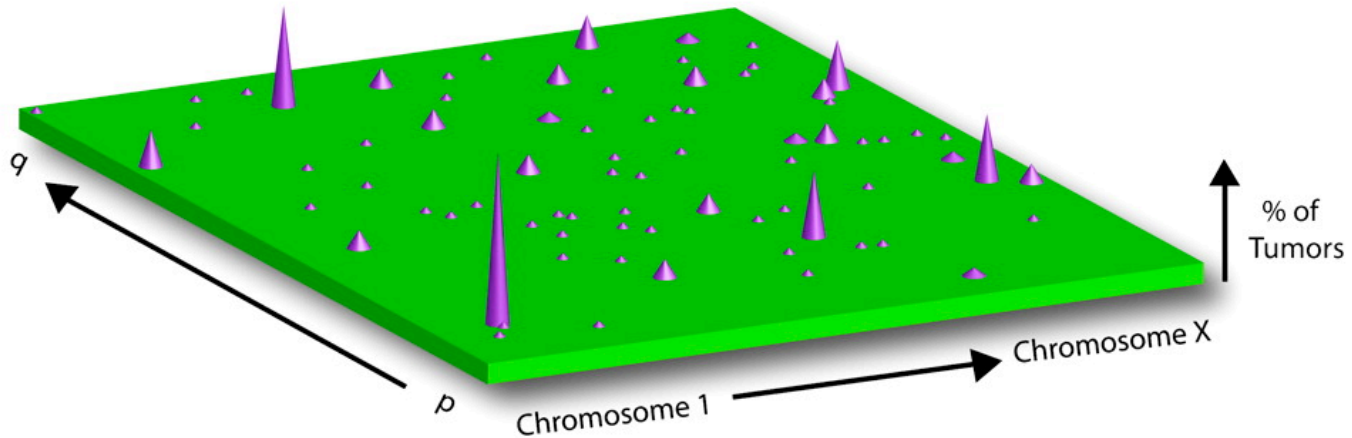


Medicine of the future: more personalized diagnostics

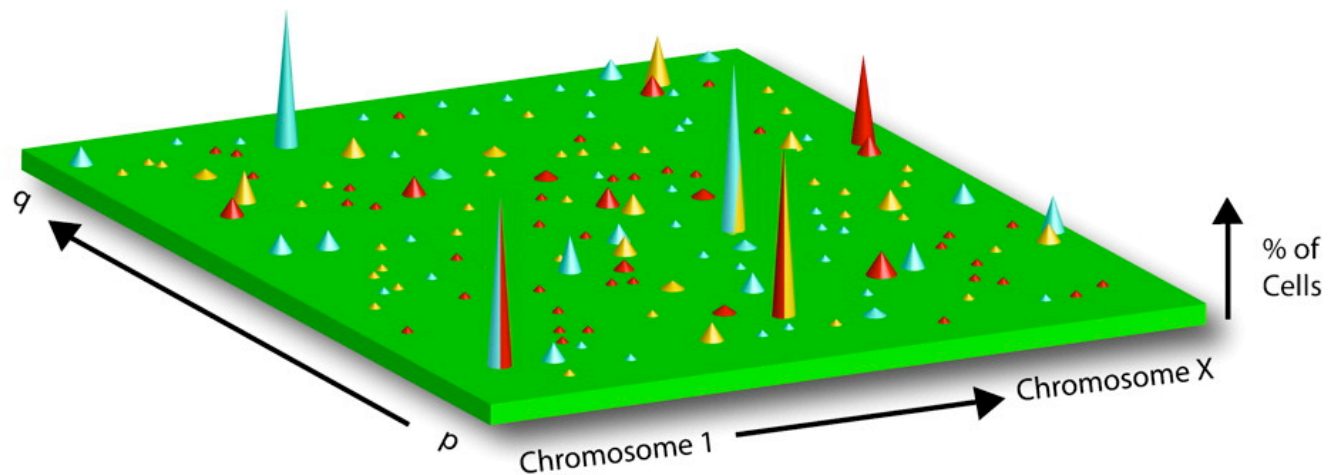


Every Cancer is Unique

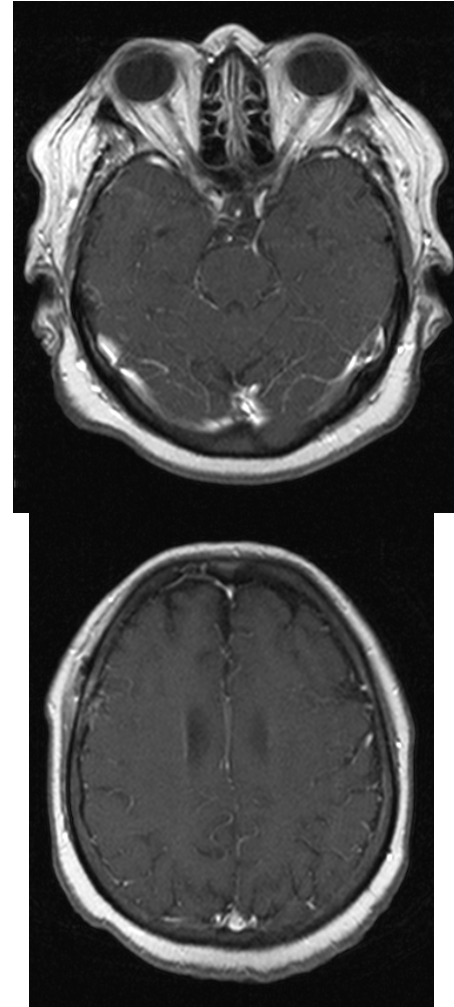
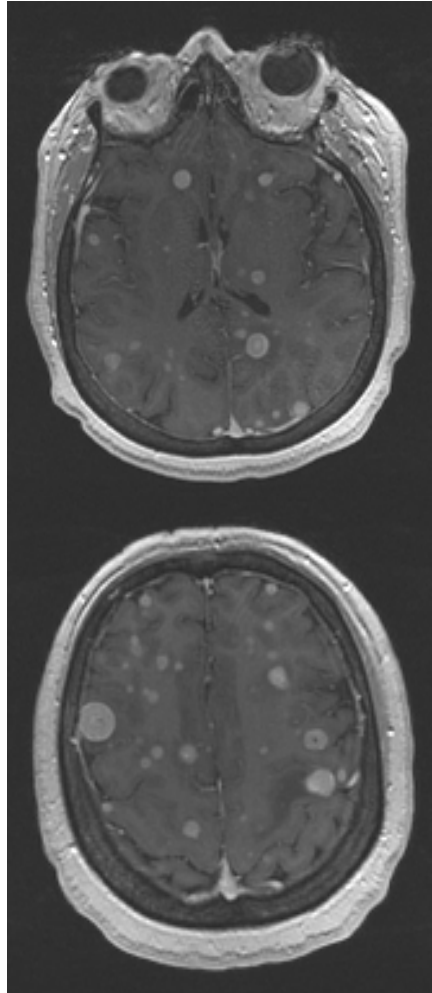
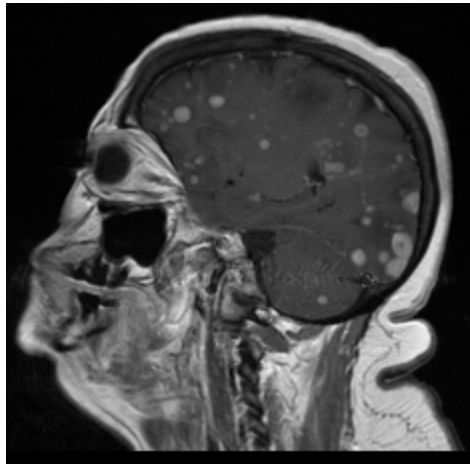
A All Colorectal Cancers



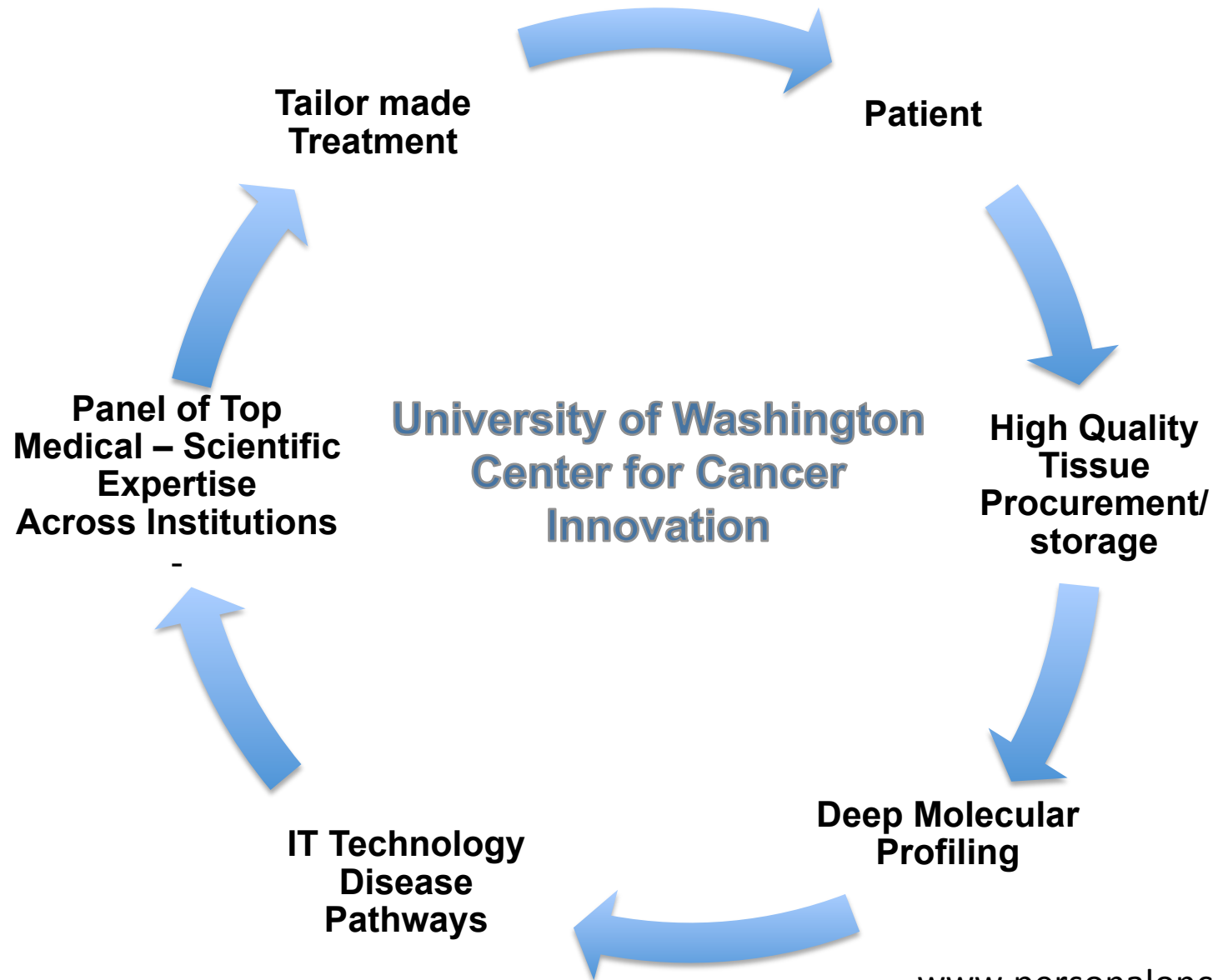
B Individual Colorectal Cancers



Brain Tumors: Metastatic



Partners in Personal Oncology



UW Center for Cancer Innovation

University of Washington

Fred Hutchinson Cancer Research Center

Institute for Systems Biology

Sage Bionetworks

Northwest Medical Specialties

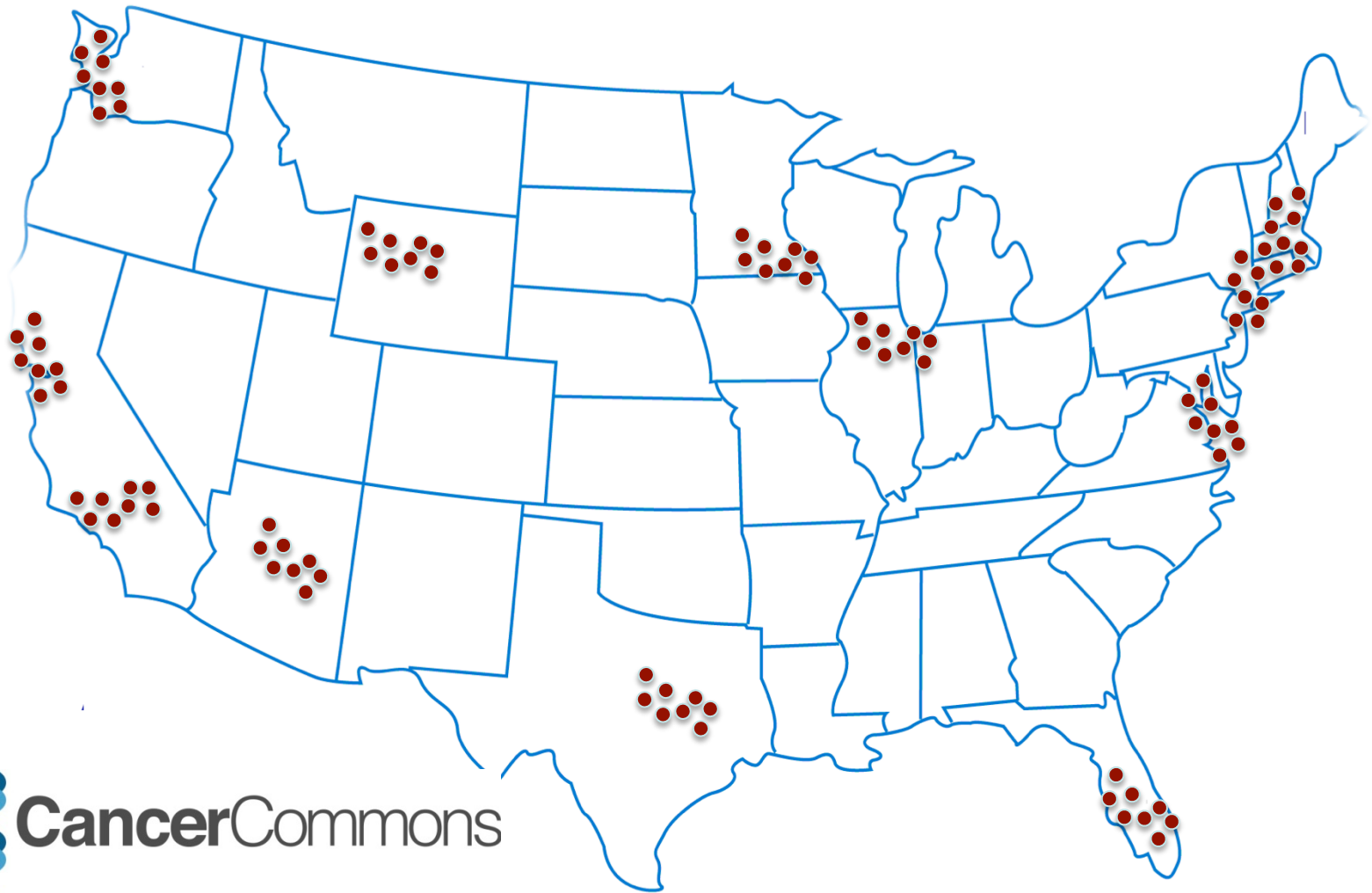
Minor and James Medical Clinic

Cancer Research and Biostatistics

Seattle Biomed

Swedish Medical Center

Rapid Learning Network



CancerCommons



Partners in Personal Oncology
Aligning the interests of cancer patients and science

 **CancerCommons**

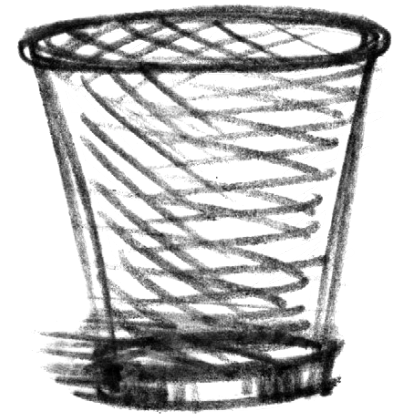


Sarah Greene, Executive Director

Rapid Learning Communities for Cancer: Breaking Barriers to Innovation

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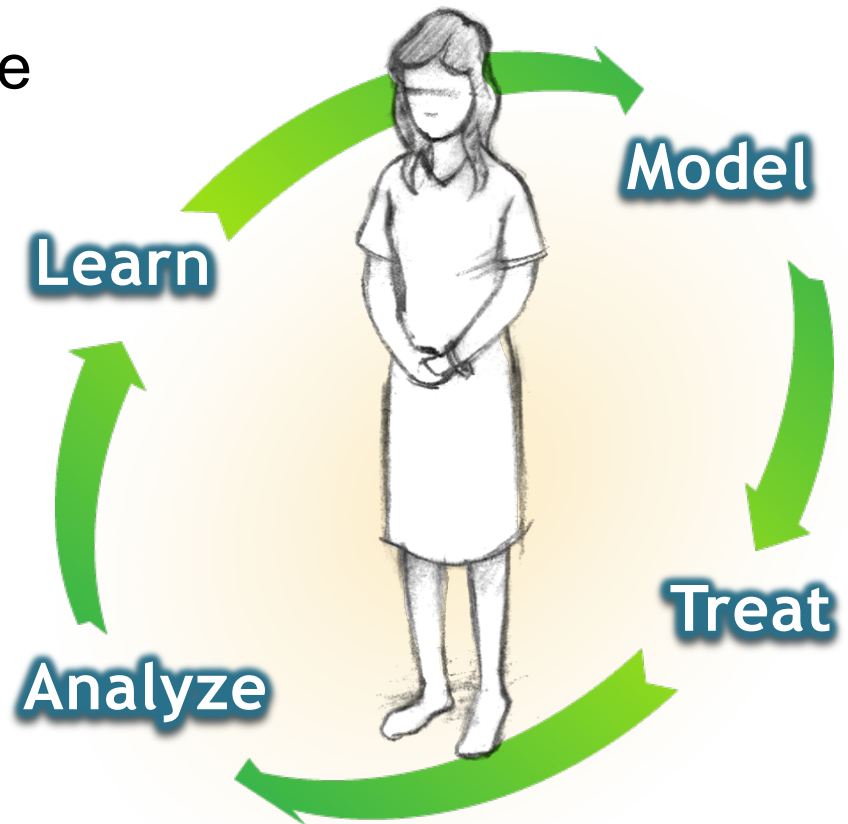
30,000 Oncologists, 1000s of “N of 1” Trials



Vision

A rapid learning community for cancer

- Obtain the best possible outcomes
- Learn as much as possible
- Disseminate rapidly



Cancer Commons Editorial Board



Frederick Appelbaum,
MD



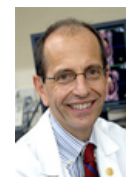
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Blayney, MD



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Caplan, PhD



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Fisher, MD
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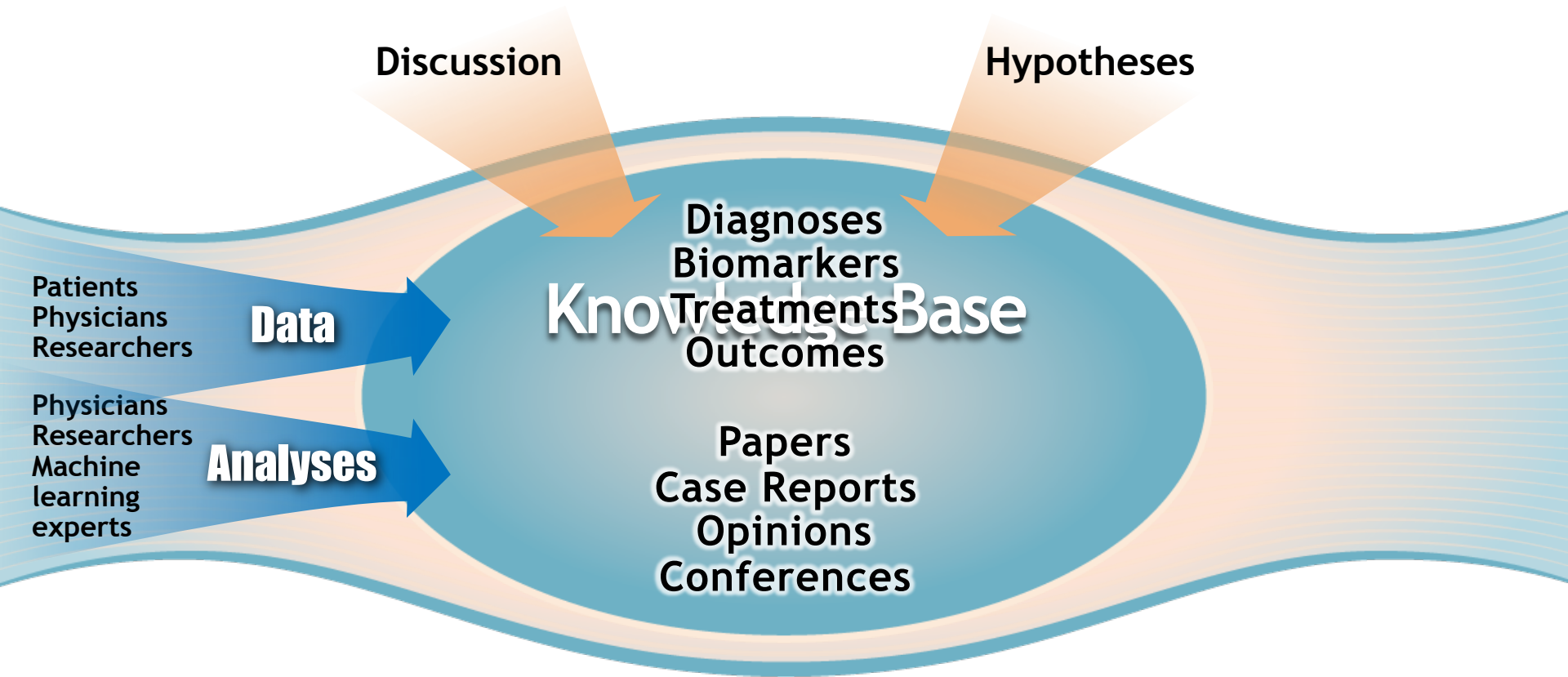


Laura J.
van 't Veer, PhD

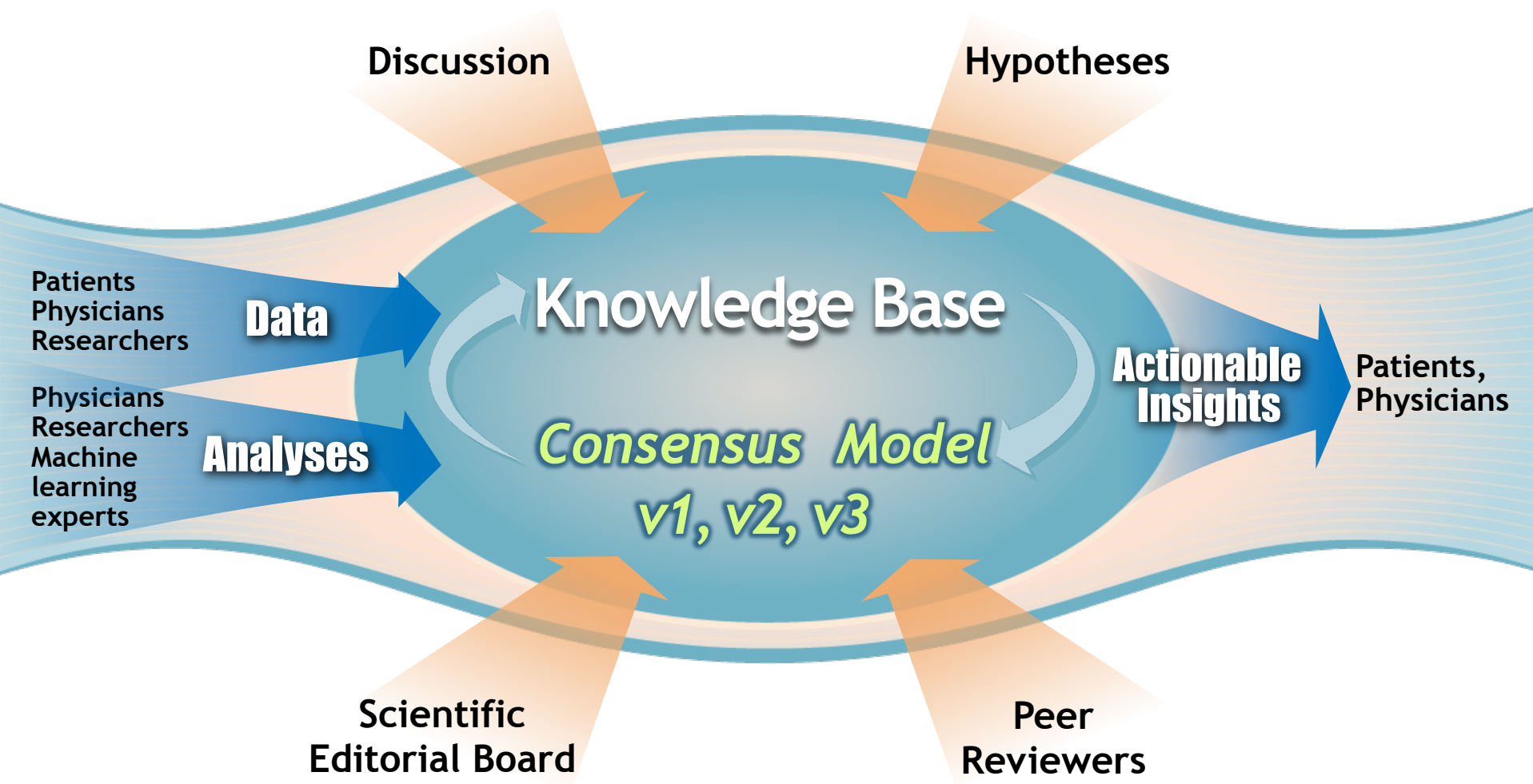


John
Wilbanks

Rapid Learning Platform



Rapid Learning Platform



Consensus Model in Translational Research

Biomarker/Mutation	Potentially Relevant Therapies
EGFR	TKIs & chemotherapy
	Dual EGFR/HER2 TKI
	c-MET inhibitors +/- 1st or 2nd generation EGFR TKIs
	HSP90 inhibitors
	CHK1 inhibitors
	TKIs & Bevacizumab
KRAS	Dual MAPK & AKT/PI3K inhibitors
	HSP90 inhibitors
ROS1	ROS1 inhibitors
c-MET	c-MET inhibitors
	dual Met/VEGFR2 inhibitors
	ALK/MET inhibitors
	c-MET monoclonal antibodies

Strength of Evidence

- Informs clinical decisions
- Organizes content & data
- Focuses discussion, research
- Instant dissemination
- Community reference

Lung Cancer Model



Cancer Commons Rapid Learning Network

Currently – melanoma, lung cancer, prostate cancer

- Stanford University Medical School
- U. British Columbia Medical School
- UC Davis Medical Center
- UC Irvine Cancer Research Institute
- UCLA Comprehensive Cancer Center
- UC Santa Cruz
- UCSF Comprehensive Center
- USC Keck School of Medicine
- John Wayne Cancer Institute
- Oregon Health & Science University
- U. Chicago Comprehensive Cancer Center
- Brigham & Women's Hospital
- Broad Institute of MIT and Harvard
- Dana Farber / Harvard Medical School
- Fred Hutchinson Cancer Center
- Johns Hopkins Medical School
- Massachusetts General Hospital
- MD Anderson Cancer Center
- National Cancer Institute



Donate Your Data App



The image shows a woman in a white lab coat standing next to a large tablet. The tablet displays the 'LUNG CANCER FOUNDATION' app interface. The app has a purple header with the foundation's logo and name. A user profile is visible in the top right corner with the email 'tony2@cancercommons.org'. The main content area is titled 'BIOMARKERS' and contains a paragraph about gene mutations and molecular testing. Below this, there is a question: 'HAVE YOU HAD ANY MOLECULAR TEST FOR SPECIFIC GENETIC BIOMARKERS?'. There are three radio buttons for 'Yes', 'No', and 'Don't Know'. The 'Yes' option is selected. Below the question, there is a table with biomarkers and their test results.

Biomarker	Test Result
ALK	<input checked="" type="checkbox"/> Positive <input type="checkbox"/> Negative Foundation Medicine
MET	<input type="checkbox"/> Positive <input type="checkbox"/> Negative
EGFR	<input type="checkbox"/> Positive <input type="checkbox"/> Negative
KRAS	<input type="checkbox"/> Positive <input type="checkbox"/> Negative

Data

Rapid Learning Platform

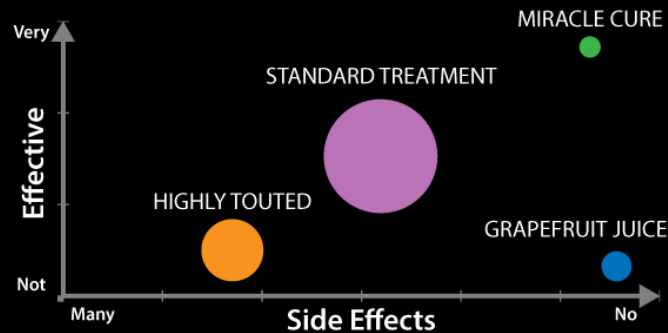
Actionable Insights

Partner Apps for Patient Pages

Patient Dashboard



EGFR

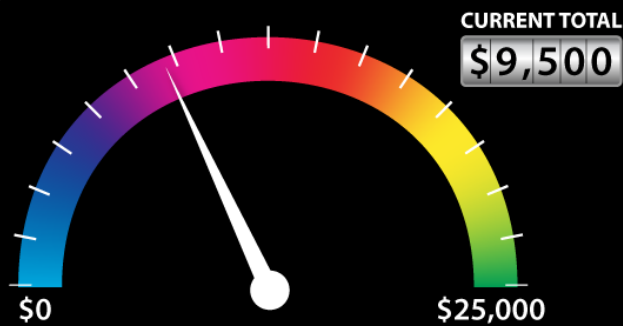


EGFR Discussion

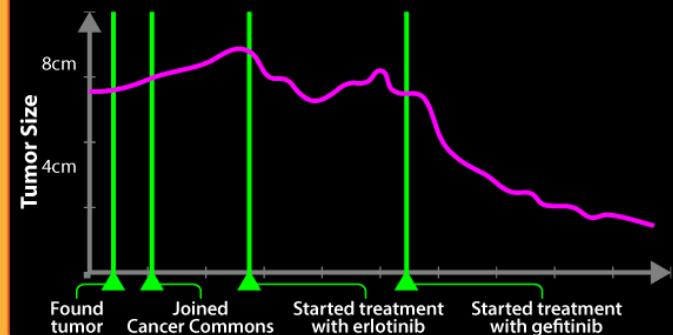
[My Discussions](#) [Recent Discussions](#) [Mark all topics read](#)

	Thread	Replies	Updated	
✉	Breast Cancer drug in EGFR	230	1 sec. ago	add reply
✓	Side Effects of new drug	13	23 min. ago	add reply
✉	EGFR discussed in Nature Magazine	45	34 min. ago	add reply

My Fundraiser



My Timeline





Mikhail Gishizky, Ph.D., Director

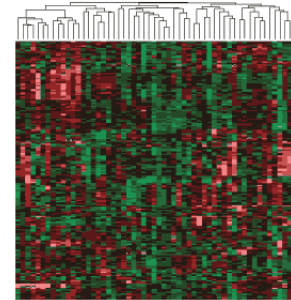


Cancer Research and Clinical Care: Connecting the Dots

- **Personalized oncology pioneer**
- **Chief Scientist SUGEN and Co-Developer of Sutent**
- **Pre-clinical development of Gleevec at UCLA**

Accelerating Research to Clinical Practice

- Redefining Cancer as a Molecular Disease
 - A constellation of diseases
 - Disease evolves and adapts

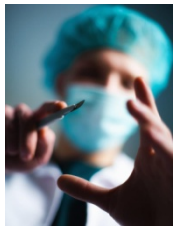


- Development of Companion Diagnostics

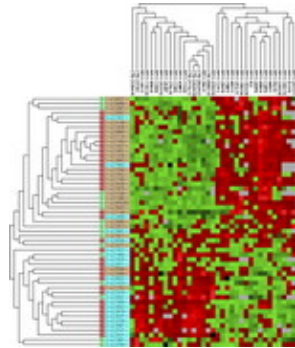


- Capture the learning's from the “individual clinical trial”
- Making a better informed decision for the individual patient

Working Toward a Better Informed Decision



Tumor
Biopsy



Genomic Profile

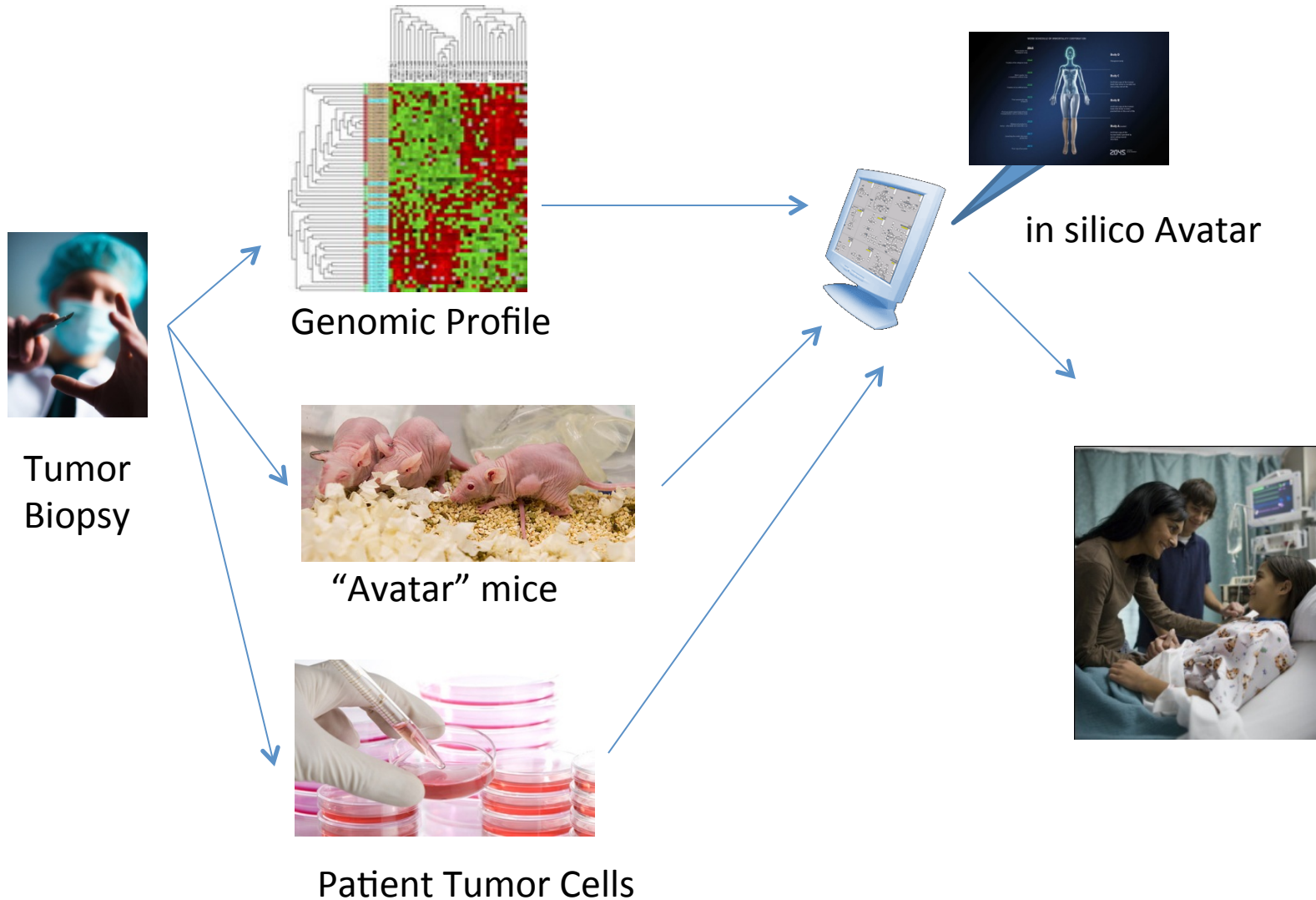


"Avatar" mice



Patient Tumor Cells

Working Toward a Better Informed Decision





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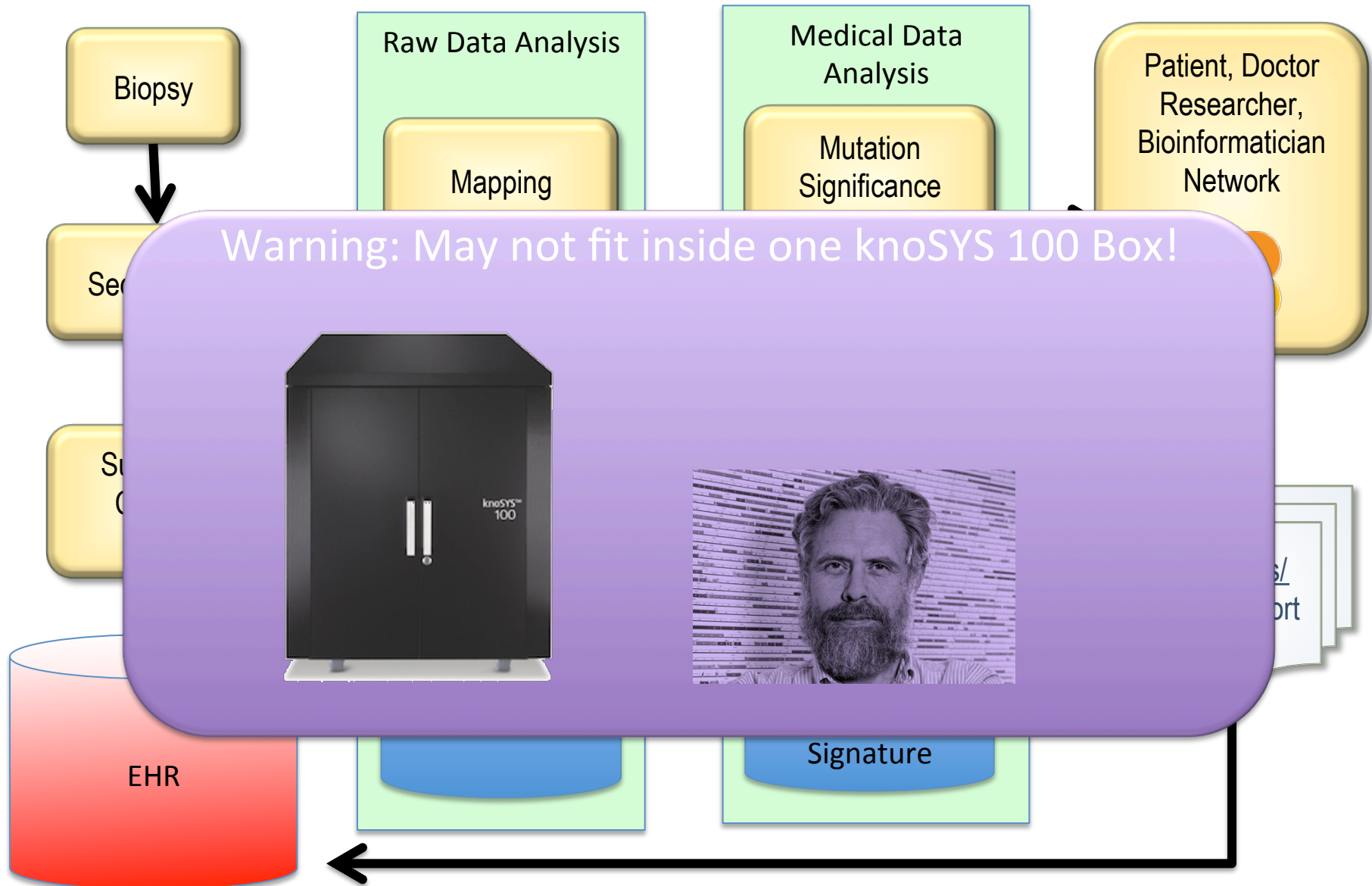
**Joshua Stuart, Ph.D., Assoc. Prof.
of Biomolecular Engineering**



Computational and Systems Biology for an “N of 1”

- Expertise: information integration, machine learning, Big Data
- Application: understanding cancer pathways
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The Goal: A Clinical Genome Pipeline

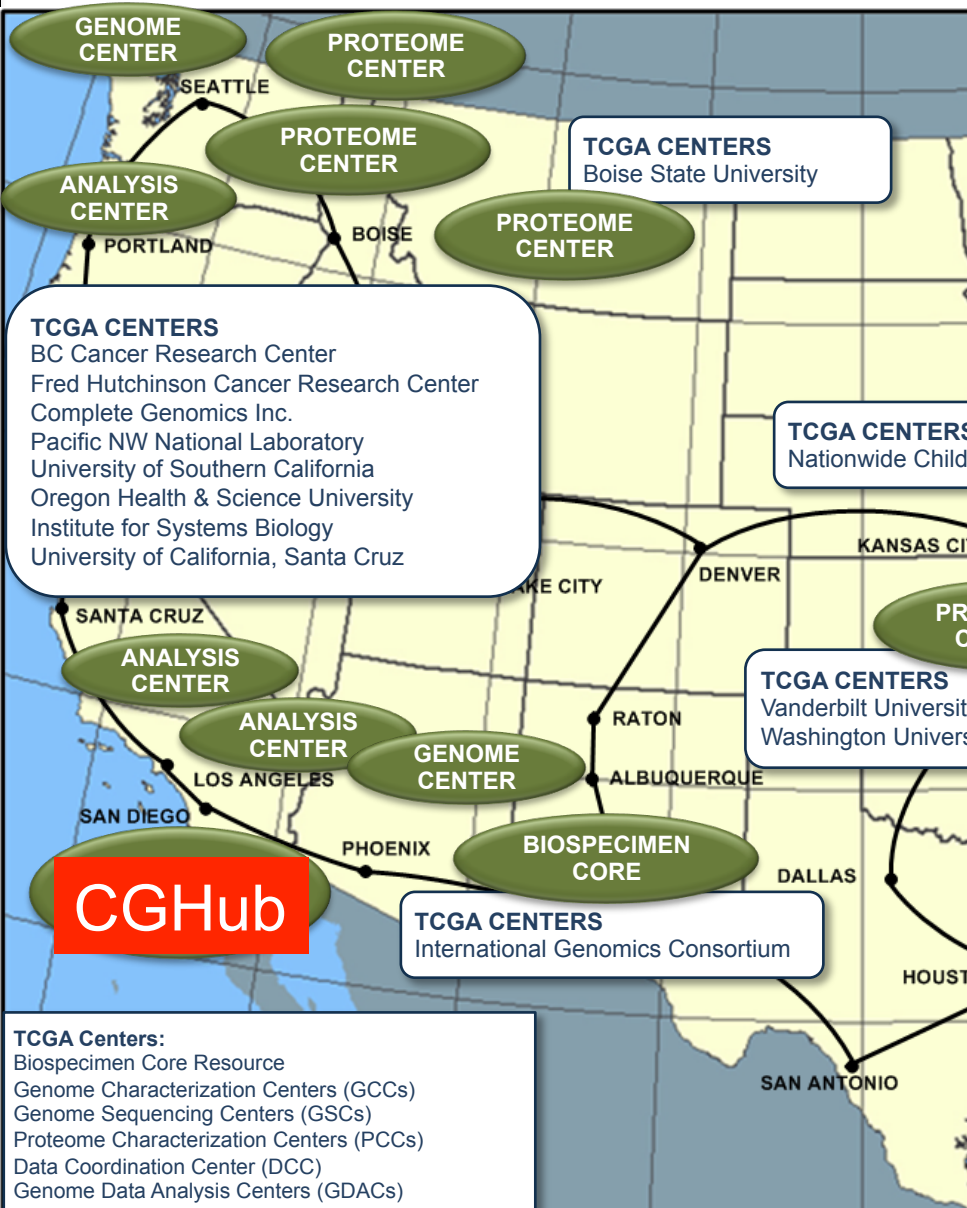


Challenges for Pathway Analysis



- What mutations are druggable?
- What are the pathway disruptions that are characteristically present in patient subtypes?
- Are there genes with recurrent mutations?
- Are there new drivers? Are they gain-of-function or loss-of-function?
- Are there genes that are essential to cancer (and non-essential to healthy tissue)?
- Is there a genetic signature associated with prognosis?
- Can we reveal mechanisms of escape, resistance and efficacy of treatment results?

The Cancer Genome Atlas: 10,000 tumors from 20 adult cancers



The Challenge of Integrative Analysis

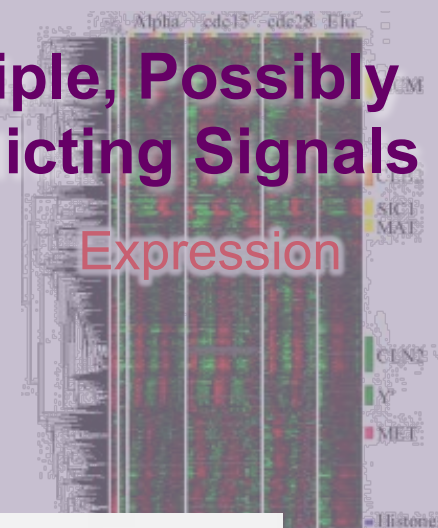
Genomics, Functional Genomics, Metabolomics, Epigenomics =

Exome

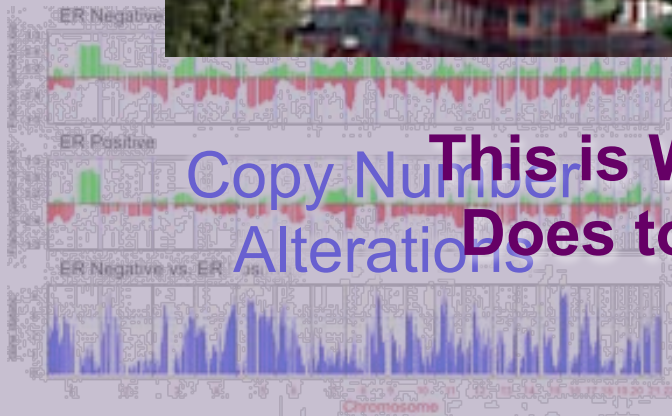
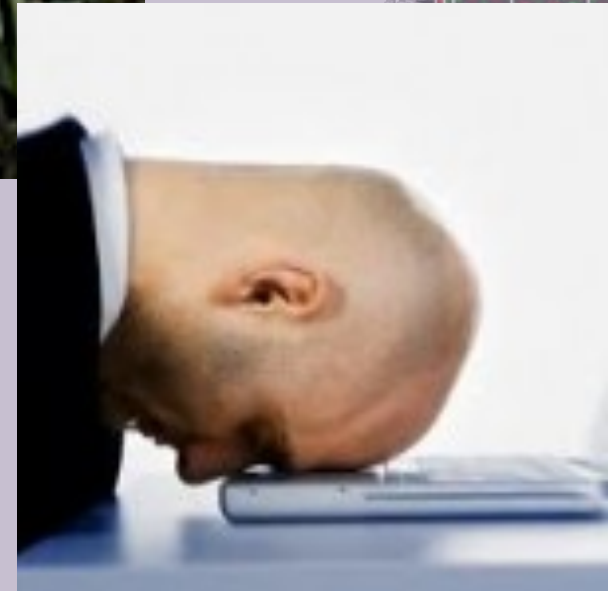
ces

Multiple, Possibly
Conflicting Signals

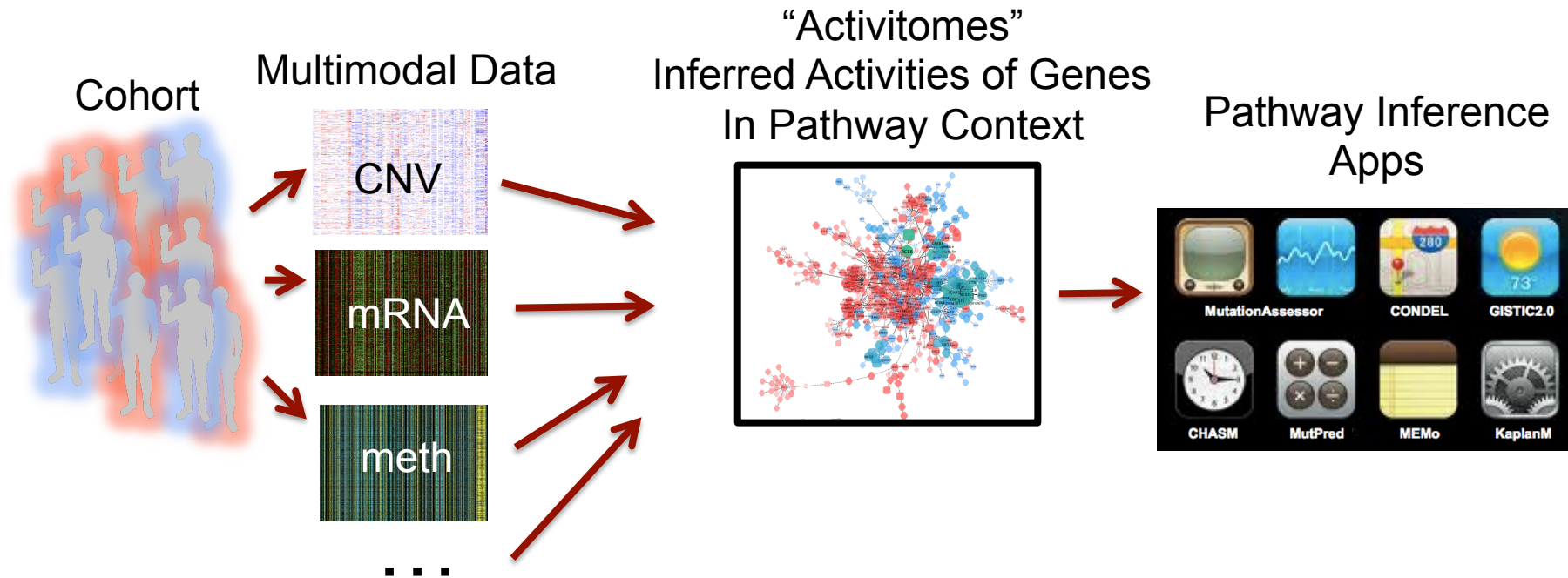
Expression



Copy Number Alterations
This is What it
Does to You



PARADIGM: Integrated Pathway Analysis for Cancer



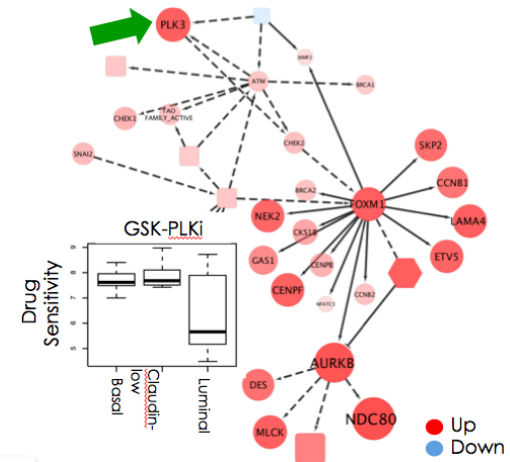
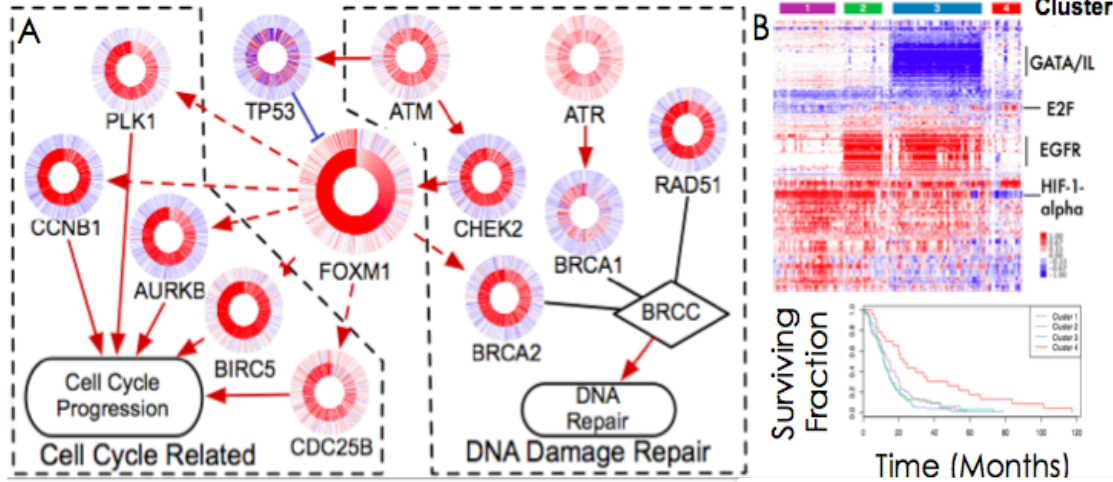
- Inferred activities reflect neighborhood of influence around a gene.
- Can boost signal for survival analysis and mutation impact

PARADIGM Reveals New Biology and Links to Outcomes

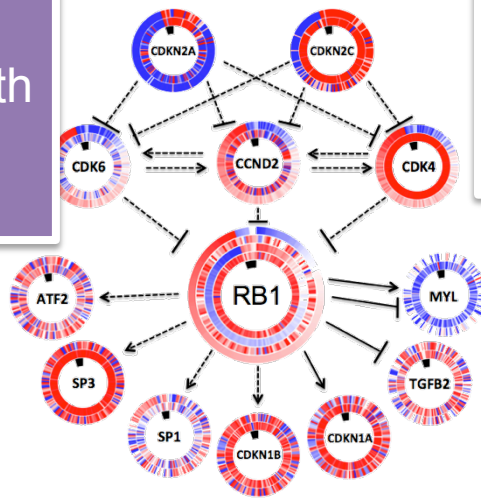
New Faulty "Switch"
Identified in Ovarian

Patients "Activitomes"
Predict Survival in GBM

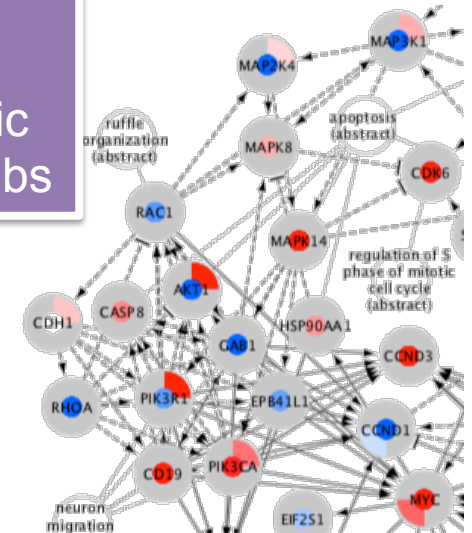
PLK3 inhibitors
Implicated as a drug
specific for basal breast CA



Characterize
mutations with
pathway
context.



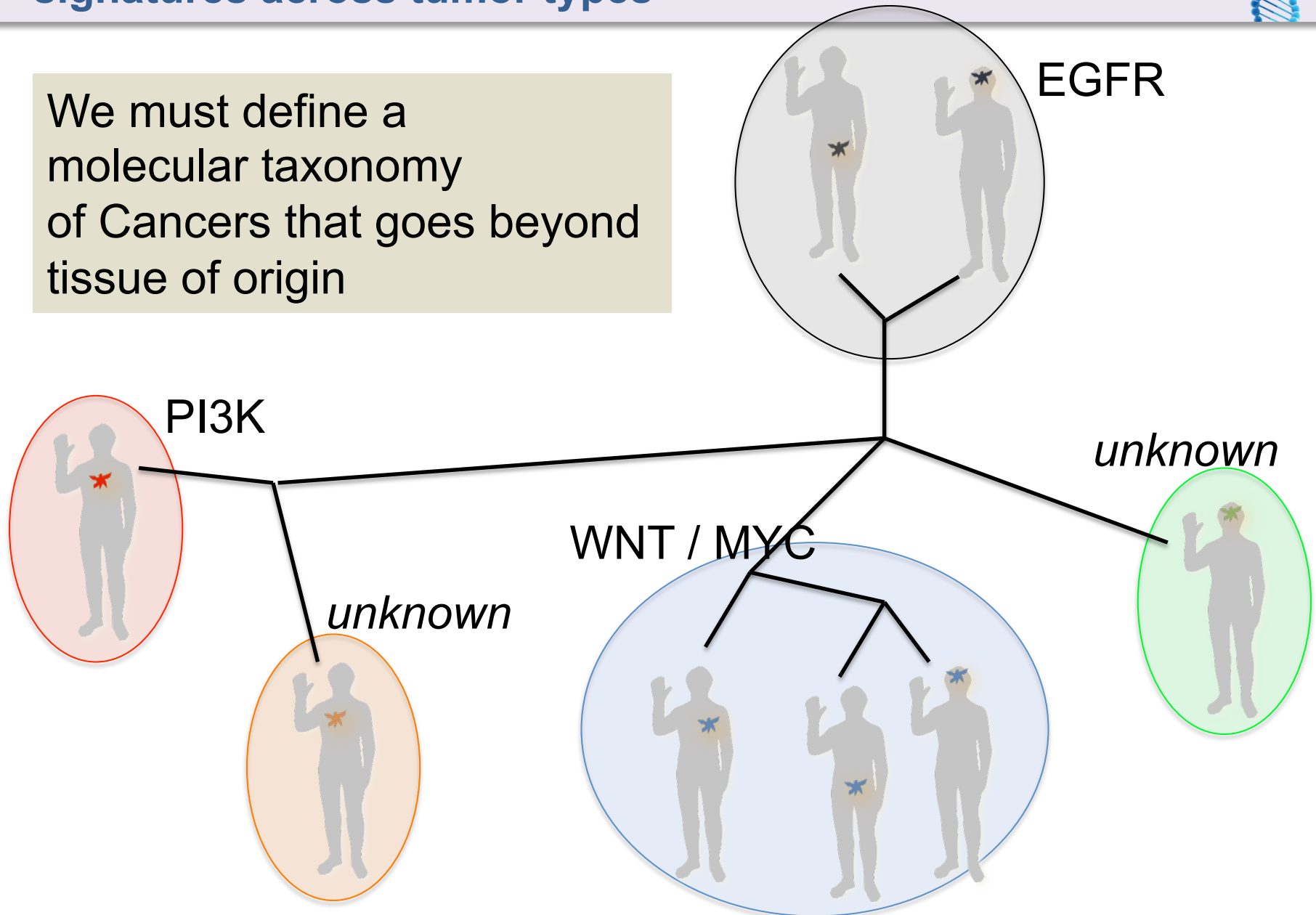
Identify putative
essential genes
that interlink genomic
Events to activity hubs



TCGA PAN-CANCER: Identify common molecular signatures across tumor types



We must define a molecular taxonomy of Cancers that goes beyond tissue of origin





Anil Sethi, Consulting CTO

New Age Data Sharing: e-Trials and e-Patients

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- **Consultant to the Director of the National Cancer Institute**
- **Advanced Breast Cancer Survivor**

Current Care for Advanced Cancer Patients –

A Cancer Treatment Lottery?

- Cancer treatments developed using broad population data
- "Most of the expensive new drugs prolong survival for no more than three or four months" *Dr. Otis Brawley, chief medical and scientific officer of the American Cancer Society*
- Few treatment guidelines for advanced cancer - more of an art than a science
- Few advanced patients get significant benefit from their cancer treatment

Patient Access to experimental compounds

- Most patients don't know how to access new treatments other than what their doctor tells them.
- To get access outside of standard of care, a patient must find out about and be eligible to participate in:
 - 'Standard' clinical trials
 - 'Adaptive' clinical trials
 - Compassionate use programs
 - Expanded access programs
- Off-label use of cancer drugs is often not reimbursed

Improving the Odds of Winning the Lottery

- Adaptive trial designs that give more patients access to more experimental treatments
- Personalized medicine
- Utilization of existing data – Public Private Partnerships - Data sharing and problem solving
- Gathering patient data needs to be the norm, not the exception
- New regulatory science tools and approaches to more quickly and better assess the safety, efficacy, quality and performance of cancer treatments

Clarity of Purpose

Working in Public Private Partnerships trying to advance regulatory science can often become complicated and very gray. Lots of perspectives and agendas.

But, then I flash back to how it felt to be diagnosed with advanced cancer and it gives me greater clarity about the right path forward.

The goal is for more patients to win the Cancer Treatment Lottery!!!!



**Marty Tenenbaum Ph.D.,
Founder and Chairman**



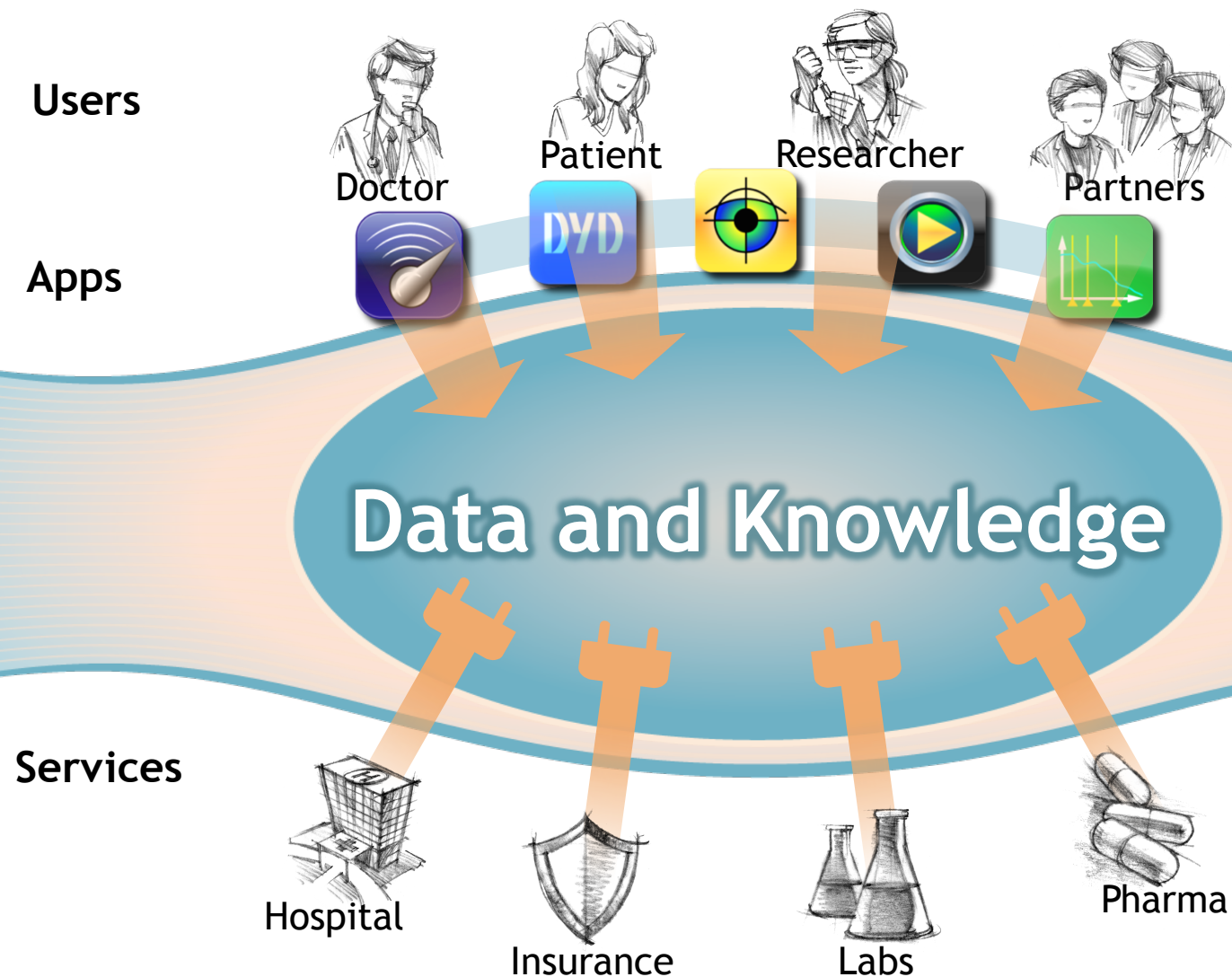
Creating the Ecosystem for Personalized Oncology

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- **Boards: Patients Like Me, PLoS, Efficient Finance, Medstory**

Big Ideas

- Science-based personalized oncology
- Rapid Learning and publishing
- *Donate Your Data*
- Tight integration of research and care
- Accelerated access to data, drugs, and services
- Platform and ecosystem alliance

Platform



Targeted Therapy Finder



How to Use This Tool

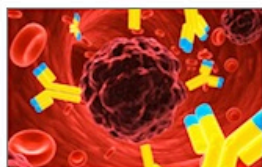
1. Provide tumor information
2. Learn about molecular tests and potential treatments
3. Discuss results with treatment team

Learn More:

[Patients](#) | [Physicians](#)

Featured Drug:

[Yervoy](#)



Yervoy, an antibody that blocks CTLA-4, is the first drug to extend survival of patients with advanced melanoma.

[Other Drugs in the News](#)

Provide Melanoma Information

Melanoma Stage ?

☐ Early
Stage 0, I, II

☐ Stage III
Advanced Stage

☒ Stage IV

Primary Origin ?

☒ Skin/Other

☐ Eye

☐ Acral/Mucosal

Metastatic Sites ?

(For statistical purposes only)

☐ Lymph Nodes

☒ Liver

☐ Brain/CNS

☐ Other

Mutation Information ?

BRAF

C-KIT

GNAQ

GNA11

[clear form](#)

[Find drugs and trials →](#)

Targeted Therapy Finder Advisors*

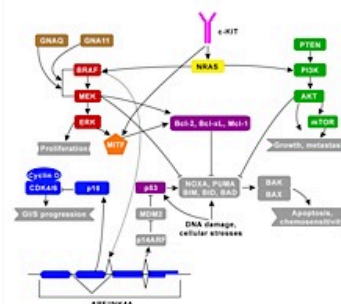


David E Fisher MD PhD
Department of
Dermatology
Harvard Medical School

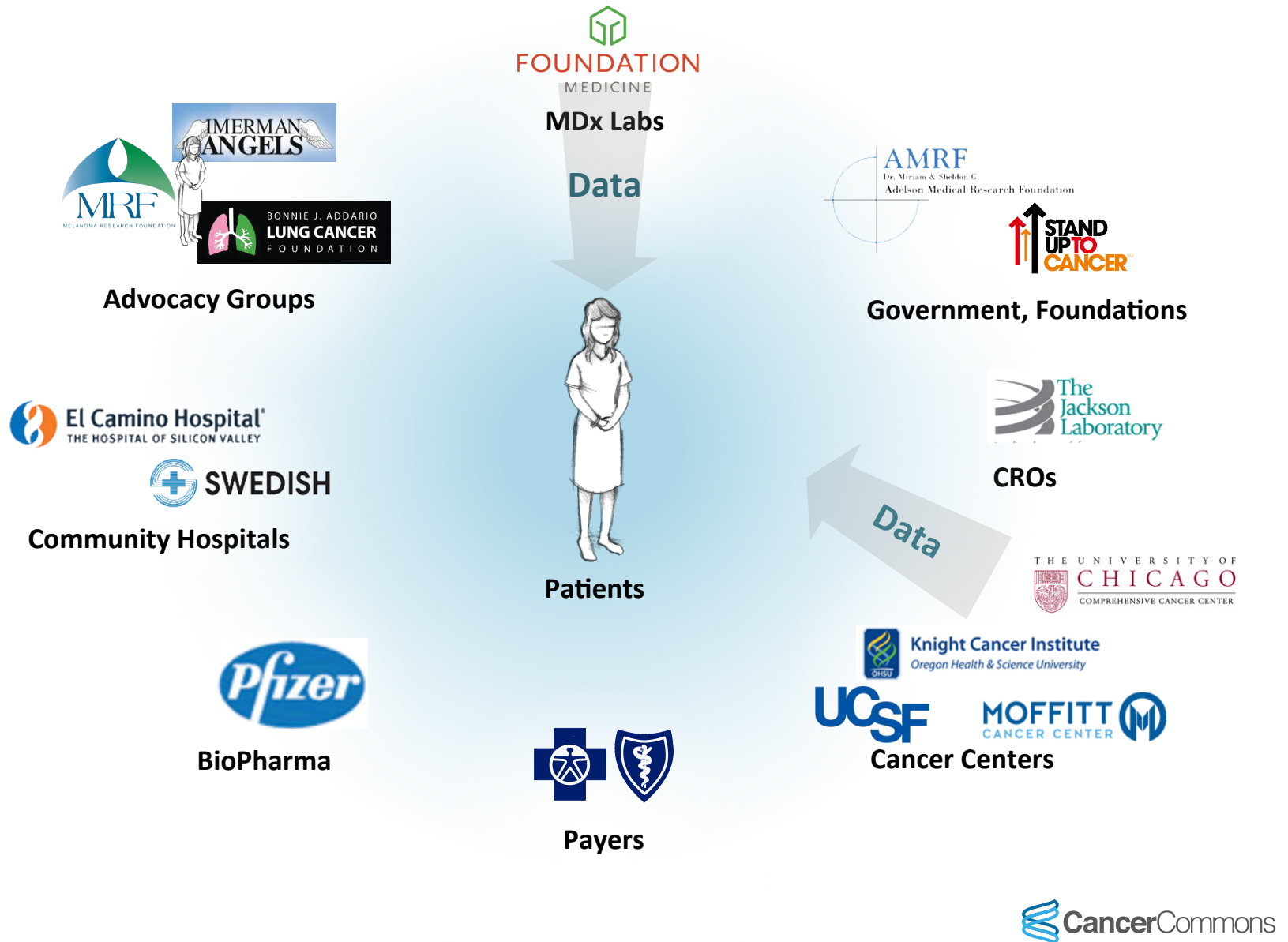


Keith T Flaherty MD
Department of
Medicine
Harvard Medical School

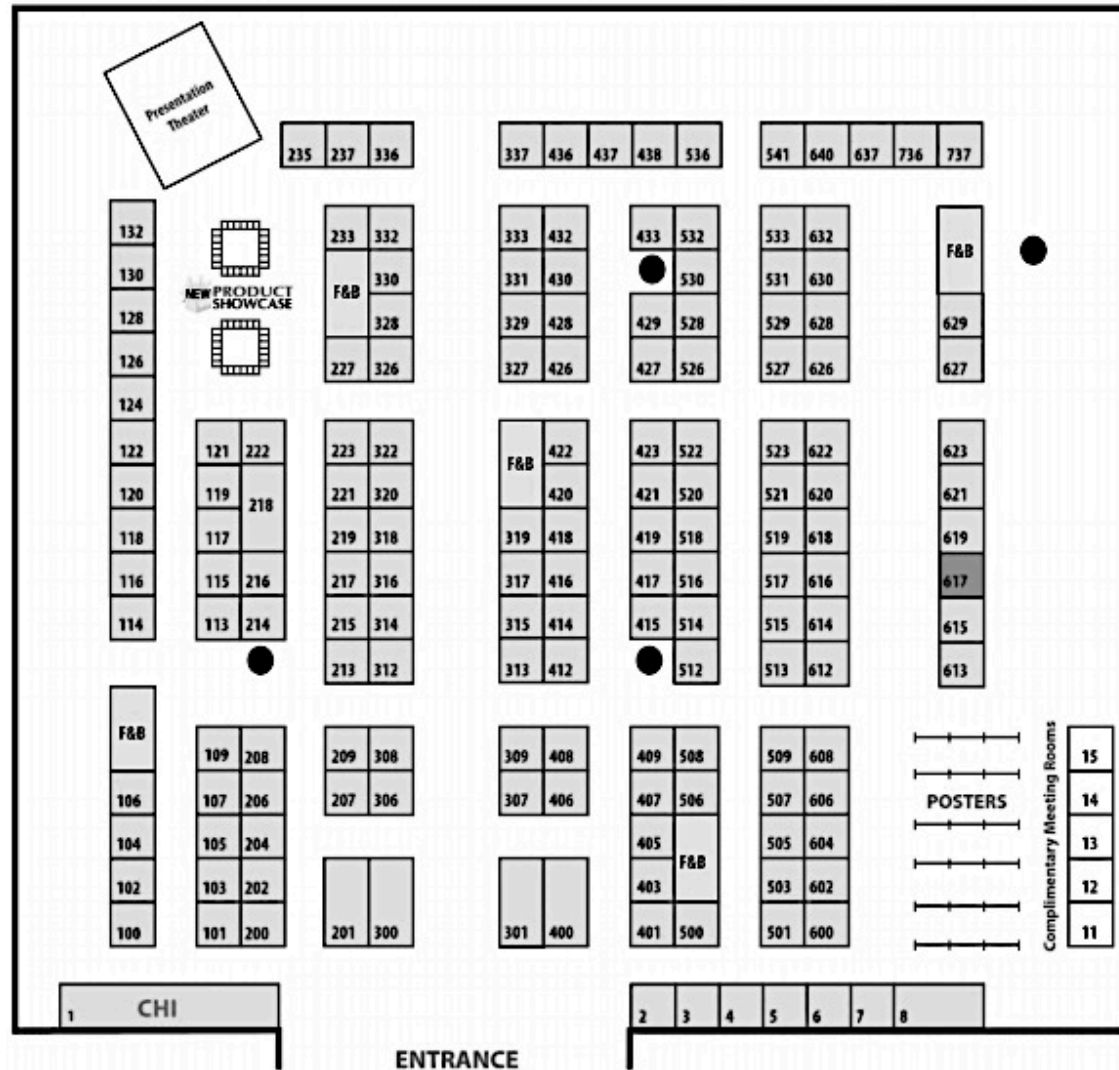
Learn the Science Behind the Targeted Therapy Finder at [Cancer Commons Melanoma](#)



Ecosystem Alliance



Tri-Con Ecosystem Initiative



The Scientific Services Marketplace

The easiest way to get experiments conducted by researchers in top core facilities and institutions.

Cloning Constructs **\$162.00**
per Sample

NGS Sequencing **\$488.00**
per Sample

Immunohistochemistry **\$10.00**
per Sample

HTS Screening **\$0.10**
per Sample

Mass Spectrometry **\$10.00**
per Sample

RNA microarray **\$107.50**
per Sample

Featured NGS Sequencing Providers

Science Exchange has 54 verified NGS Sequencing providers including the following featured providers.



Center for Cancer Computational Biology (CCCB)

Dana-Farber Cancer Institute | Boston, Massachusetts, United States

The CCCB sequencing facility offers a wide range of services to assist in the design and execution of next-generation sequencing projects. Utilizing the Illumina (Solexa) sequencing technology, the facility supports a range of...

\$1,200.00 USD per Sample

[REQUEST ESTIMATE](#)



+49
others

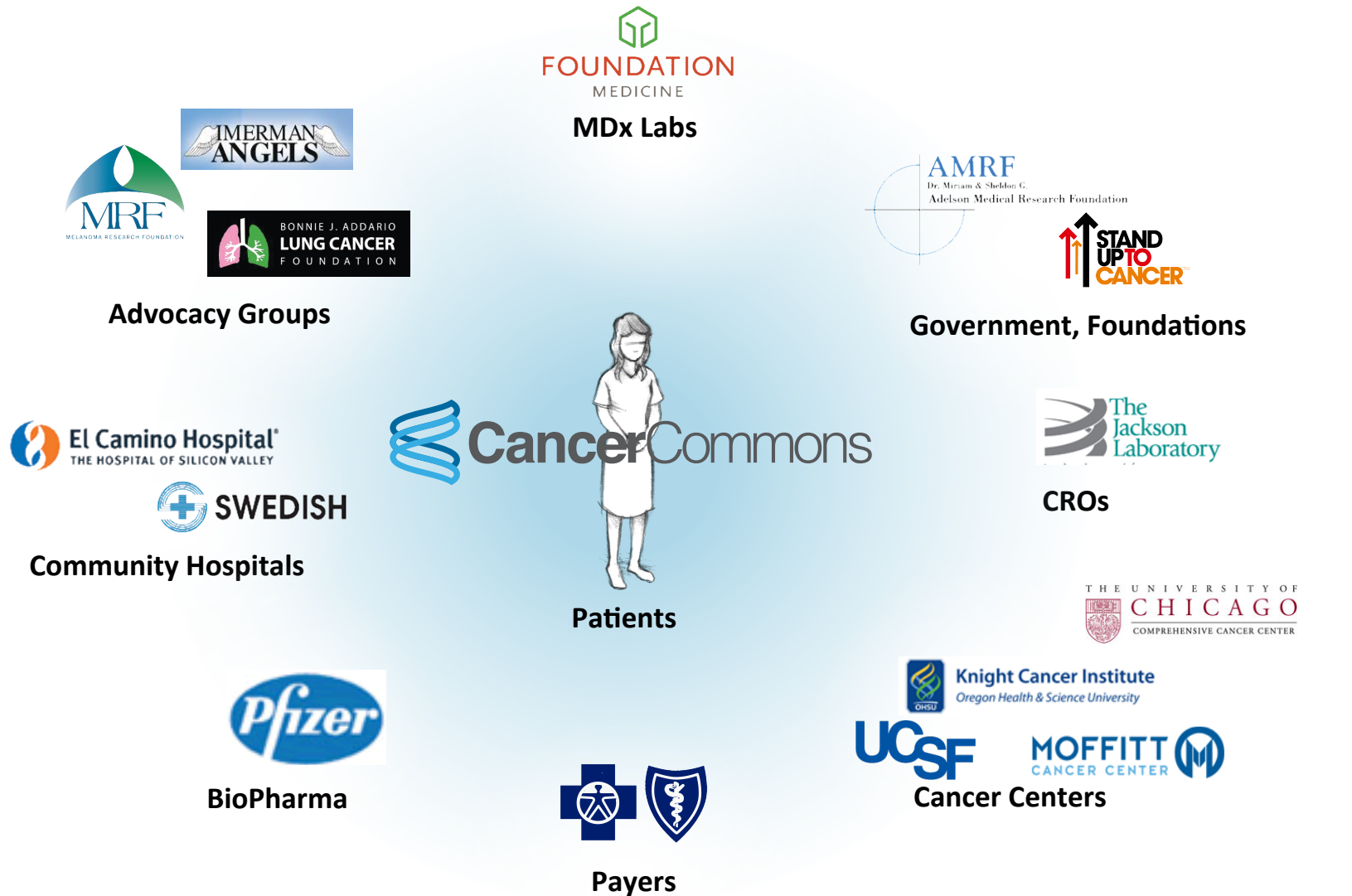
[View](#)

Barriers

- Business models
- Technical
- Legal
- Regulatory
- Cultural
- Financing

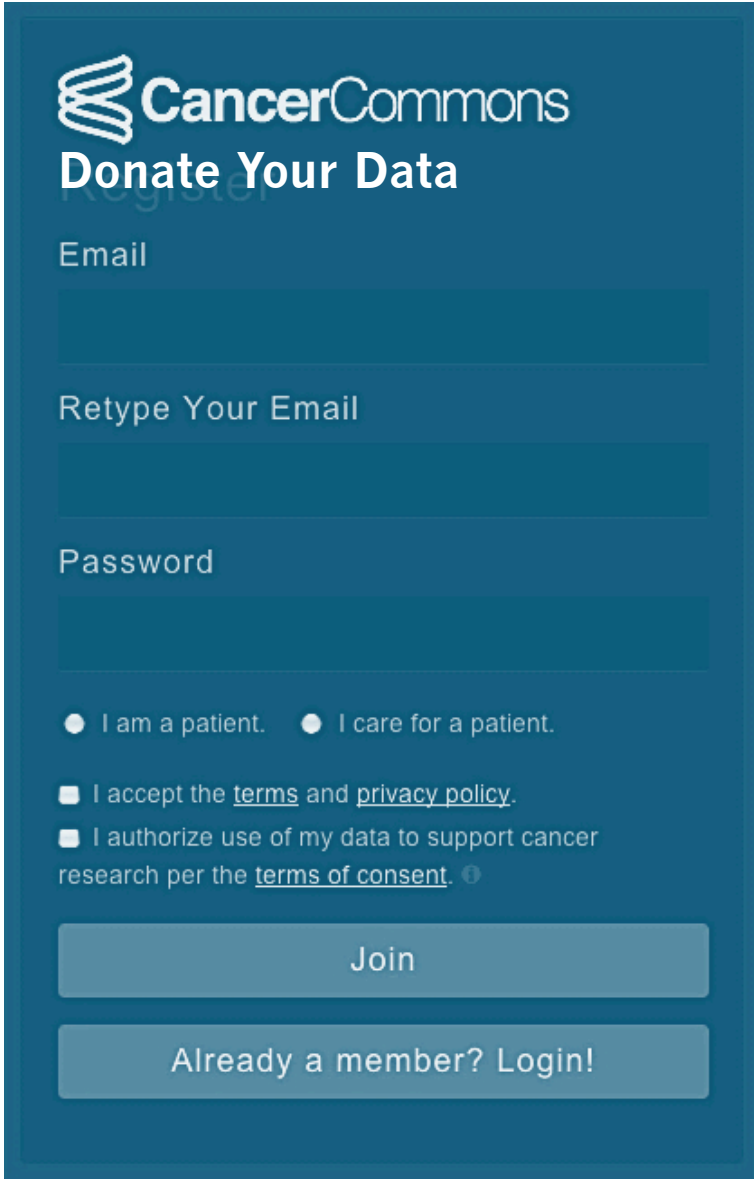


Marketplace => A Commons



Call For Participation

- Patient consents
- IRB approvals
- SOPs for Sample handling
- Data formats
- ecommerce protocols



The image shows a registration form for CancerCommons. The form is titled "CancerCommons Donate Your Data" and includes a "Register" button. The form fields are: Email, Retype Your Email, and Password. Below the fields are three checkboxes: "I am a patient.", "I care for a patient.", and "I accept the terms and privacy policy." There is also a checkbox for "I authorize use of my data to support cancer research per the terms of consent." with a help icon. At the bottom are two buttons: "Join" and "Already a member? Login!".

CancerCommons
Donate Your Data
Register

Email

Retype Your Email

Password

☐ I am a patient. ☐ I care for a patient.

☐ I accept the [terms](#) and [privacy policy](#).

☐ I authorize use of my data to support cancer research per the [terms of consent](#). ⓘ

Join

Already a member? Login!

...For Today's Patients

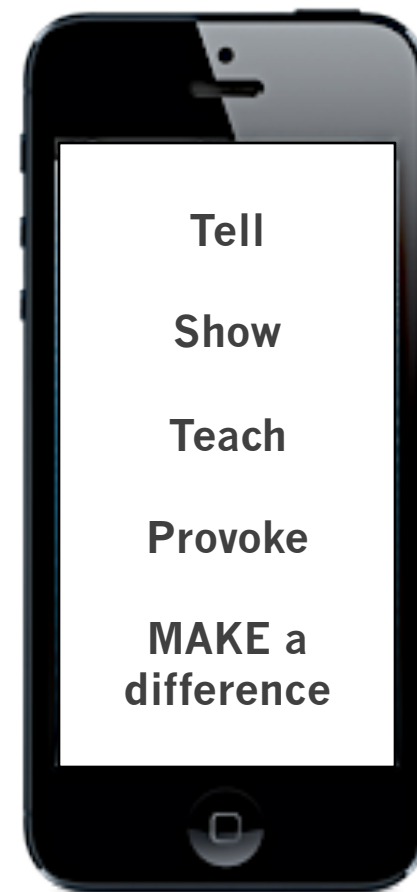
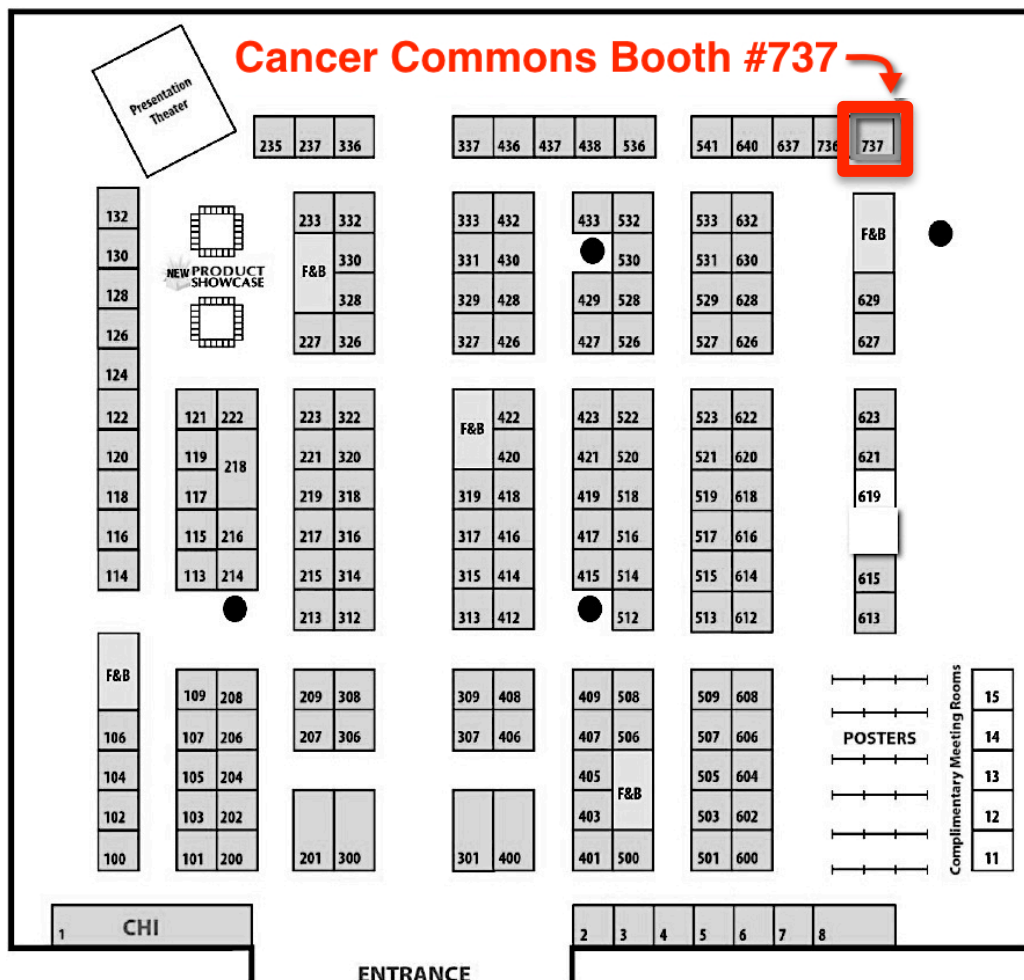
- Access to the latest data, information, therapies
- Contribute to science
- Participate in patient-centric trials
- Better outcomes

Let's beat cancer. Tell us how.

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Thank You!

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