



Recent Advances in Cancer Research and Therapeutic Approaches

Leonidas C. Platanias, MD, PhD



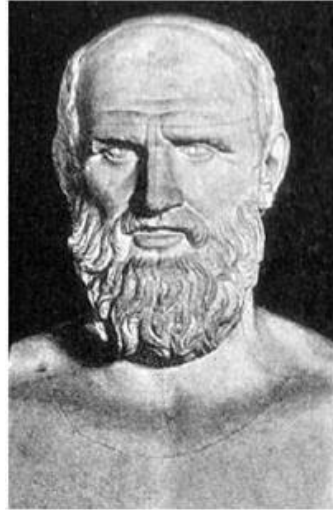
ROBERT H. LURIE
COMPREHENSIVE CANCER CENTER
OF NORTHWESTERN UNIVERSITY



Cancer



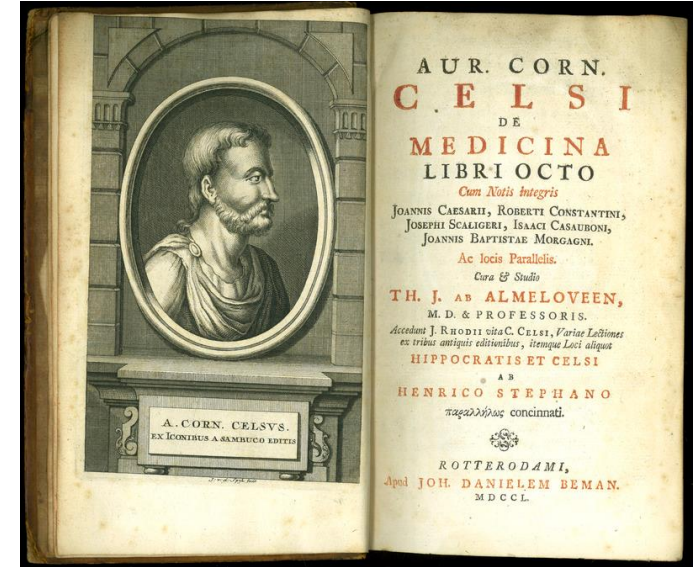
Edwin Smith Papyrus
1600 BC - Ancient Egypt



Hippocrates of Kos
460-370 BC



"the veins stretched on all sides as the animal the crab has its feet"



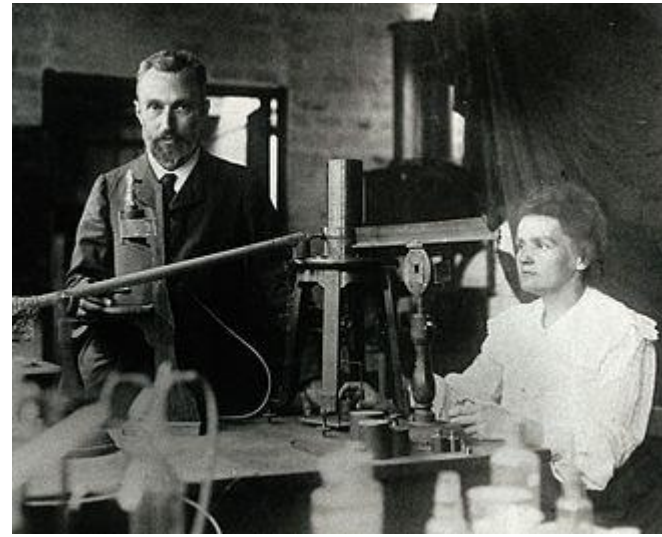
Aulus Cornelius Celsus
25 BC- 50 AD

Advances in Cancer Research and Treatment - Past

Radiation Therapy – late 1800s



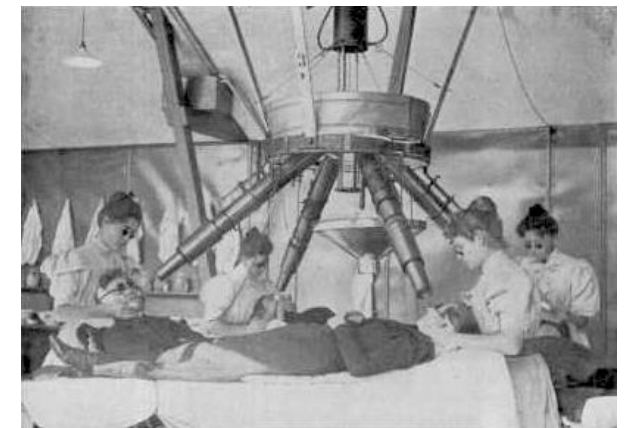
Wilhelm Conrad Röntgen



Pierre and Marie Curie



Niels Ryberg Finsen



1900 – Finsen Lab

Advances in Cancer Research and Treatment - Past

Chemotherapy – 1940s



Sidney Farber

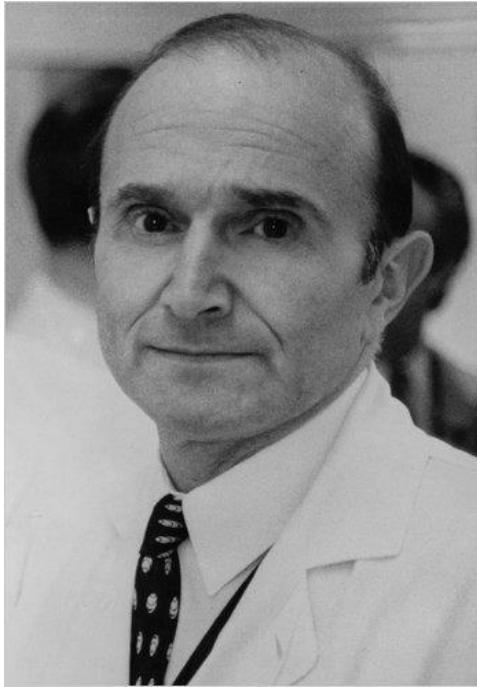
Combination Chemotherapy – 1960s



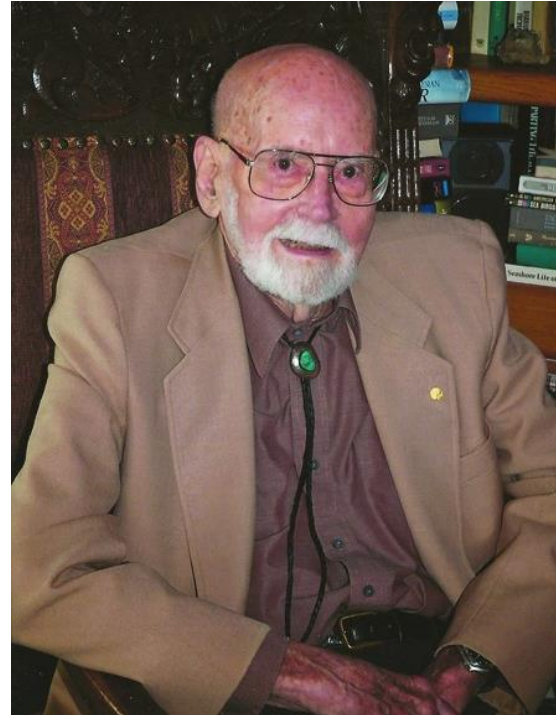
George Canellos-Vincent DeVita-Robert Young (1971)

Advances in Cancer Research and Treatment - Past

Stem Cell Transplant – 1970s

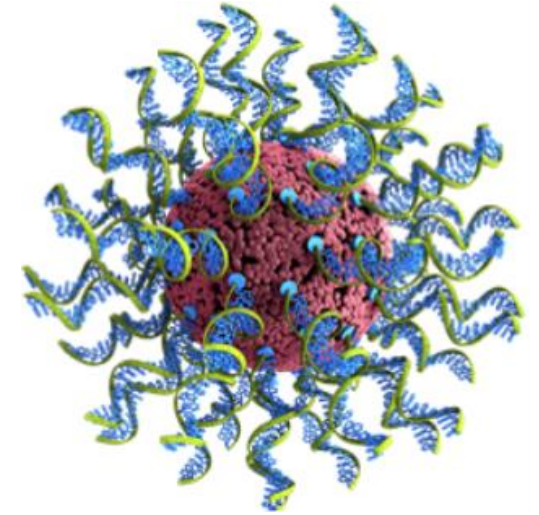
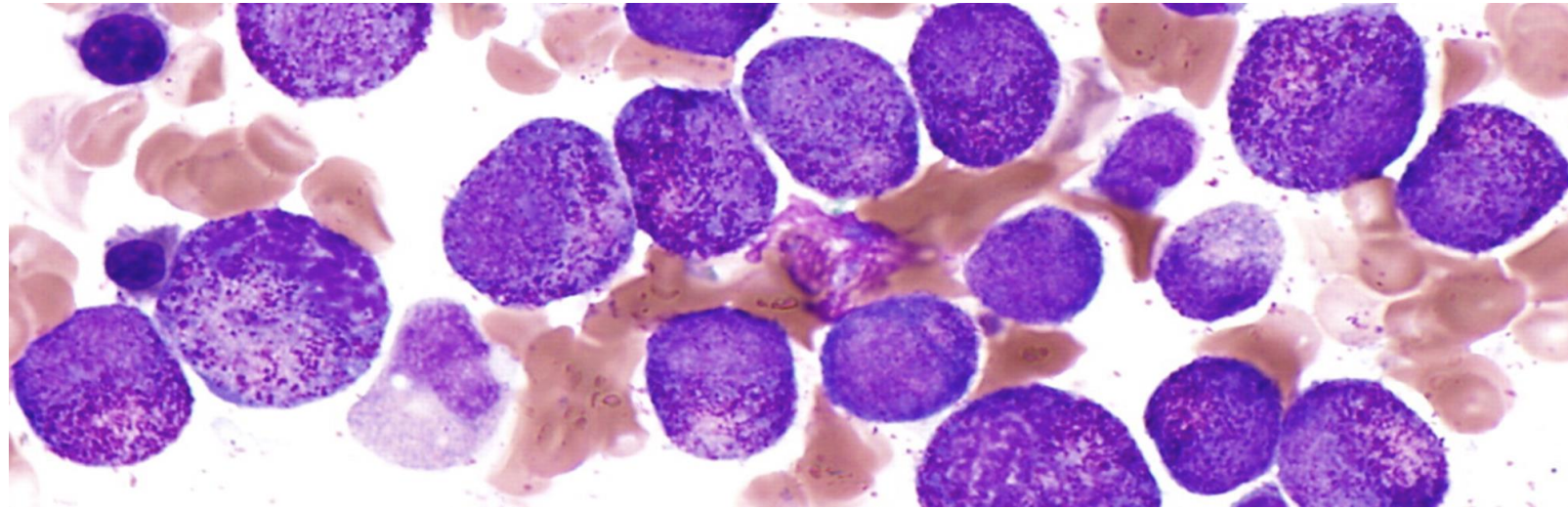


Georges Mathé



E. Donald Thomas

Advances in Cancer Research and Treatment



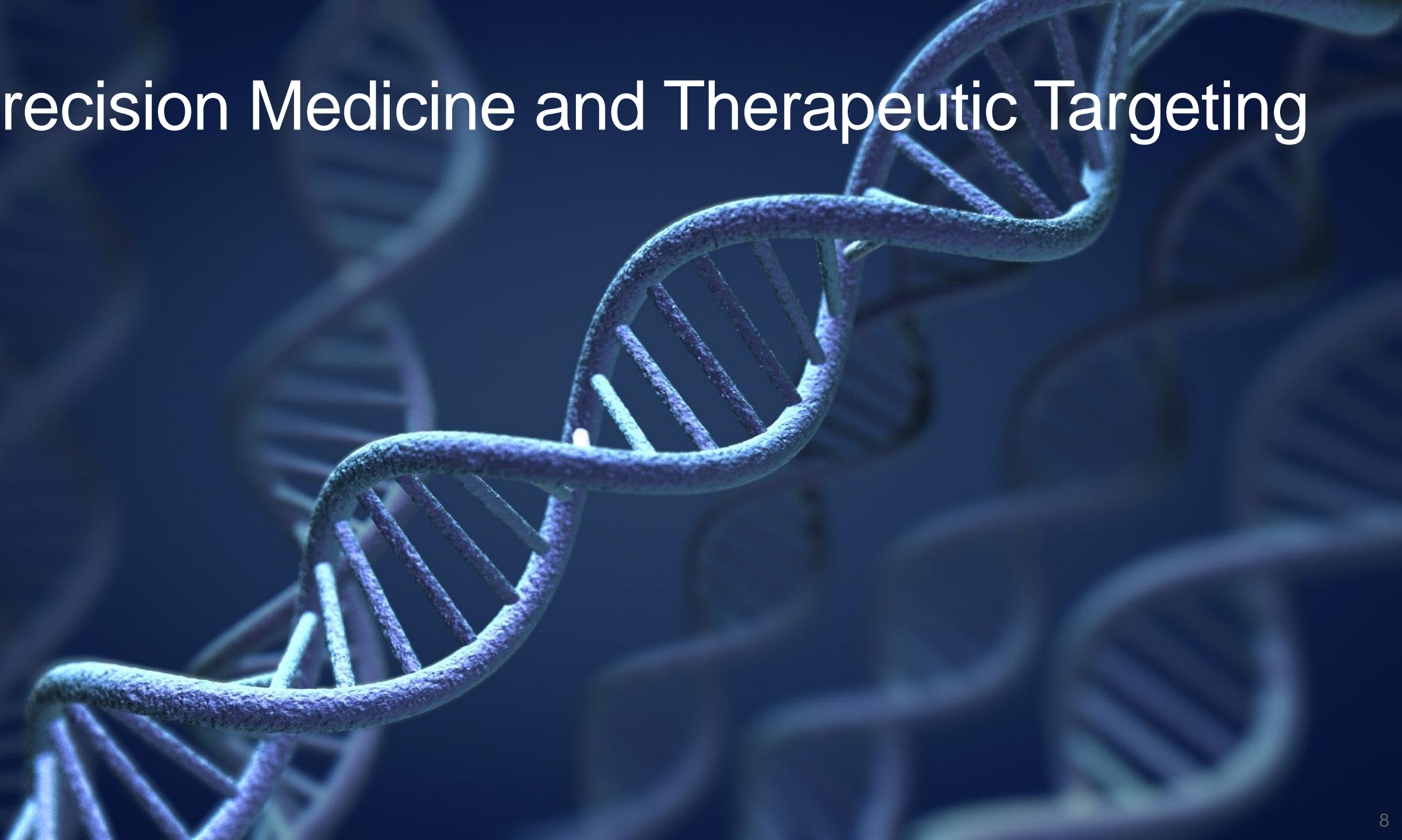
Precision Medicine

Nanotechnology

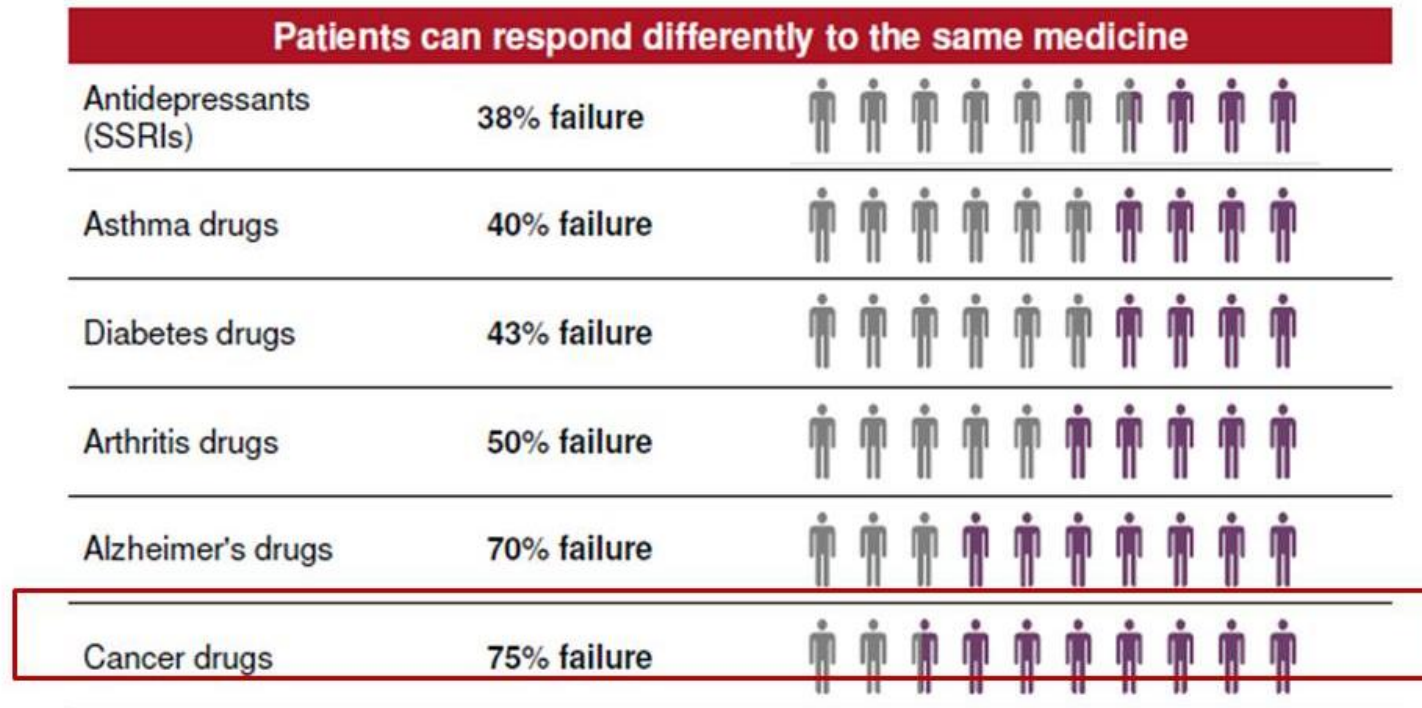
Epigenetics

Immunotherapy

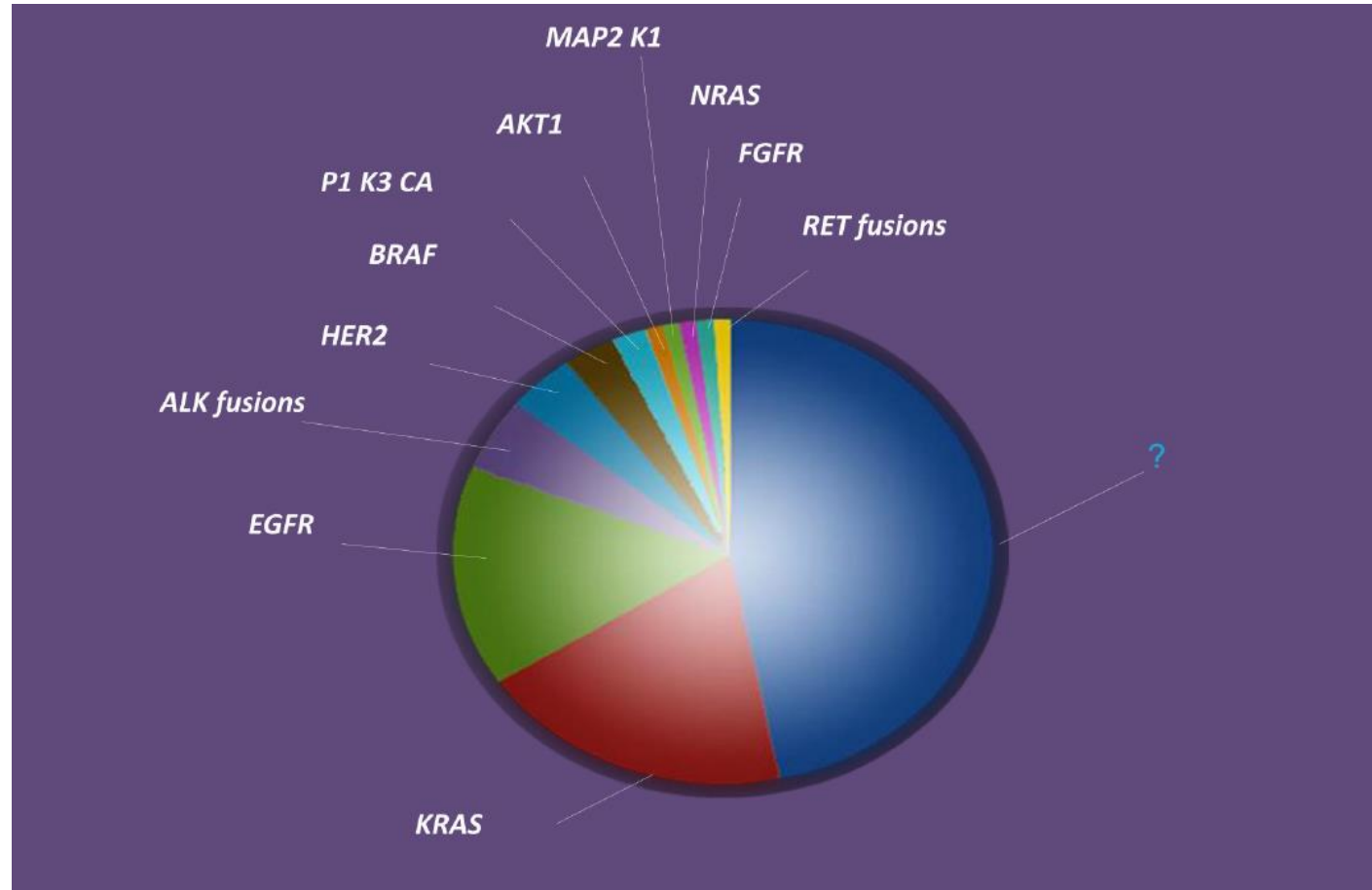
Precision Medicine and Therapeutic Targeting



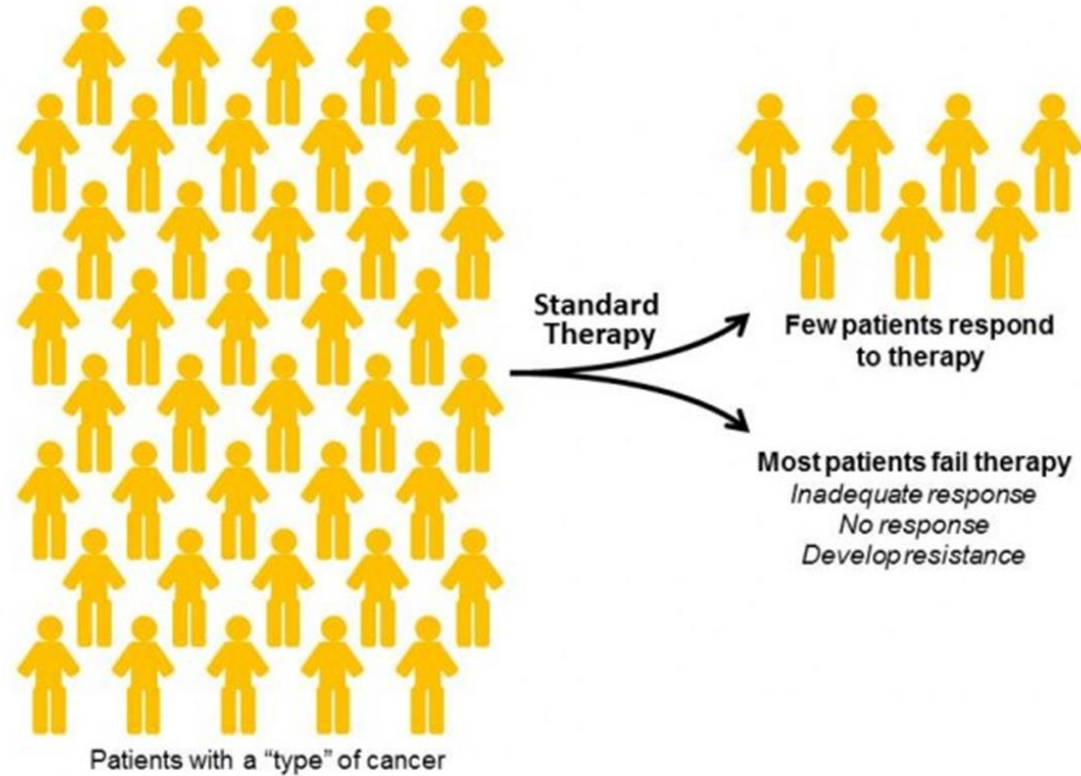
One Size does not fit all



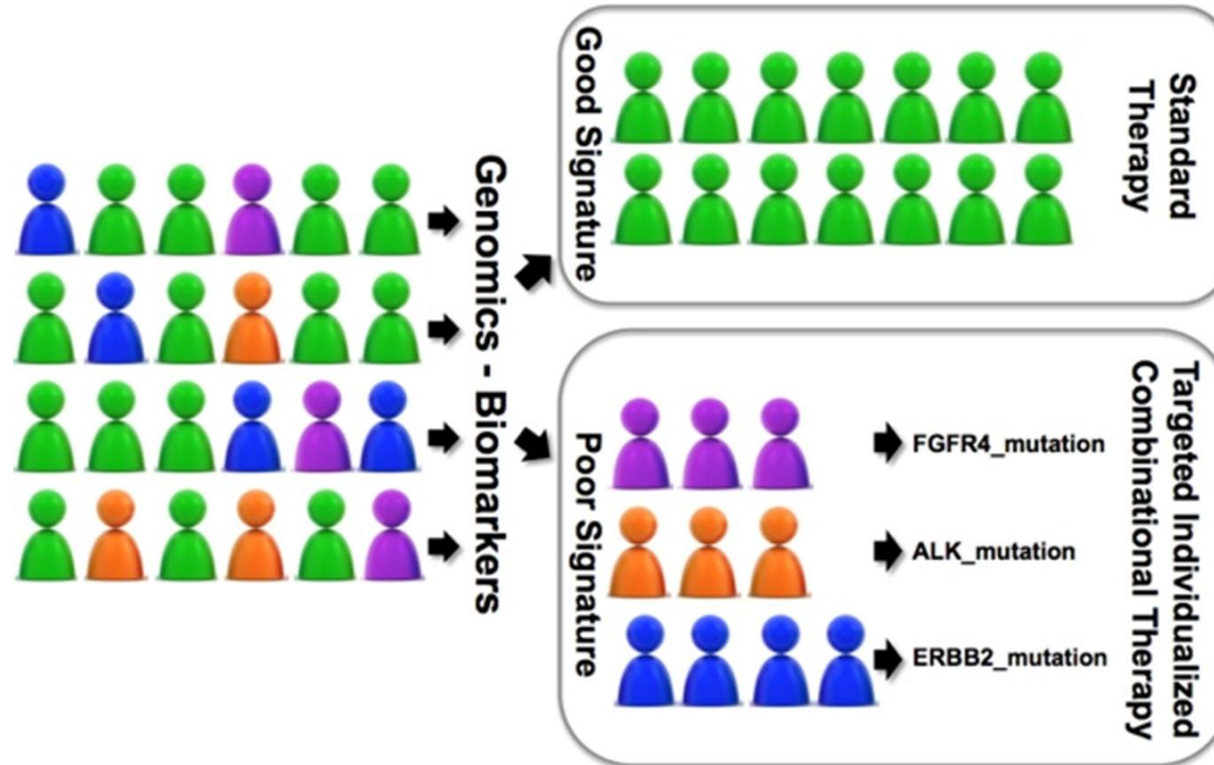
Lung Cancer- Molecular Abnormalities



Current Approach



Future Approach



Integrative Genomic Analysis of Wilms Tumor

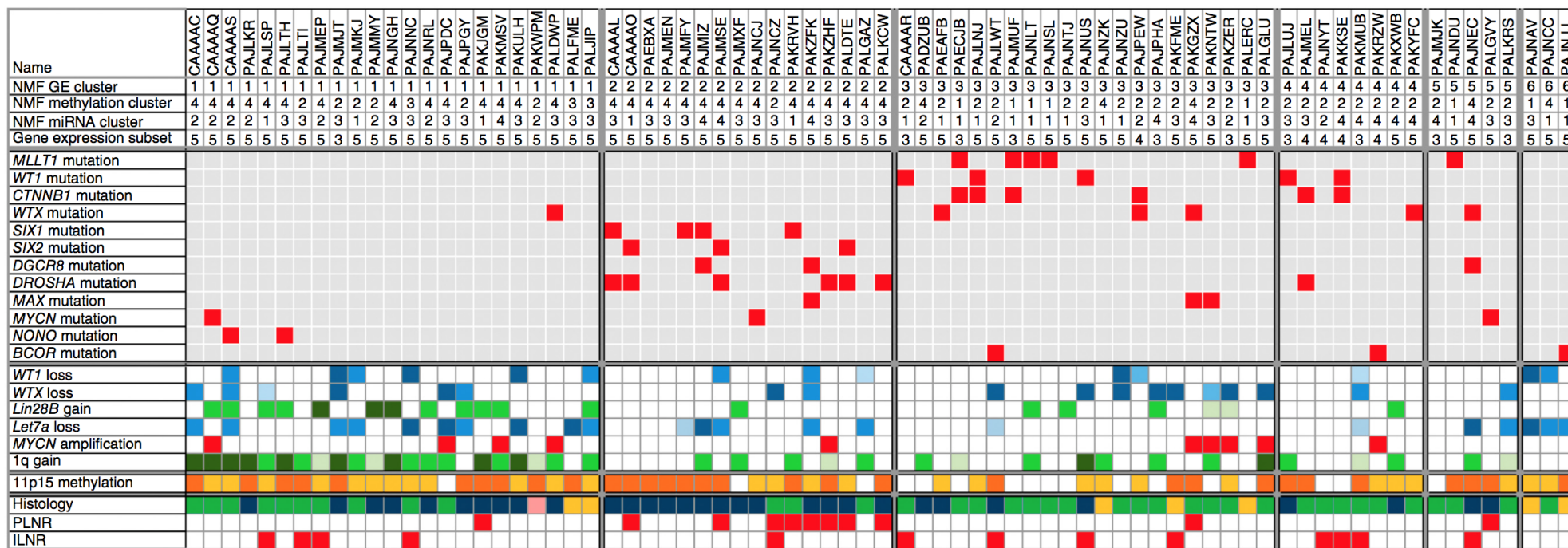
Nature Genetics 2017 | J Clin Oncol 2016, Clin Cancer Res 2016, Cancer Cell 2015, Nature Comm 2015



E. Perlman



The genetic landscape of Favorable Histology Wilms Tumor



ARRA TARGET; U10CA98543

Genomic Core

Integrative Genomic Analysis of Wilms Tumor

Nature Genetics 2017 | J Clin Oncol 2016, Clin Cancer Res 2016, Cancer Cell 2015, Nature Comm 2015

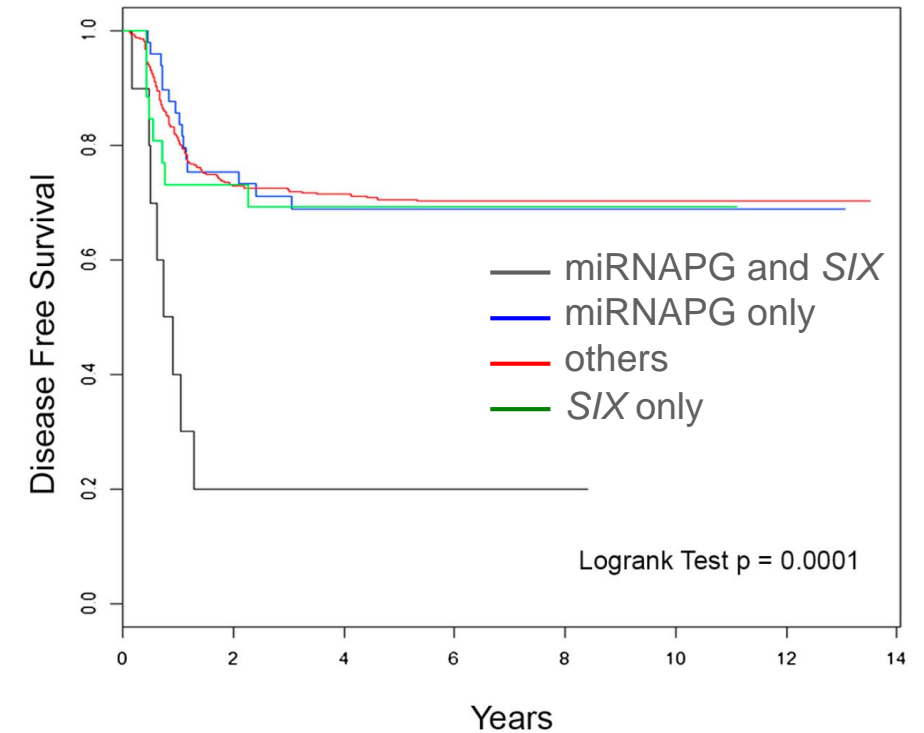
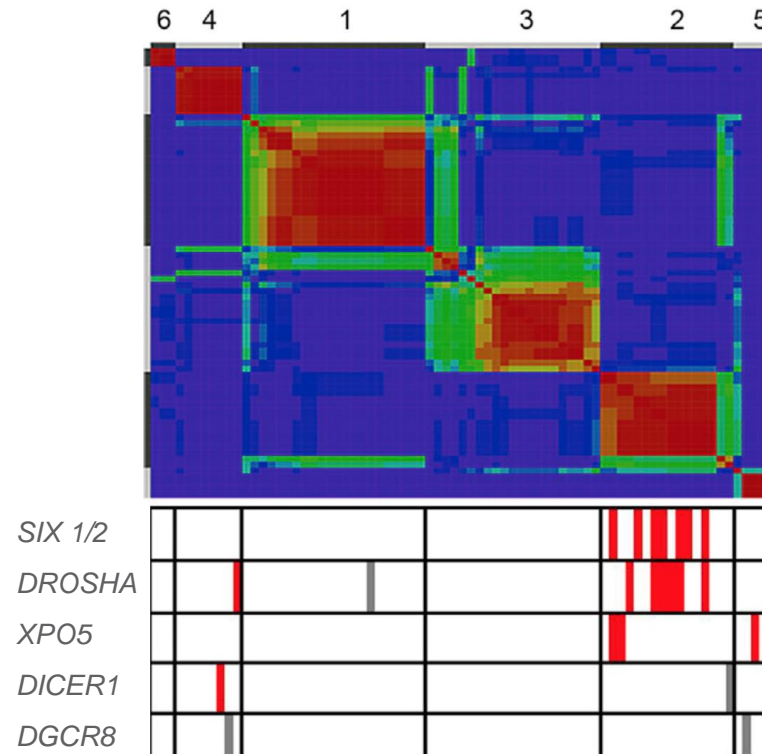


E. Perlman

CHILDREN'S ONCOLOGY GROUP



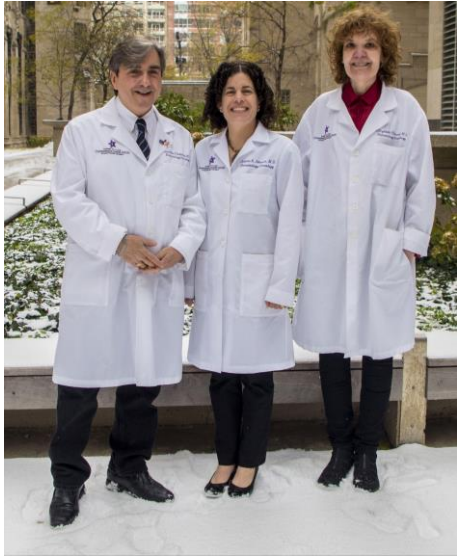
The combination of two rare mutations results in poor clinical outcome



ARRA TARGET; U10CA98543

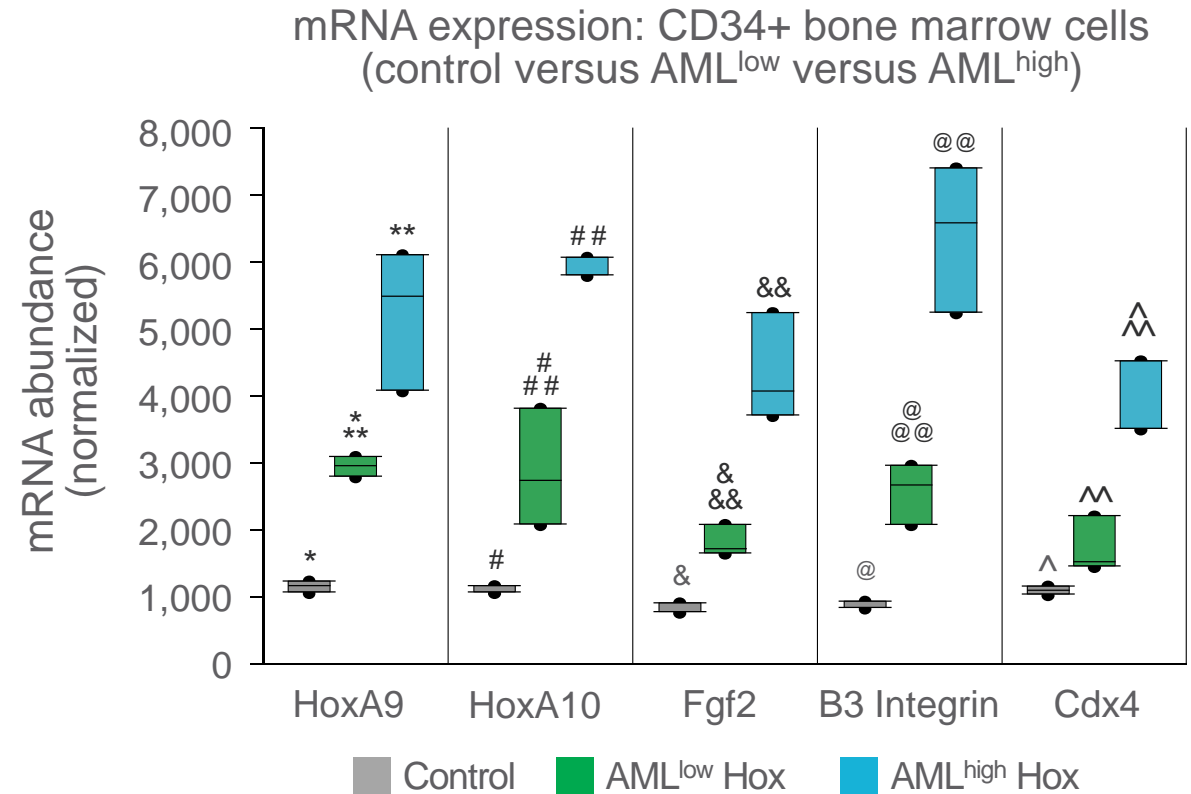
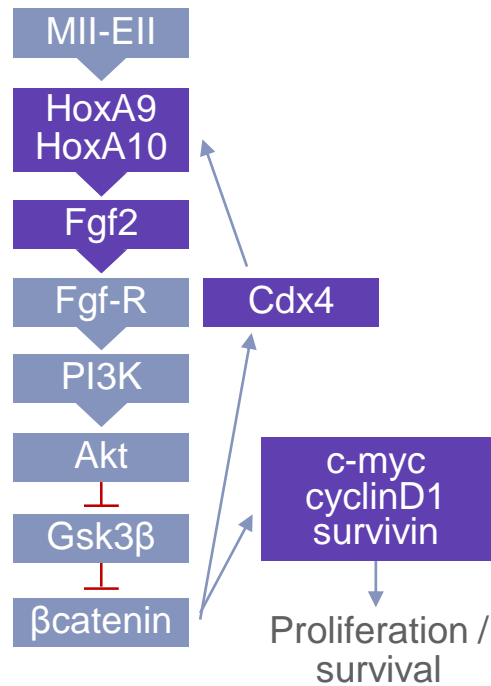
Genomic Core

Therapeutic Targets of Growth Factor Pathways in Acute Myeloid Leukemia



L. Platanius J. Altman E. Eklund

Increased HoxA9/10 correlates with Fgf2-dependent cytokine hypersensitivity in AML
Clinical trial: 5-Azacitidine + Nintedanib

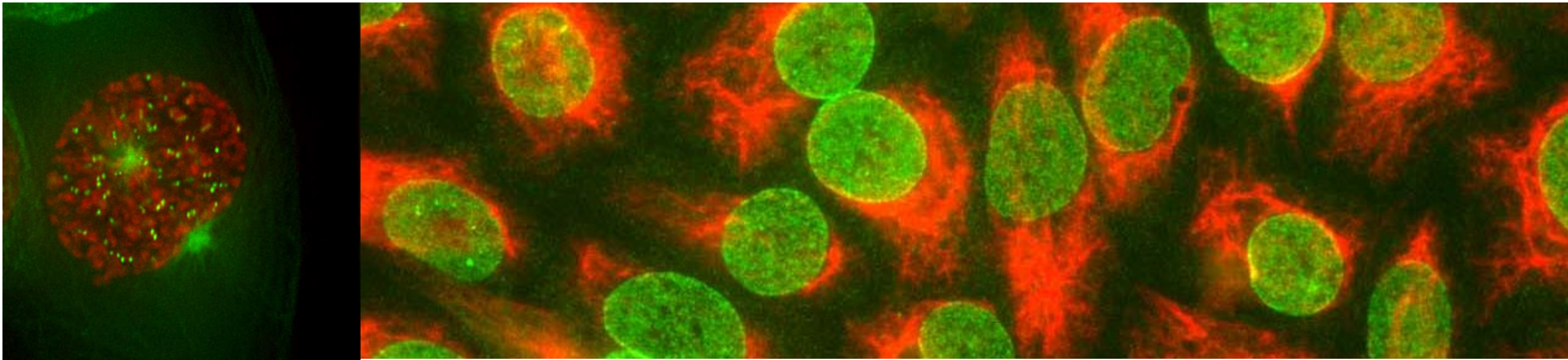


R01CA195642, R01CA077816, R01CA121192

Flow Cytometry, Developmental Therapeutics, Mouse Histology and Phenotyping, Proteomics, High Throughput Analysis, ChemCore

Advances in Cancer Research and Treatment

Epigenetics and Nuclear Dynamics



Histone H3 Lysine to Methionine Mutants in Malignancies

Nature Genet 2017; Science 2014; | Nature Med 2017; Genes Dev 2017



A. Shilatifard



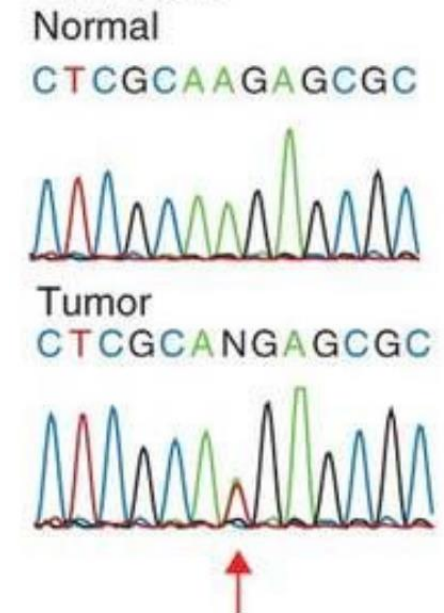
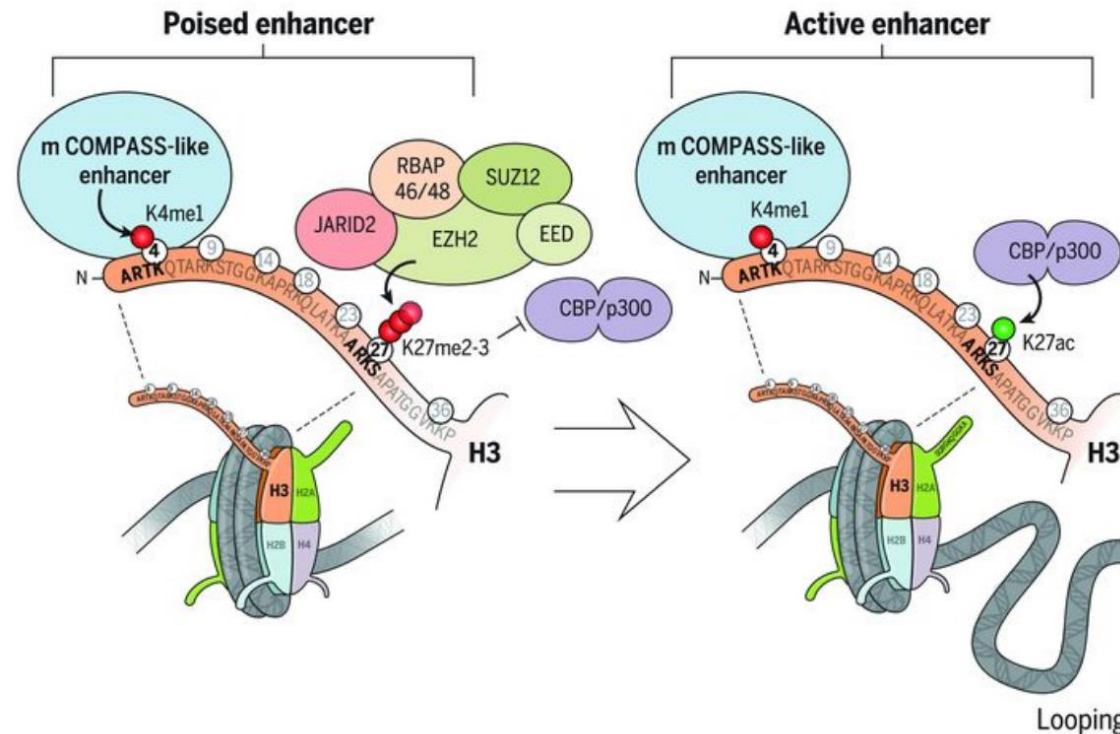
N. Kelleher (MOM)



C. D. James (TRIST)



S. Goldman (TRIST)

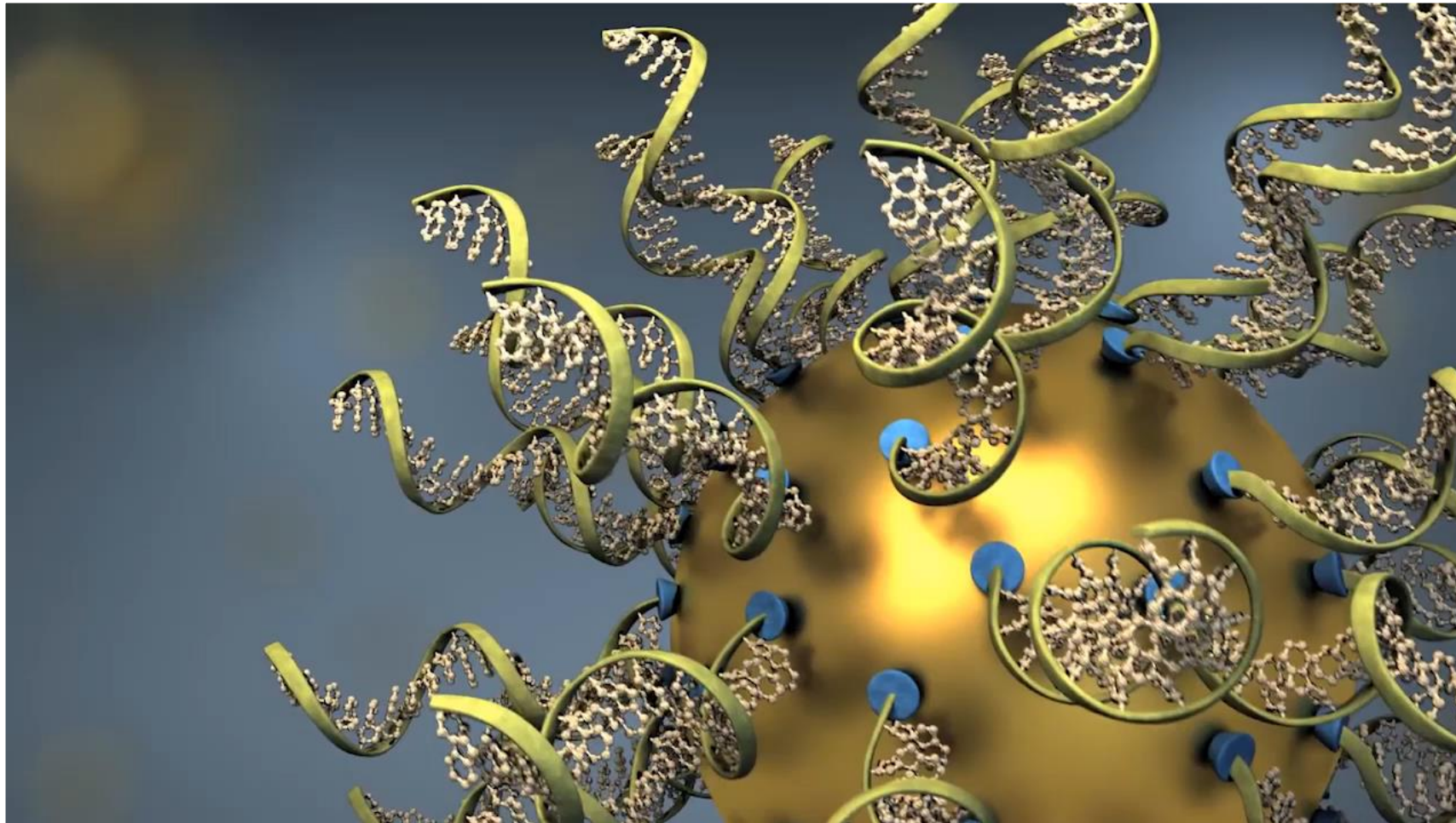


R01CA089455; P41GM108569; R35CA197569

Proteomics Core Facility, Developmental Therapeutics Core, Quantitative Data Sciences

Advances in Cancer Research and Treatment

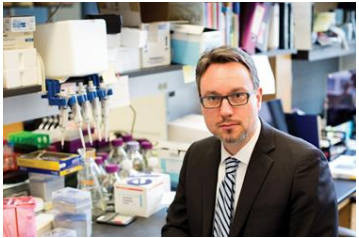
Nanotechnology



Nanotechnology - From the lab to the treatment of solid tumors



Chad Mirkin (CAPS)



Alex Stegh (TRIST)

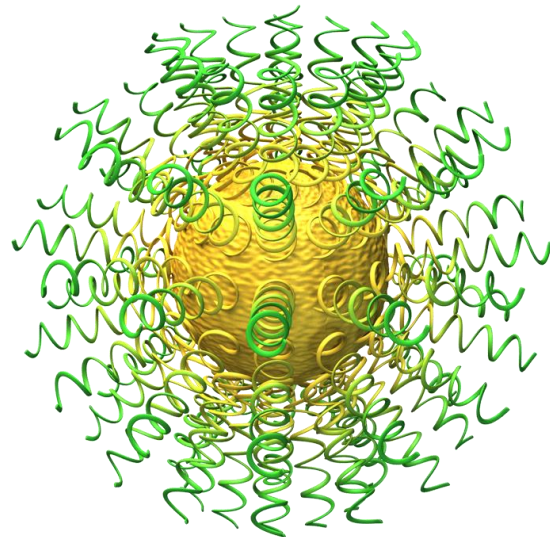


Priya Kumthekar (TRIST)

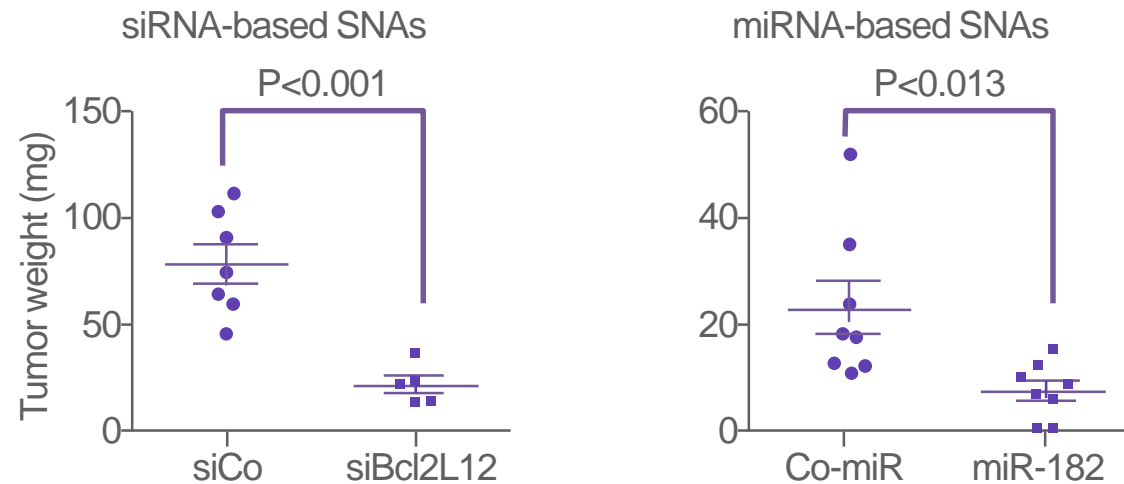
Sci Transl Med 2013; *PNAS* 2017; *J Am Chem Soc* 2015, *Genes & Dev* 2015

First in Human - Phase 0 clinical trial BCL2L12- targeting SNAs

NCT03020017- ongoing - 3 patients enrolled so far
Anticipated accrual 8 patients and then move to Phase I



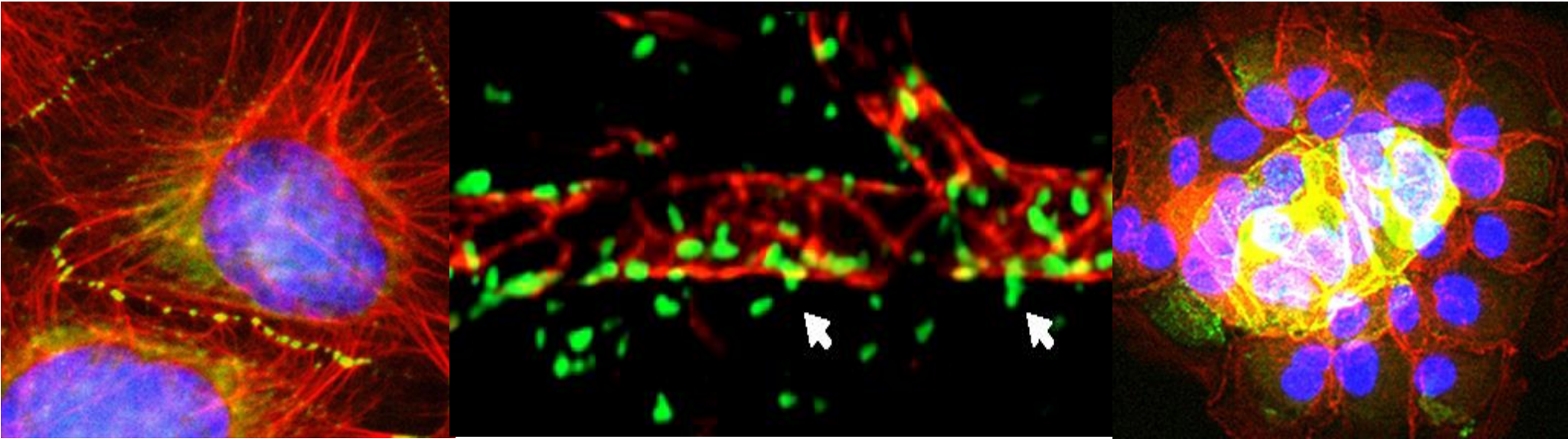
Crossing the blood brain-barrier in animal models



U54 CA151880, R01CA208783, the American Cancer Society Research Scholar Award

Flow Cytometry, Mouse Histology and Phenotyping, Pathology, Center for Advancer Microscopy

Tumor Environment and Immunotherapy



Coley's toxin

Sometimes referred as MBV for mixed bacterial vaccine, Coley's toxin was the first attempt to use immunotherapy and hyperthermia against cancer. William B. Coley MD, a bone surgeon at MSK from 1893 to 1936 developed interest when his first patient, a young girl died from metastatic sarcoma.



New York Times - July 29, 1908

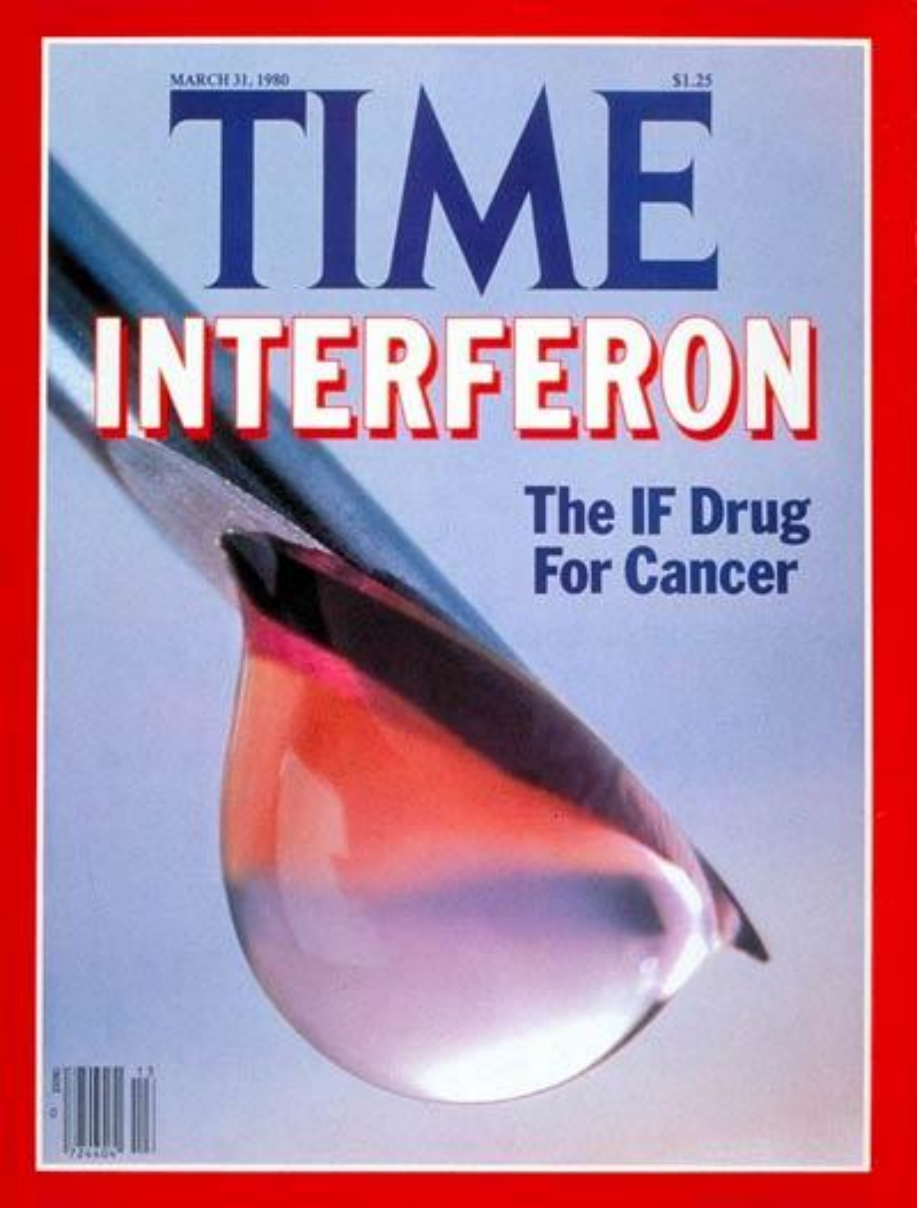
ERYSIPELAS GERMS AS CURE FOR CANCER

Dr. Coley's Remedy of Mixed
Toxins Makes One Disease
Cast Out the Other.

MANY CASES CURED HERE

Physician Has Used the Cure for 15
Years and Treated 430 Cases—
Probably 150 Sure Cures.

Following news from St. Louis that
two men have been cured of cancer in
the City Hospital there by the use of
a fluid discovered by Dr. William B.
Coley of New York. It came out yester-



MARCH 31, 1980

\$1.25

TIME

INTERFERON

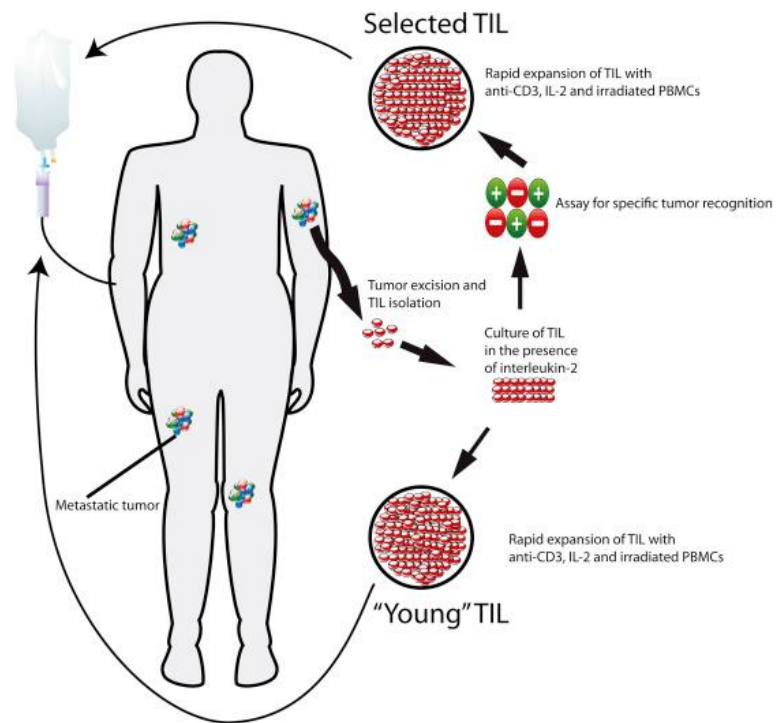
**The IF Drug
For Cancer**



1984

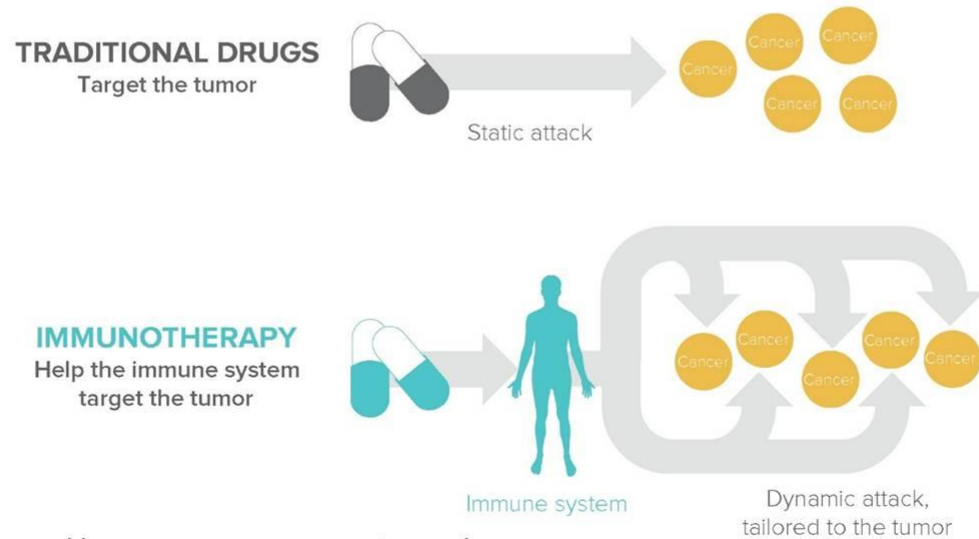


2016

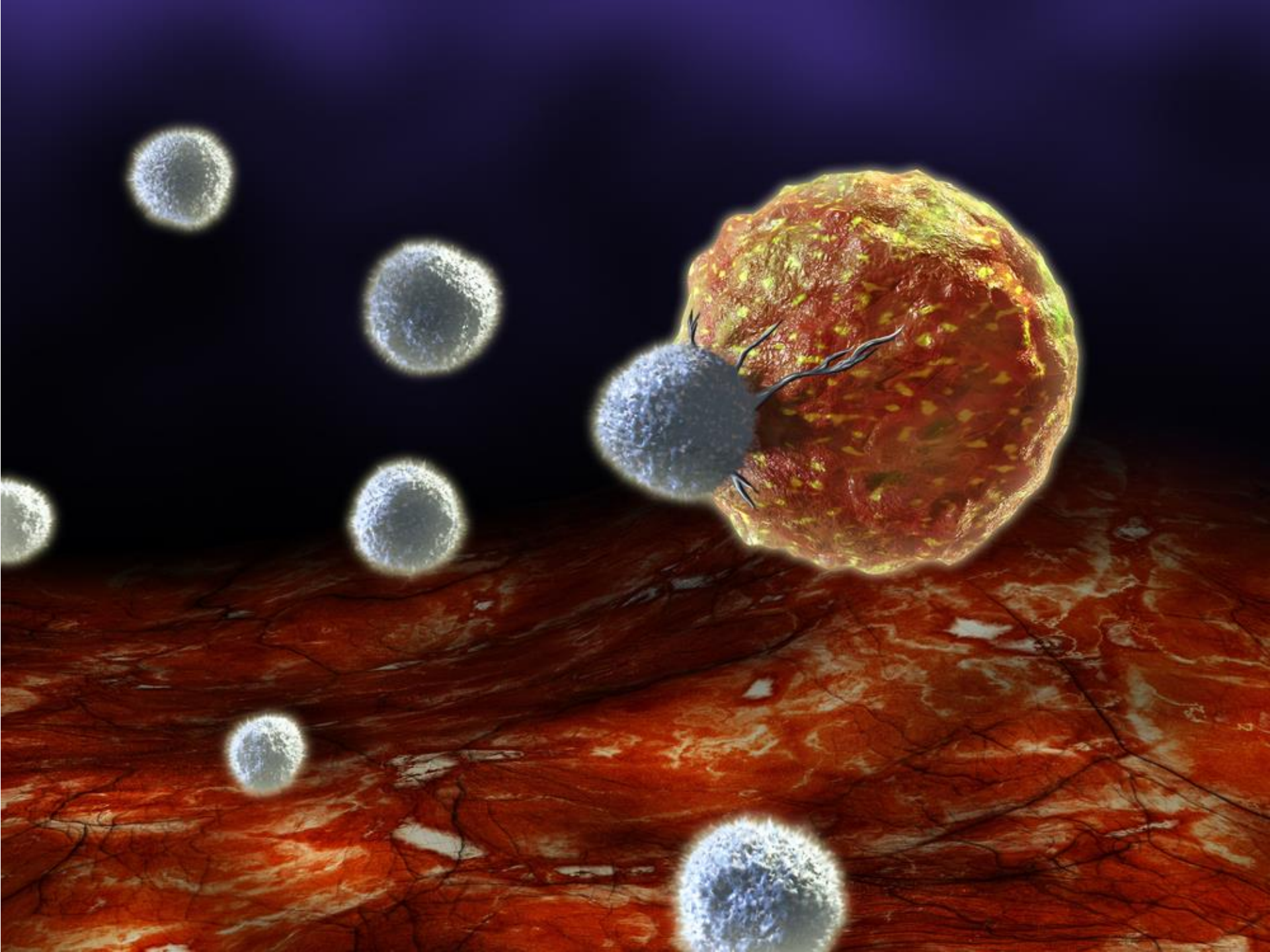


The Case for Cancer Cellular Therapy

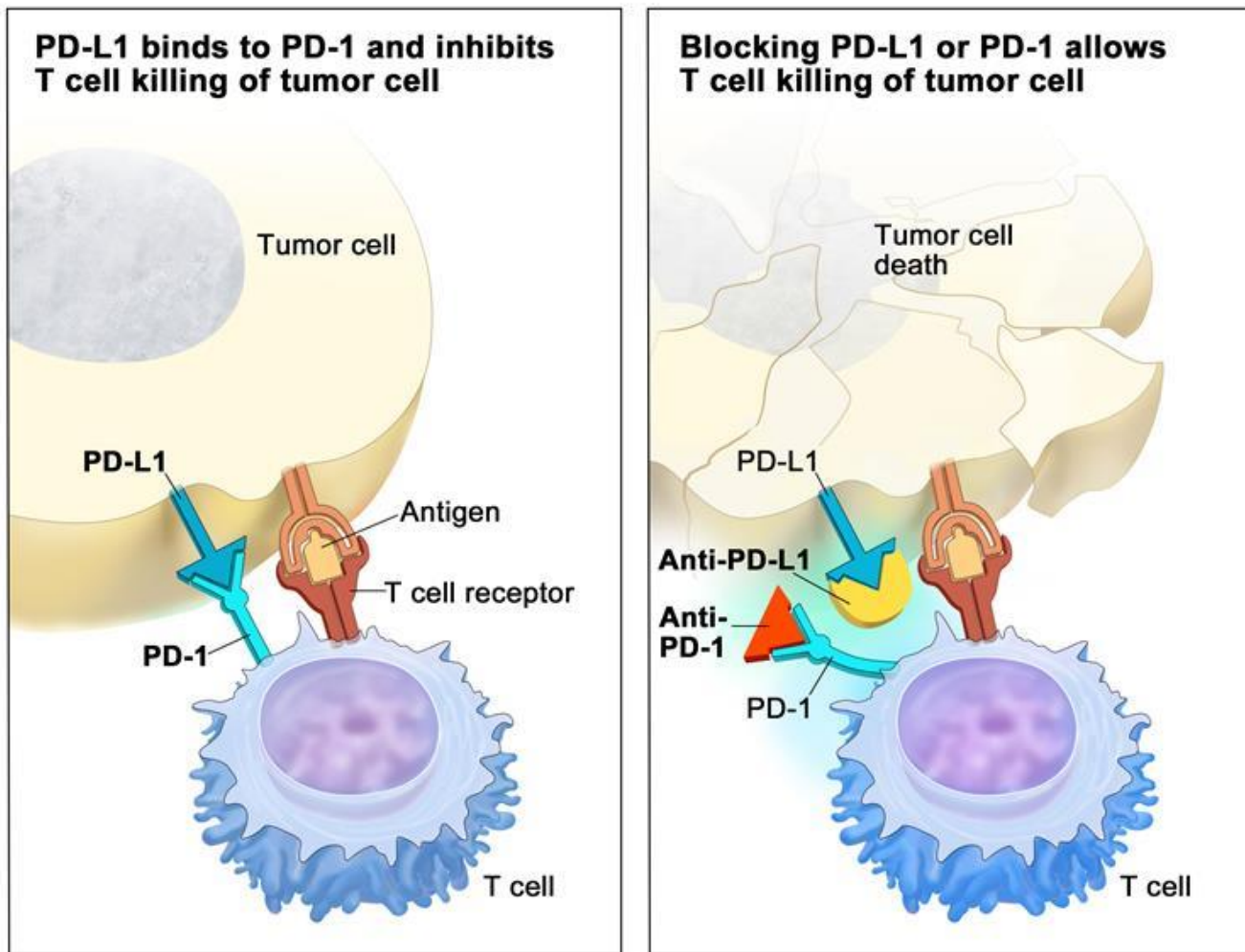
- Immunotherapy is a “living drug”
- Immune system can evolve to treat the tumor
- Immunotherapy can cure some cancers



<http://www.cancerresearch.org/>

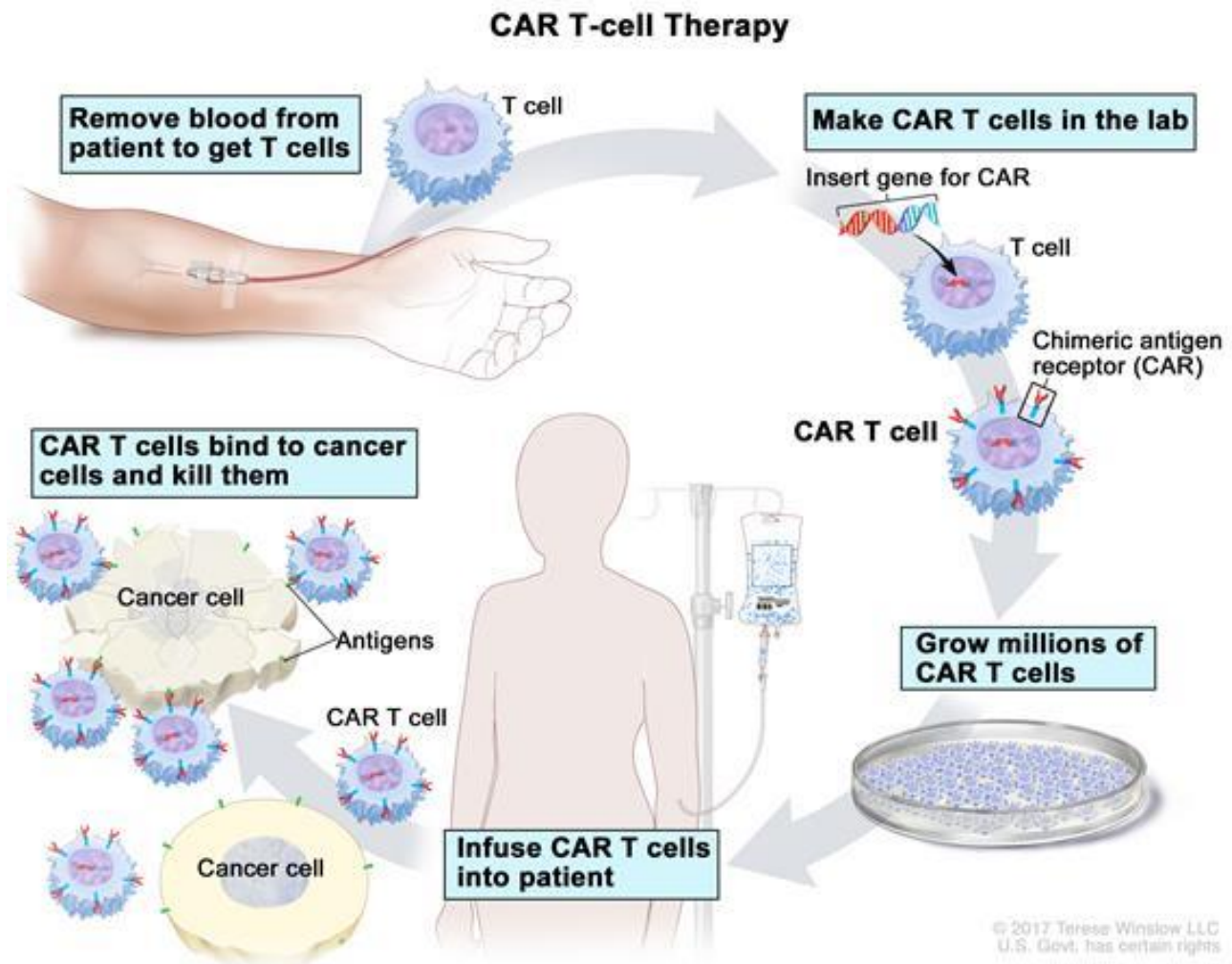


Checkpoint Inhibitors

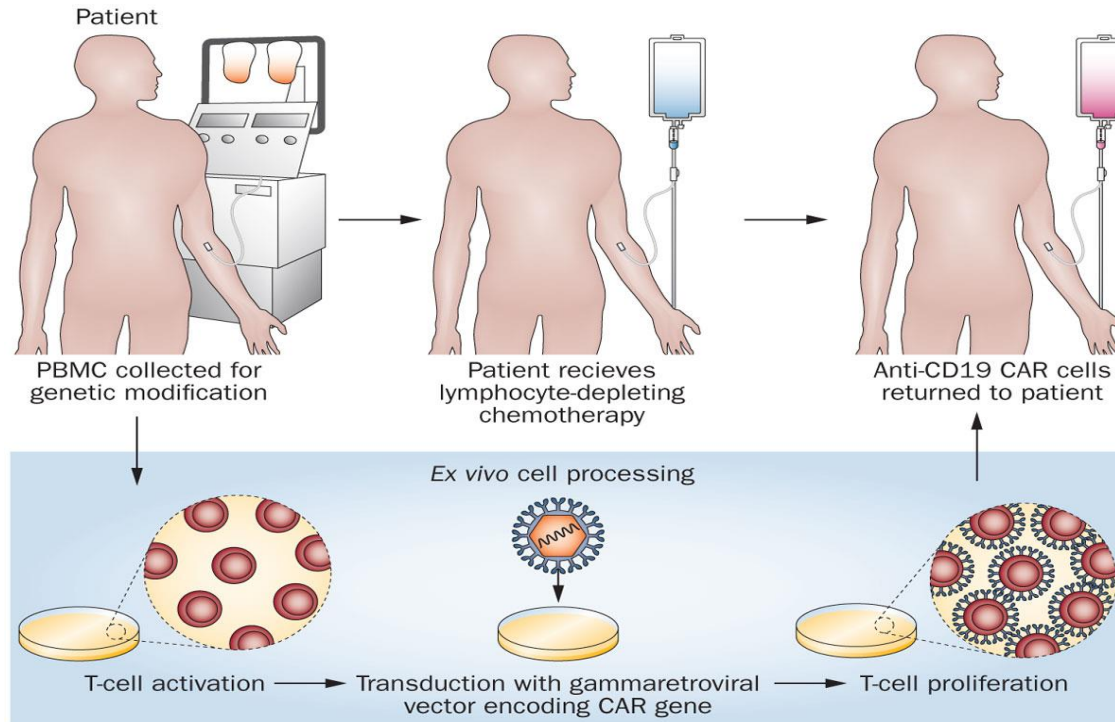


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CAR T cells



CAR T manufacturing and administration



*large range on timing for processing

Future Approaches in Cancer Therapy

- New Immunotherapeutic Modalities
- New Targeted Agents
- Combinations of Therapeutic Approaches

We are still missing something significant in order to develop definitive curative treatments for all cancers



Thank You

