



# An Introduction to Cancer Immunotherapy

PROF HARDEV PANDHA

UNIVERSITY OF SURREY  
ST LUKE'S CANCER CENTRE, GUILDFORD









# CANCER IMMUNOTHERAPY- WHAT DO WE MEAN?

Exploiting the immune system to control and eradicate cancer

Multiple components of the immune system 'army'  
Highly specific and efficient

Has 'memory'  
Protective/prophylactic

Achieve cures not just long term palliation  
Less toxic and better quality of life than chemotherapy

# HOW WAS SUCCESS ACHIEVED?



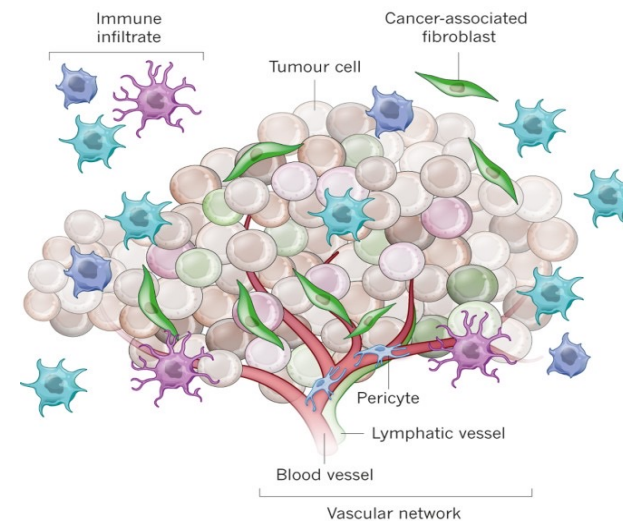
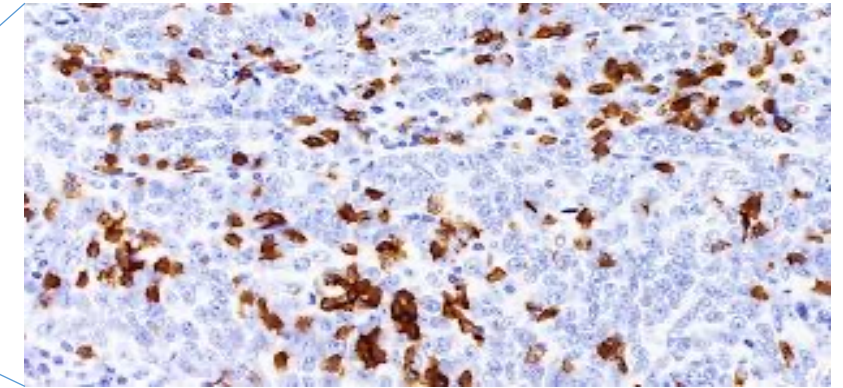
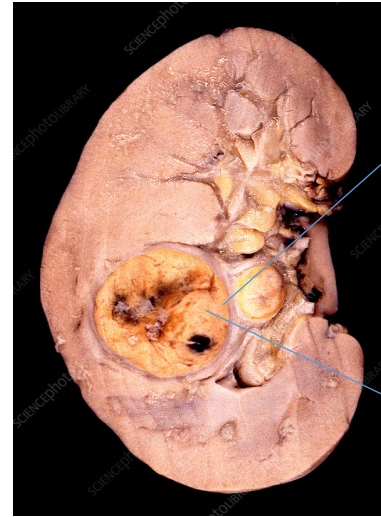
Determining the components of the immune system and how they work/interact

How does the body 'see' cancer and why does it not reject the cancer

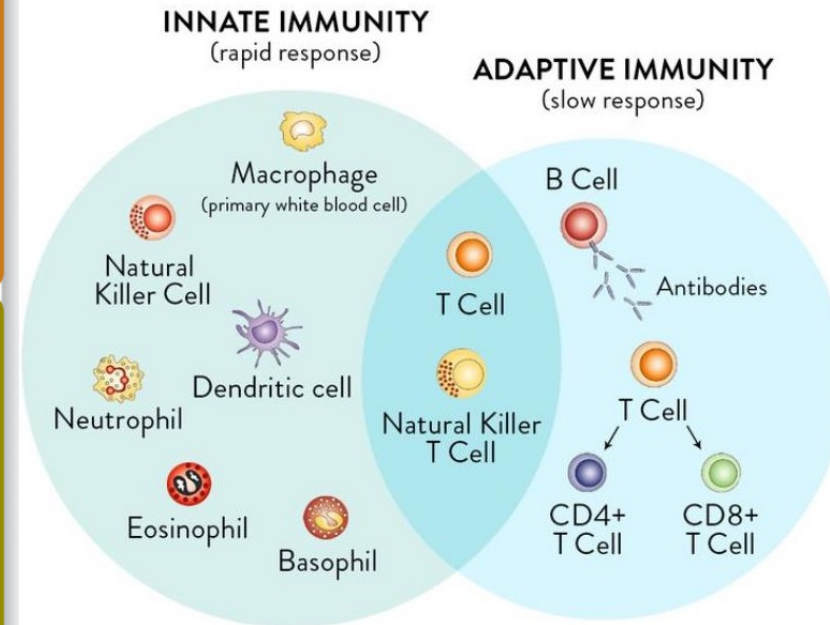
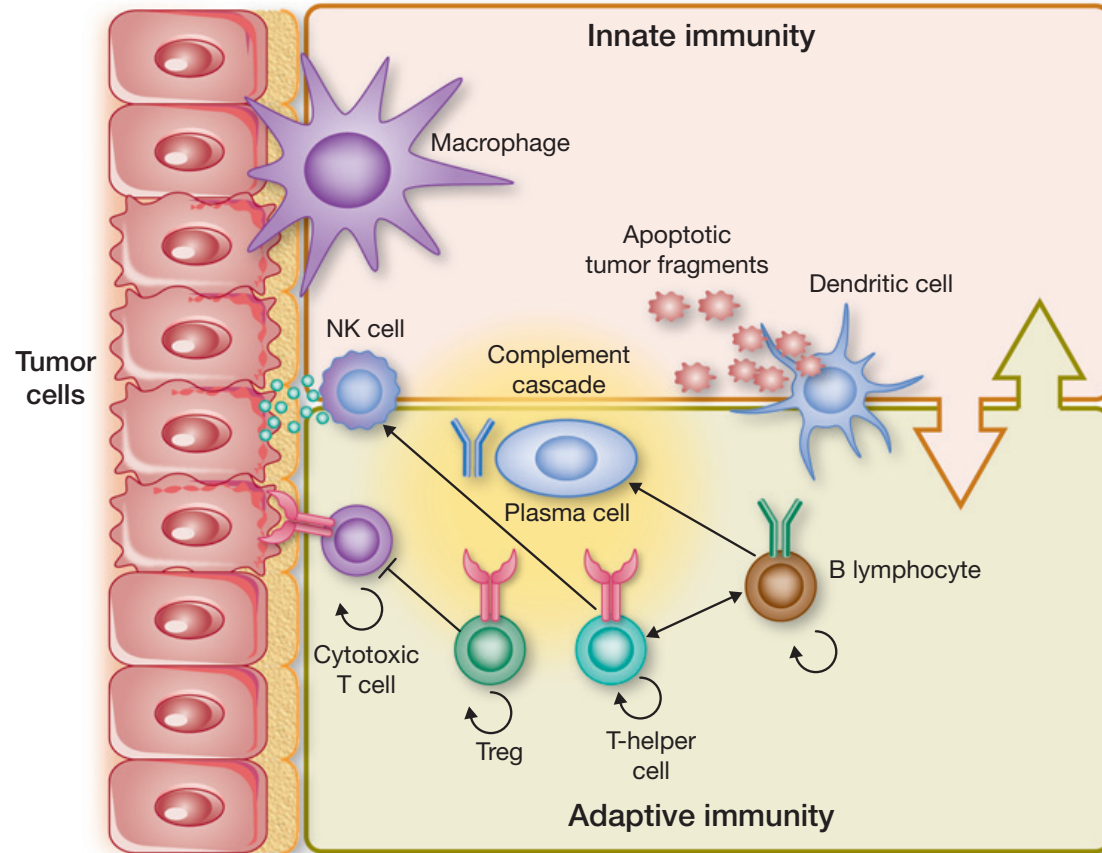
Working out how to 'awaken' the immune system already trying to reject the cancer

Growing and modifying immune cells outside the body, and reprogramming them against the cancer

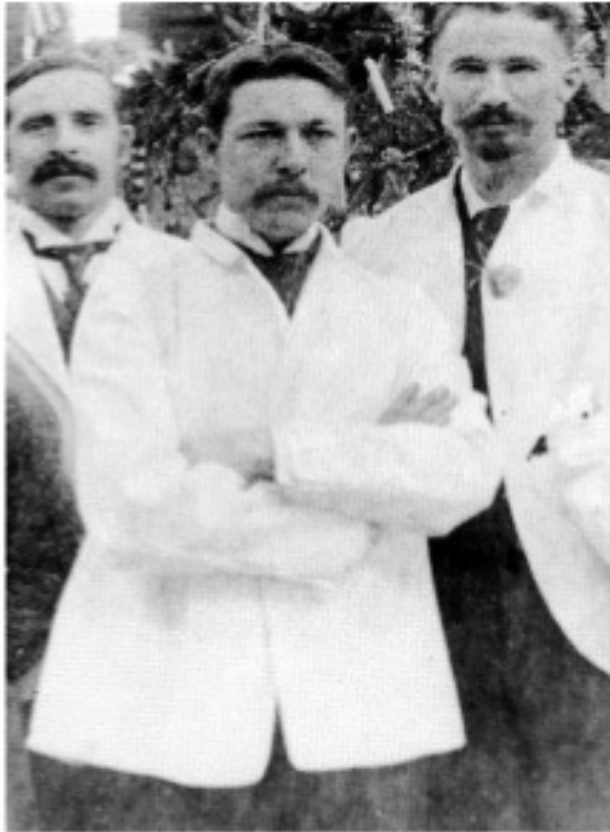
Creating drugs and we can use in the NHS



# IMMUNE SYSTEM OVERVIEW



# William Coley and the birth of cancer immunotherapy



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.

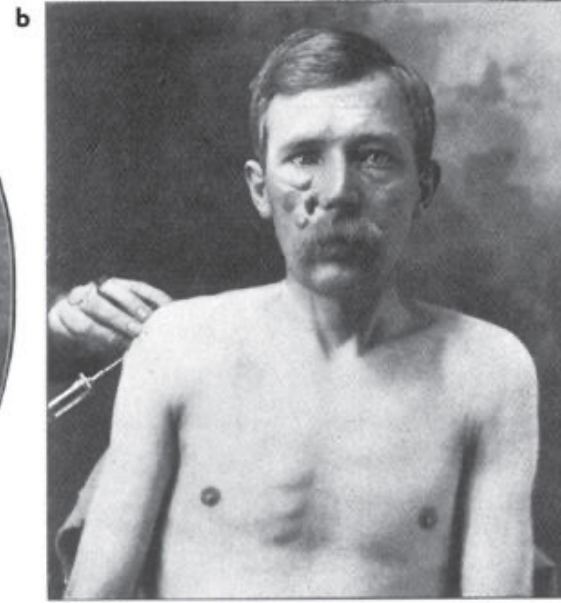
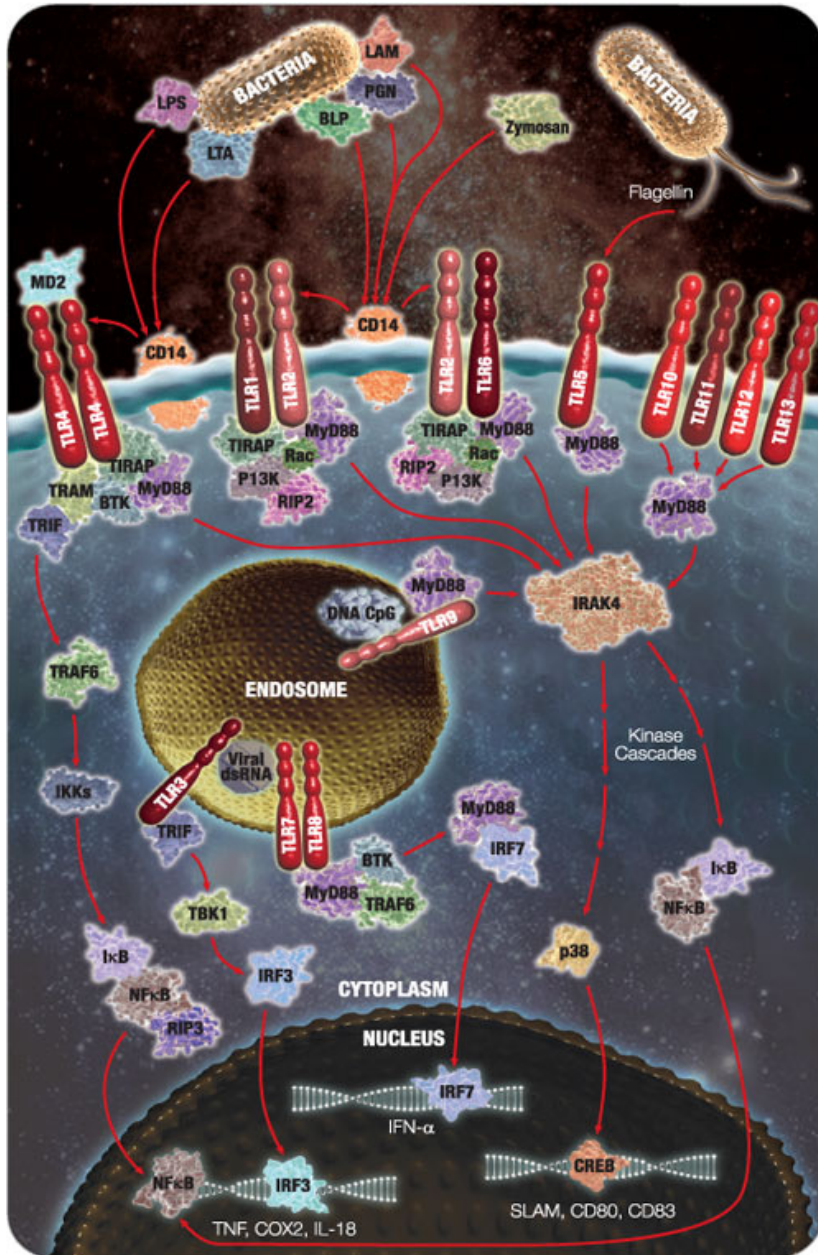
MANY CASES CURED HERE

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-

*Elie Metchnikoff & Paul Ehrlich won the Nobel Prize 3 months later*

# Bacterial proteins stimulate the immune system

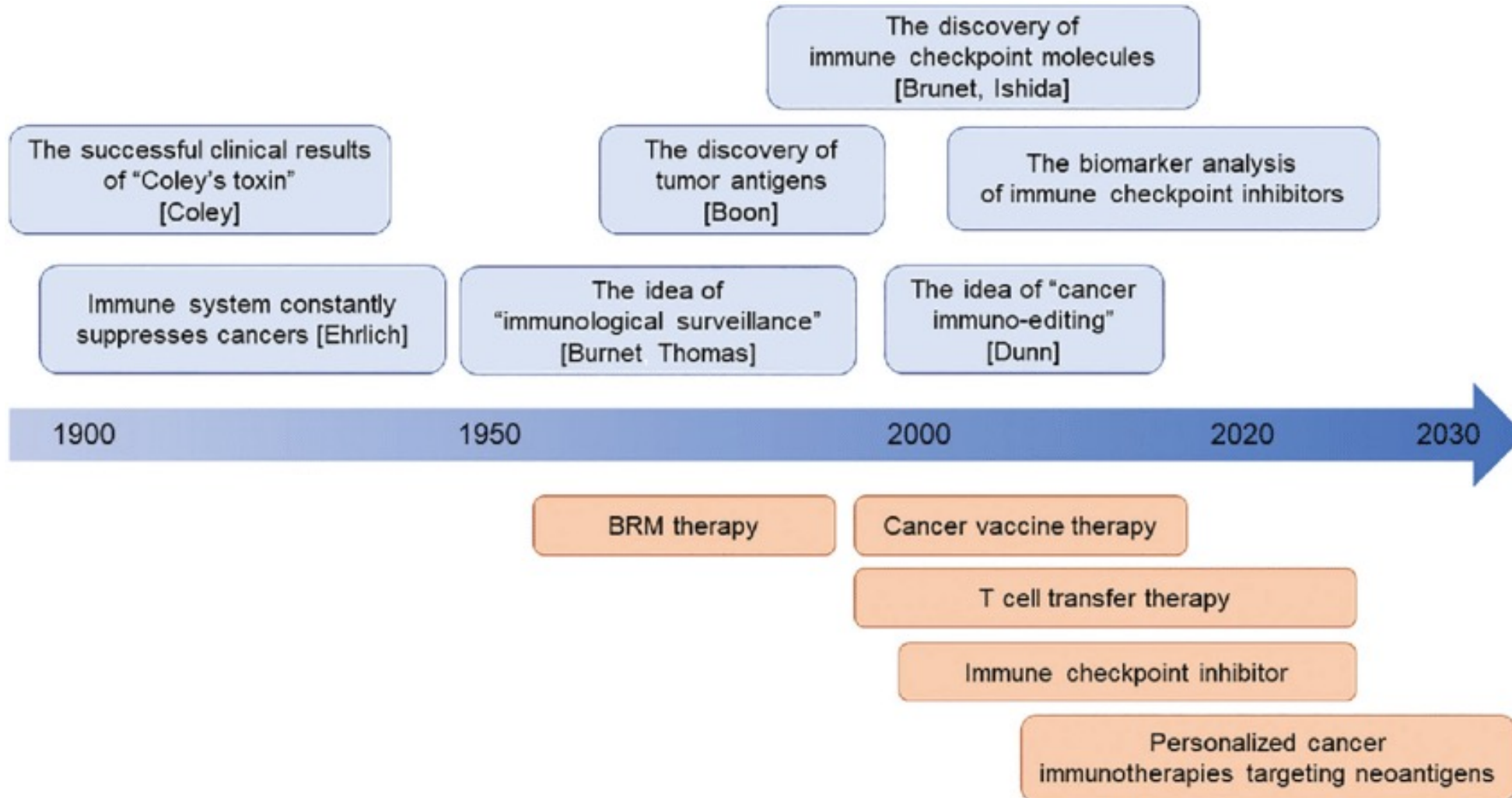


Nature Reviews | [Cancer](#)

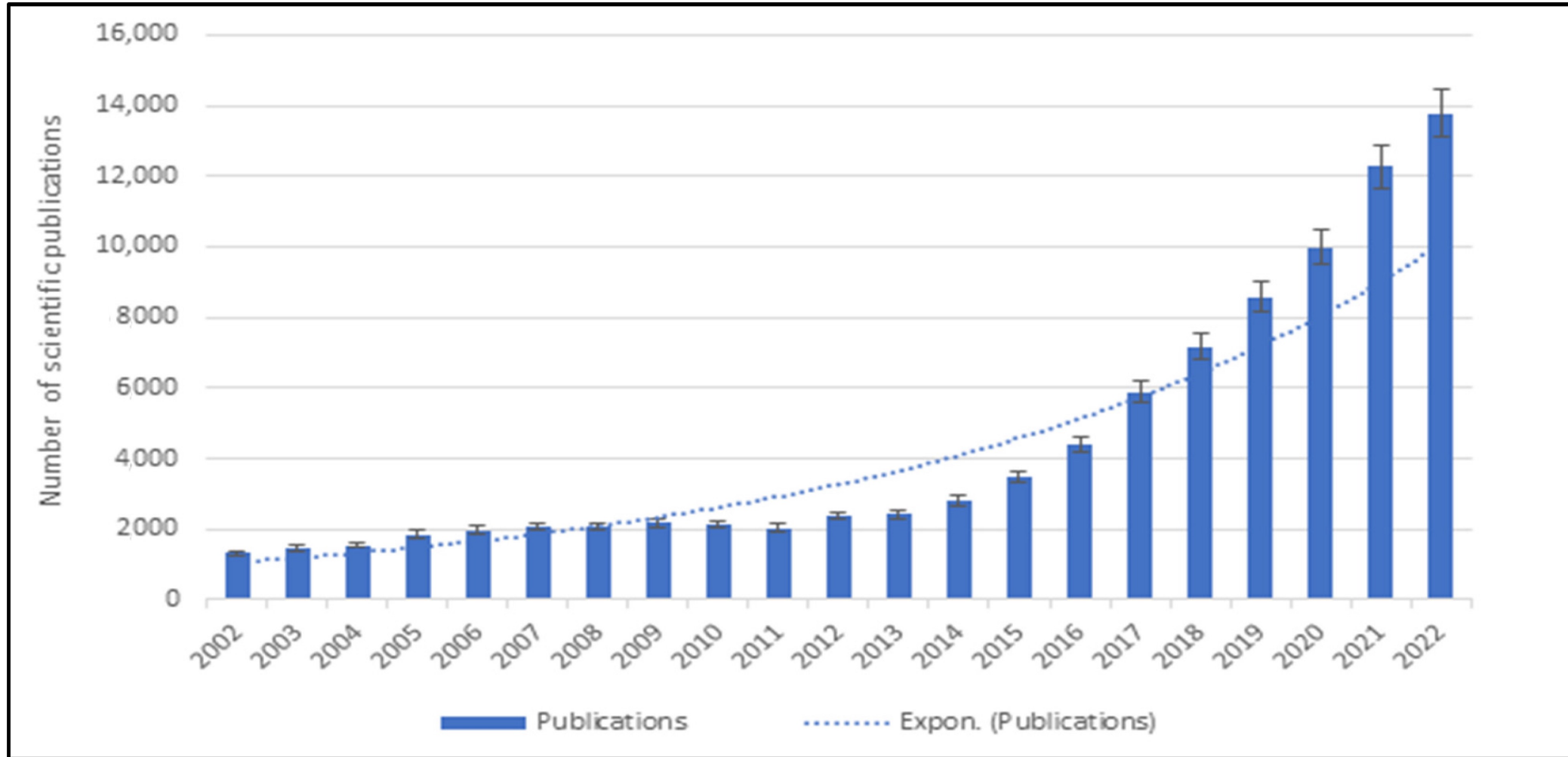
A patient with round cell sarcoma of the jaw and abdominal metastases seen by Coley in 1899. Photograph after 63 injections with Coley's toxins; tumour had diminished to about half its original size



# CANCER IMMUNOTHERAPY : OVER 100 YEARS OF RESEARCH

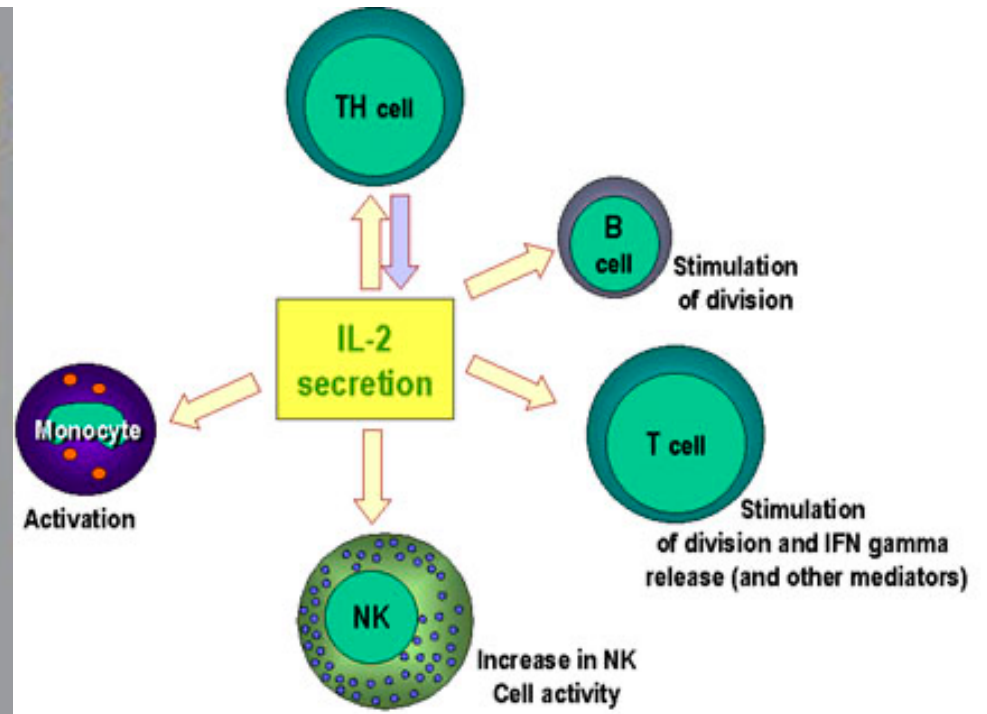


# Scientific publications in immunotherapy over last 10 years



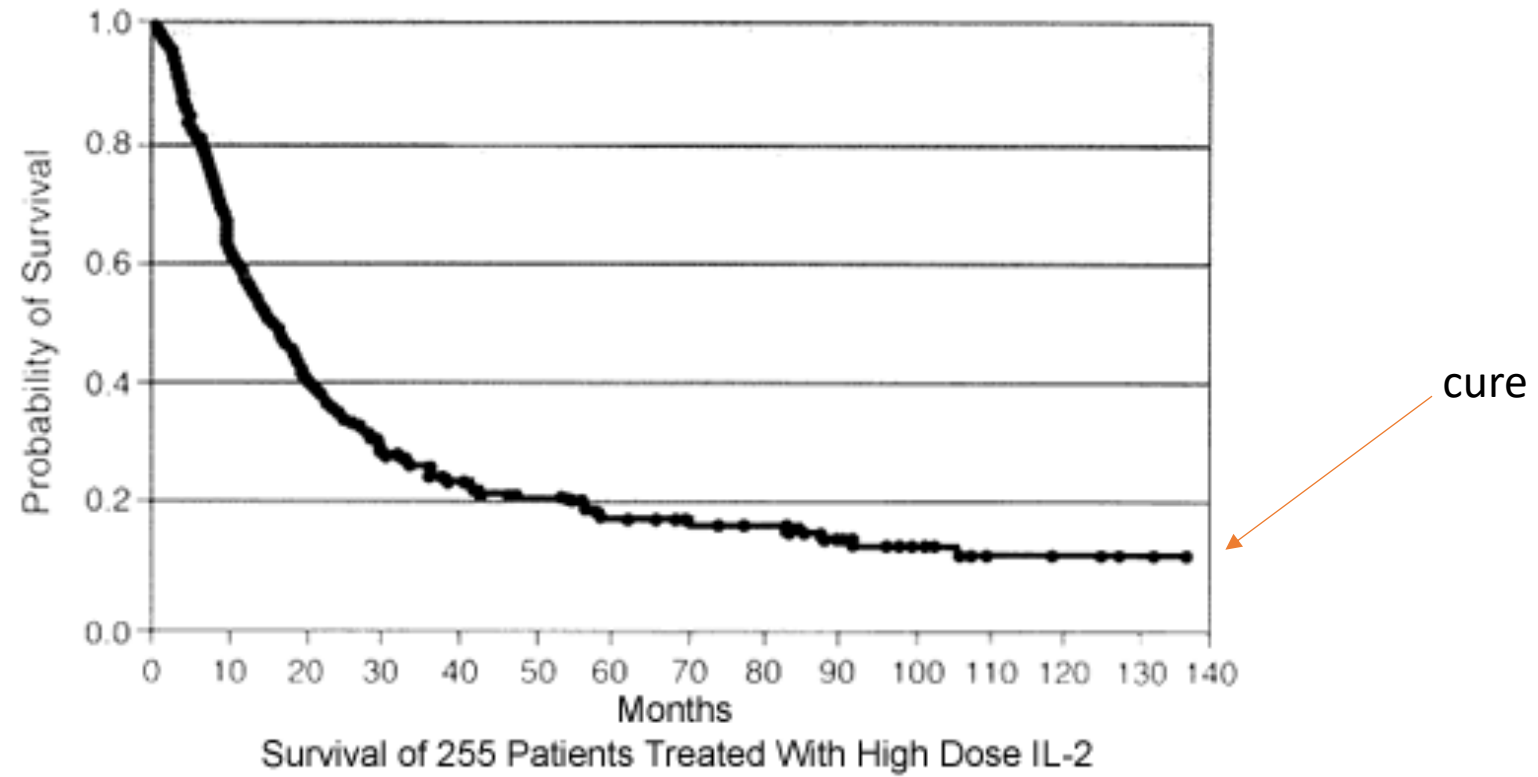


# INTERLEUKIN-2





# HIGH DOSE IL-2 IN METASTATIC RCC



Fisher RI, Rosenberg SA, Fyfe G.  
Cancer J Sci Am. 2000 Feb;6



James P. Allison



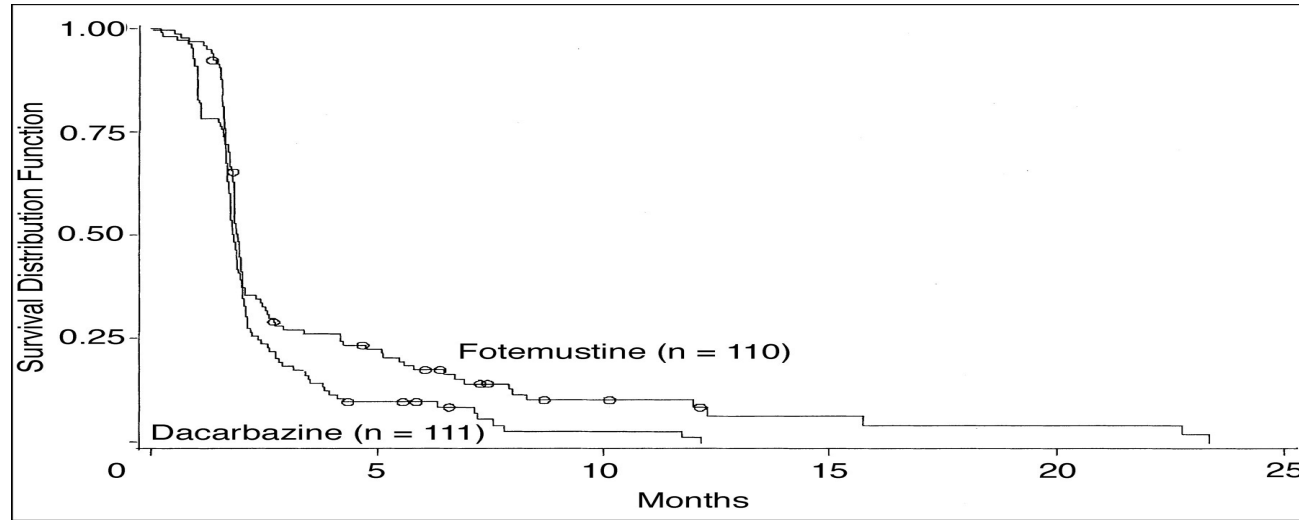
Tasuku Honjo

## The Nobel Prize in Physiology in Medicine 2018

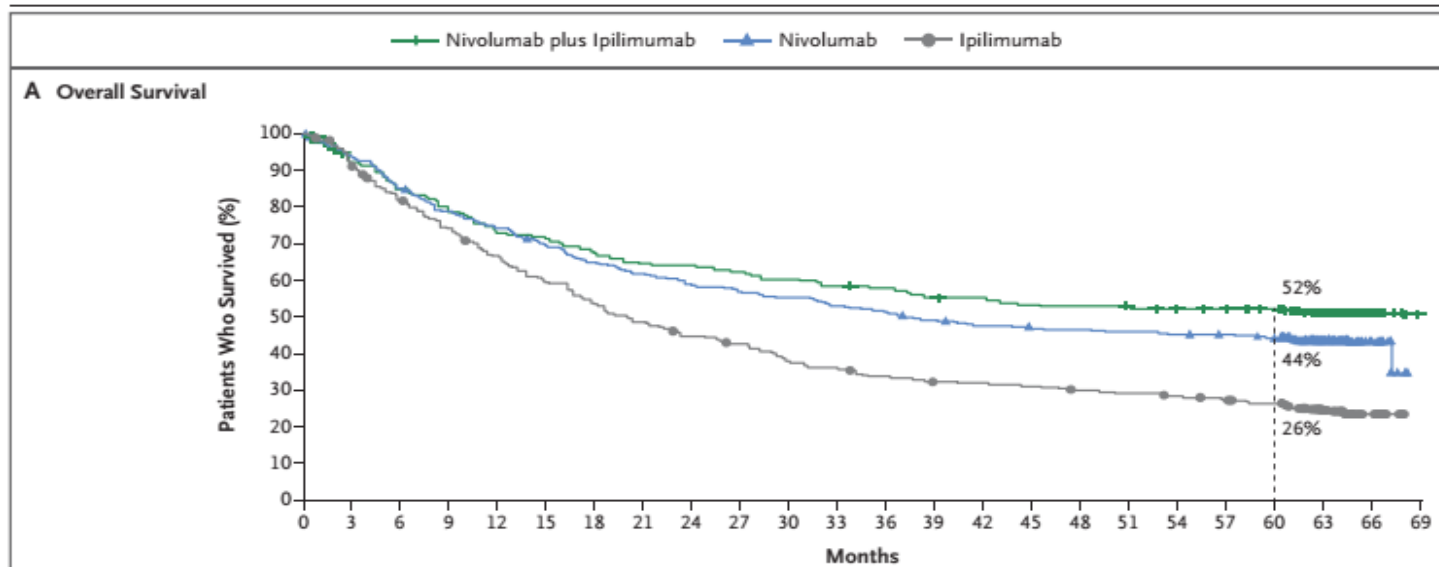
for their discovery of cancer therapy by inhibition of negative immune regulation



# Impact of immunotherapy in the real world



Avril et al Journal of Clinical Oncology  
Volume 22, Number 6, 2004



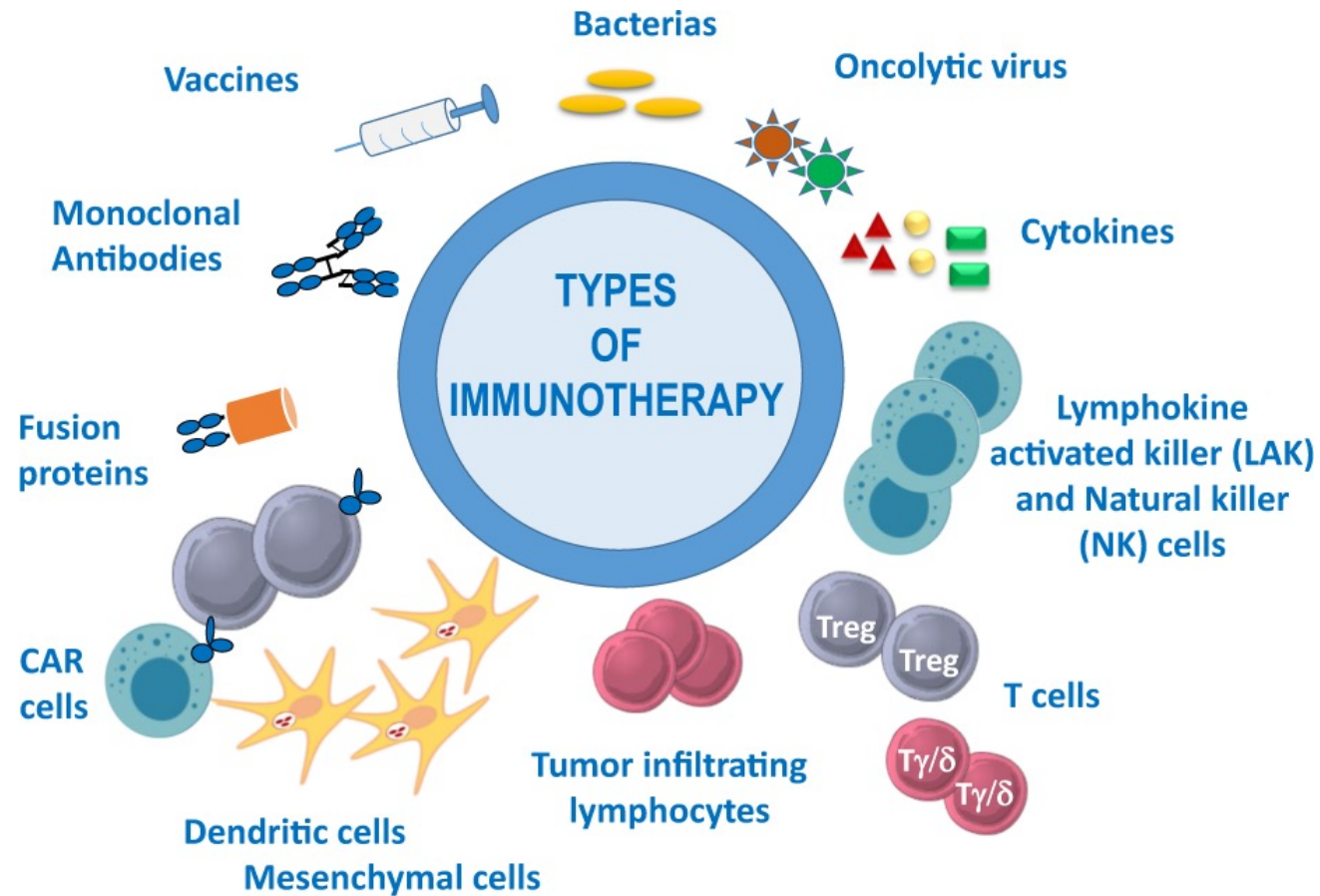
Larkin et al.  
N Engl J Med 2019, 381:1535-1546

# IMMUNOTHERAPY HAS BEEN APPROVED FOR THE TREATMENT OF THE FOLLOWING CANCERS :



- Bladder cancer
- Breast cancer
- Cervical cancer
- Colorectal cancer
- Oesophageal cancer
- Head and neck cancer
- Kidney cancer
- Leukaemia
- Liver cancer
- Lung cancer
- Lymphoma
- Melanoma
- Prostate cancer
- Skin cancer

# Types of immunotherapy used to treat cancer







# HOW HAVE WE ACHIEVED THIS AMAZING PROGRESS?

Advances in our understanding of immunology science and the cancer 'ecosystem'- multiple Nobel Prize winners

Investment and development of analytical technology

Investment in clinical trials and designing better trials

Collaboration between academia, pharma and medicines regulators

and .....Serendipity

