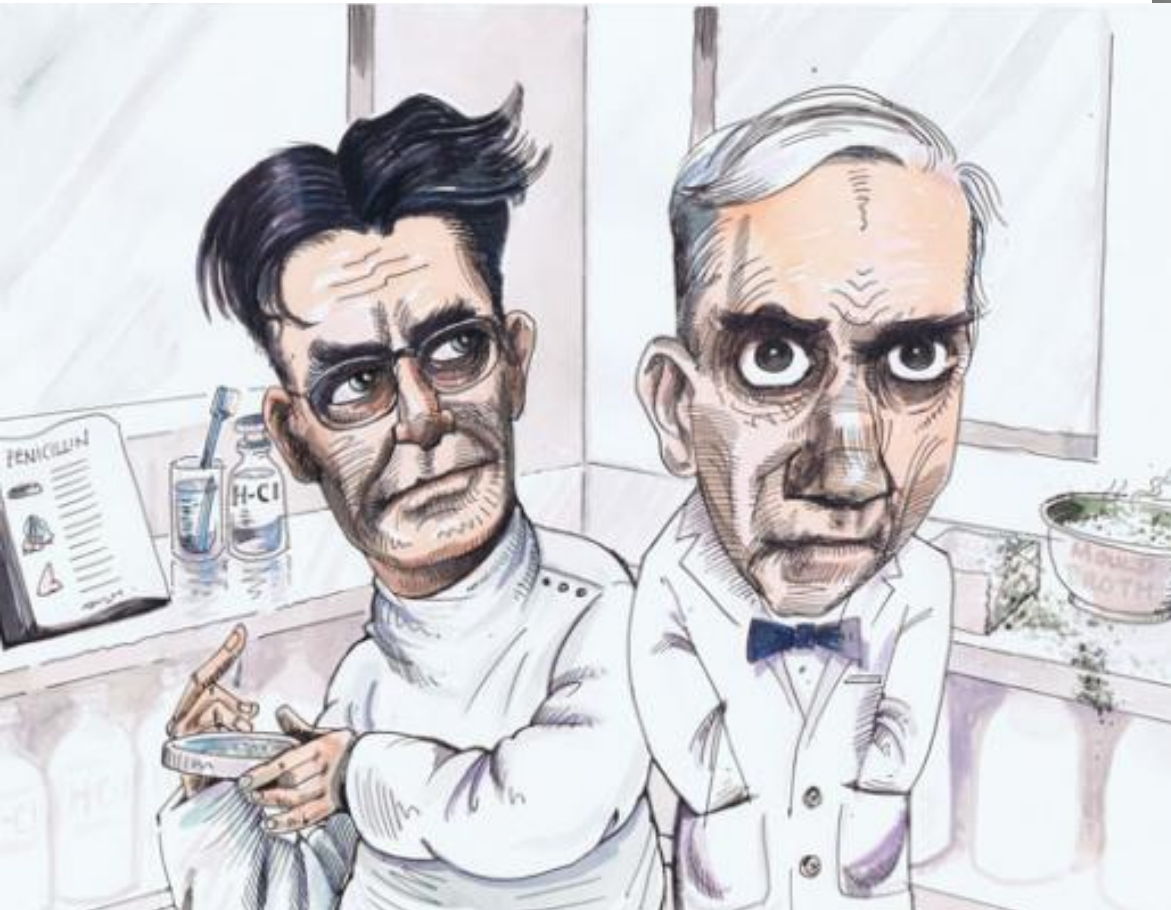


- Australian scientist; and Rhodes Scholar
- British Journal of Experimental Pathology; editor
- 1935 the Chair of Pathology at Oxford

Howard W. Florey



Ernst Chain

A German biochemist
joins Florey at Oxford



- Florey and Chain jointly decided on penicillin
 - Odd chemistry
 - Active against staph
- **1940** experiment





**Alexander
Fleming**



**Howard
Florey**



**Ernst
Chain**



The Pill



- The story starts with a nurse
- In Holland she learned about diaphragms and wrote “What Every Girl Should Know”
- Clinic in Brownsville in Brooklyn
- Established Planned Parenthood 1921
- Coined the term “Birth Control”

Margaret Sanger

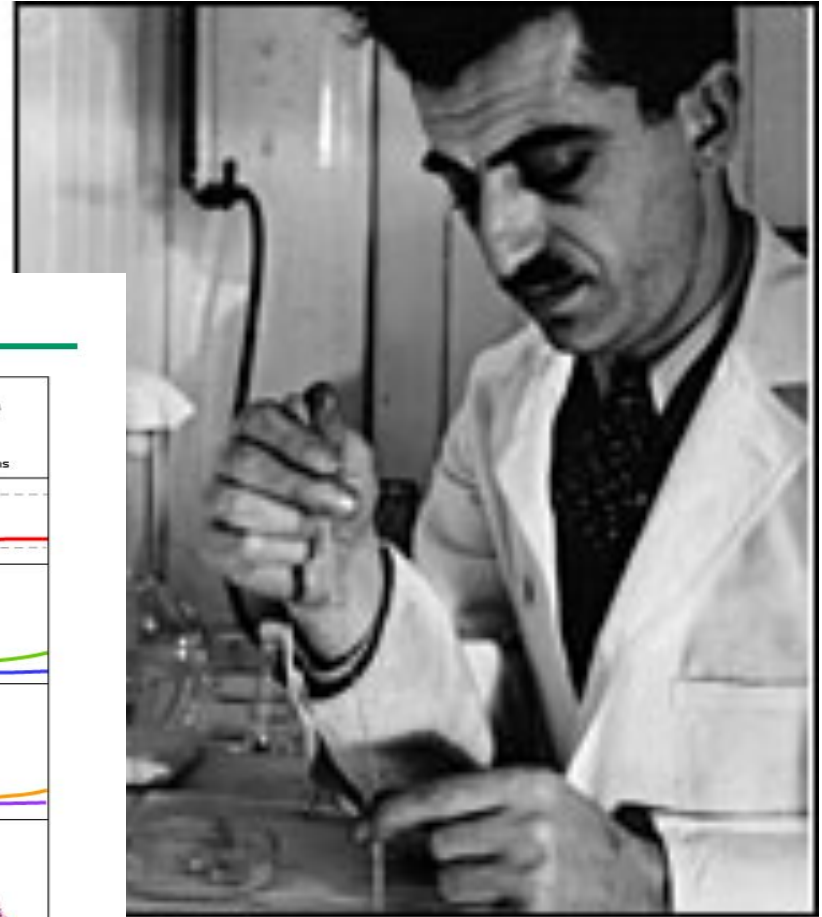
1879-1966



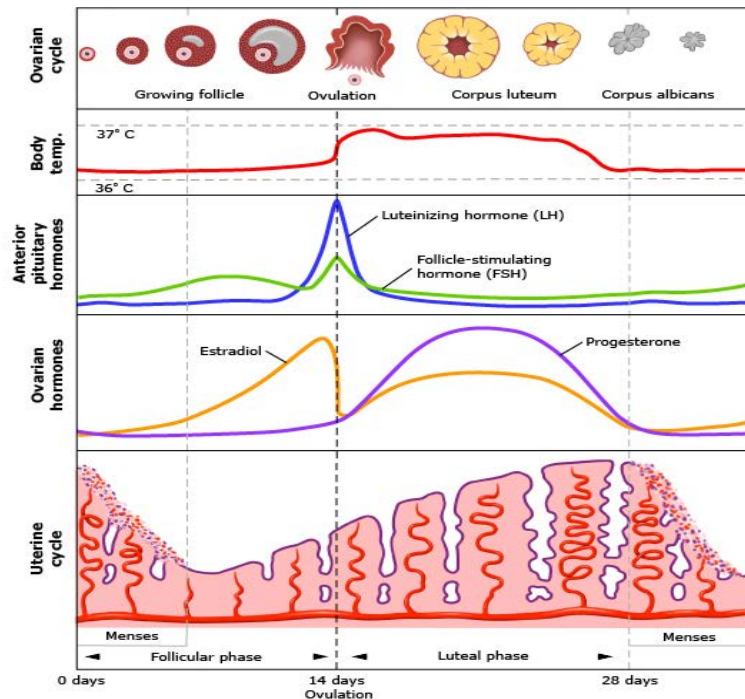
Gregory Pincus

(1903-1967)

- Progesterone could suppress ovulation
- Pincus with Min Cheuh Chang tested 200 compounds in animals.
- Pincus needed a doctor



Menstrual cycle



PINCUS

John Rock M.D.

(1890-1984)

- Signs 1931 petition protesting law prohibiting contraception; the only Catholic doctor to do so
- ***“...always stick to your own conscience. Never let anyone keep it for you”***
 - American Experience The Pill, People and Events; PBS



- Norethynodryl/mestranol.
- Approved by the FDA in **1957** for menstrual irregularity

U. S. APPROVES PILL FOR BIRTH CONTROL

WASHINGTON, May 9 (AP)

—For the first time the Food and Drug Administration has approved a pill as safe for contraceptive or birth control use.



RARY OF CONGRESS

Pincus G, Rock J et al Fertility Control with Oral Medication

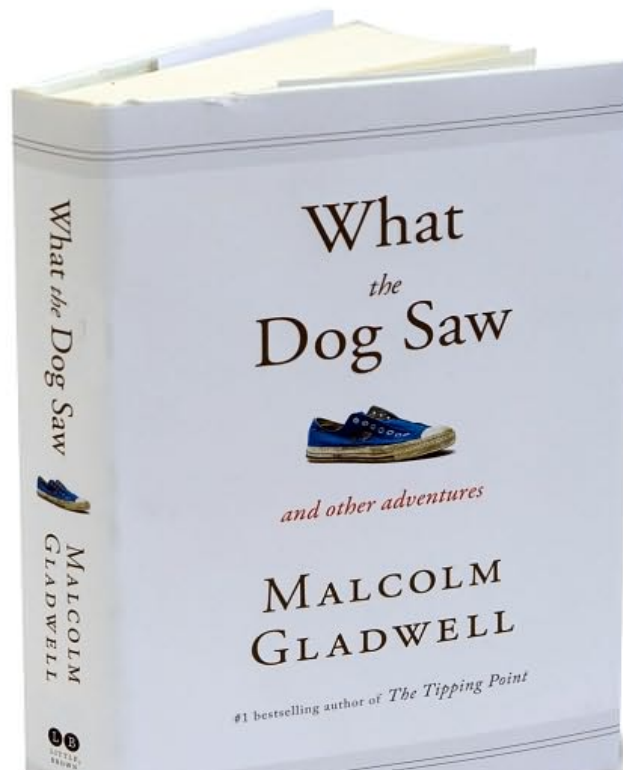
Am J Obstet Gynecol. Jun;75(6):1333-46

1958

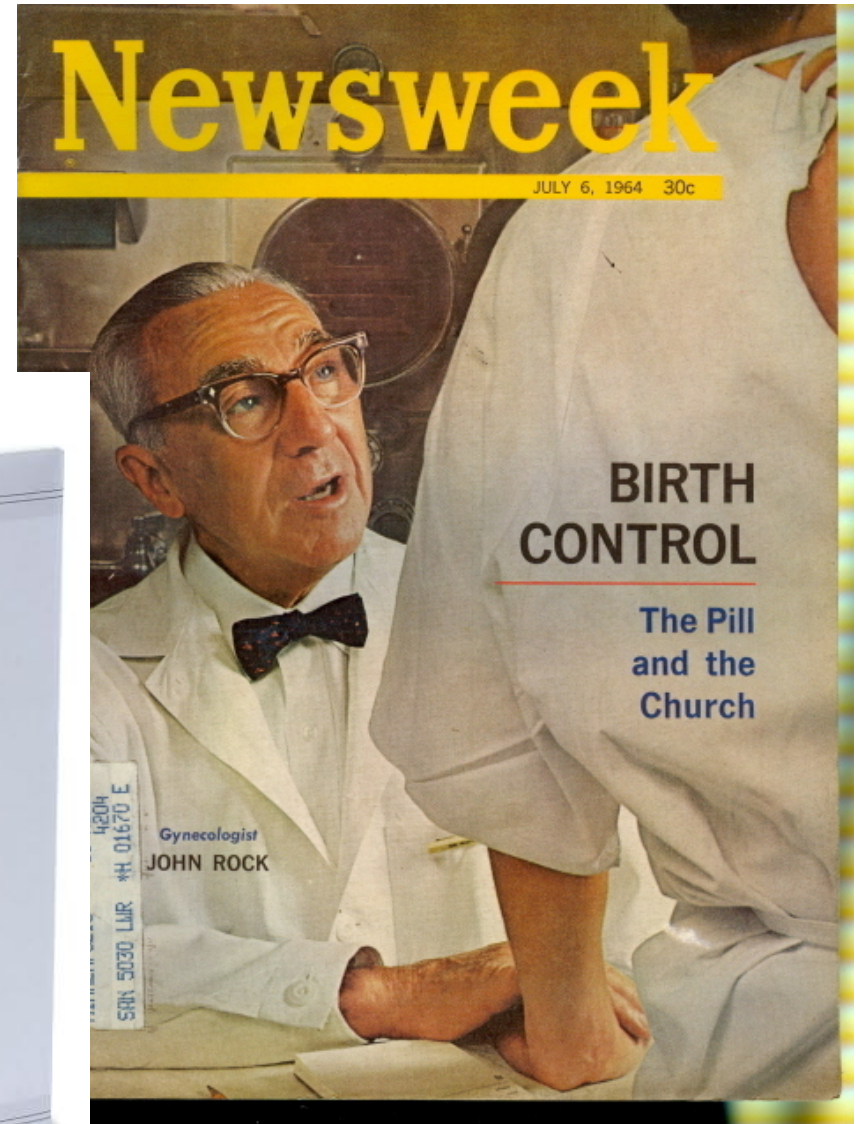


1963 book *"The Time Has Come: A Catholic Doctor's Proposals to End the Battle over Birth Control"*

- American Experience The Pill, People and Events; PBS

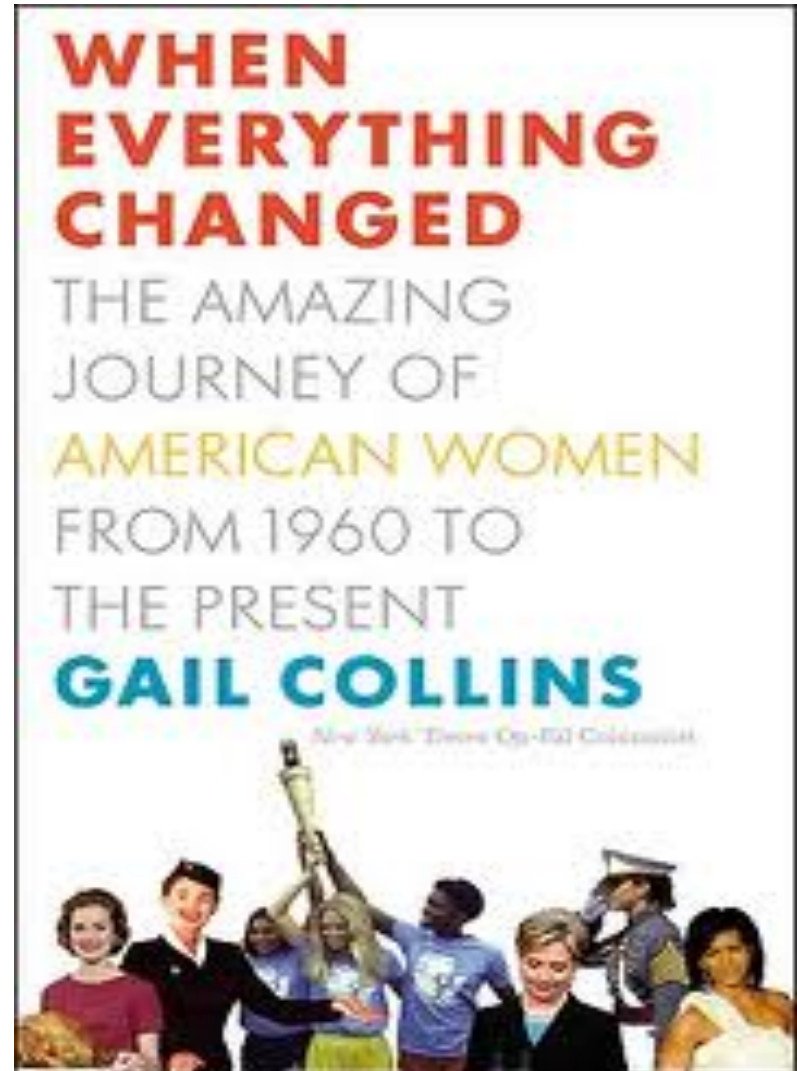


John Rock M.D.
(1890-1984)



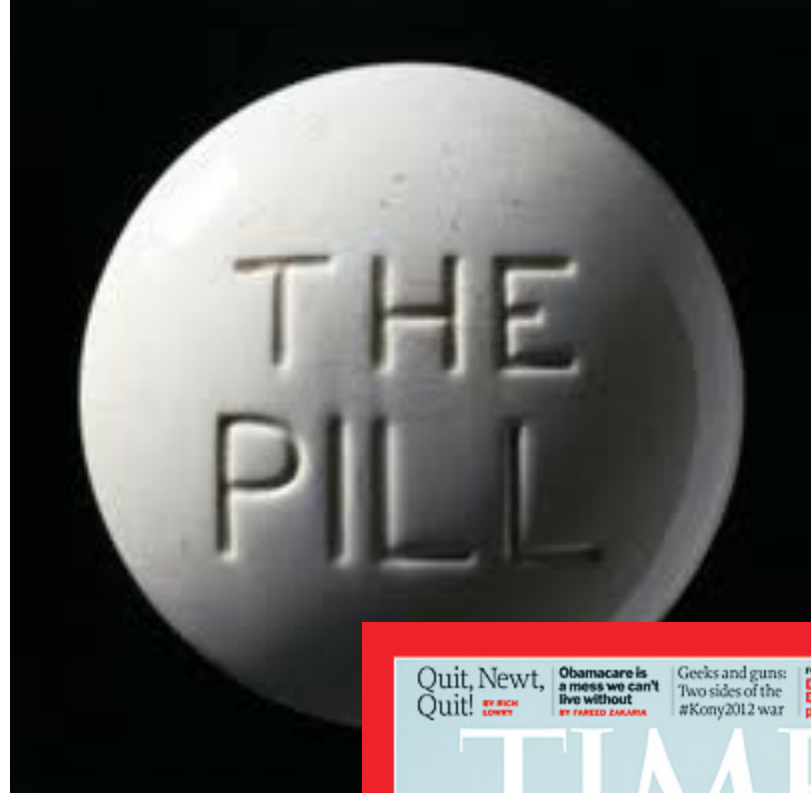
Griswold v Connecticut

- 30 states had laws outlawing contraception. The most “draconian” was in CT which outlawed “any drug, medicinal article or instrument for the purpose of preventing conception.”
- Estelle Griswold, Charles Lee Buxton, M.D., Fowler Harper Esq.
- U.S. Supreme Court ruled in 1965 by a vote of 7-2 that the CT law violated the “right to marital privacy”
- Many felt this was a vindication of Sanger’s efforts earlier in the century
 - *When Everything Changed: the Amazing Journey of American Women from 1960 to the Present. Gail Collins Little Brown 2009*

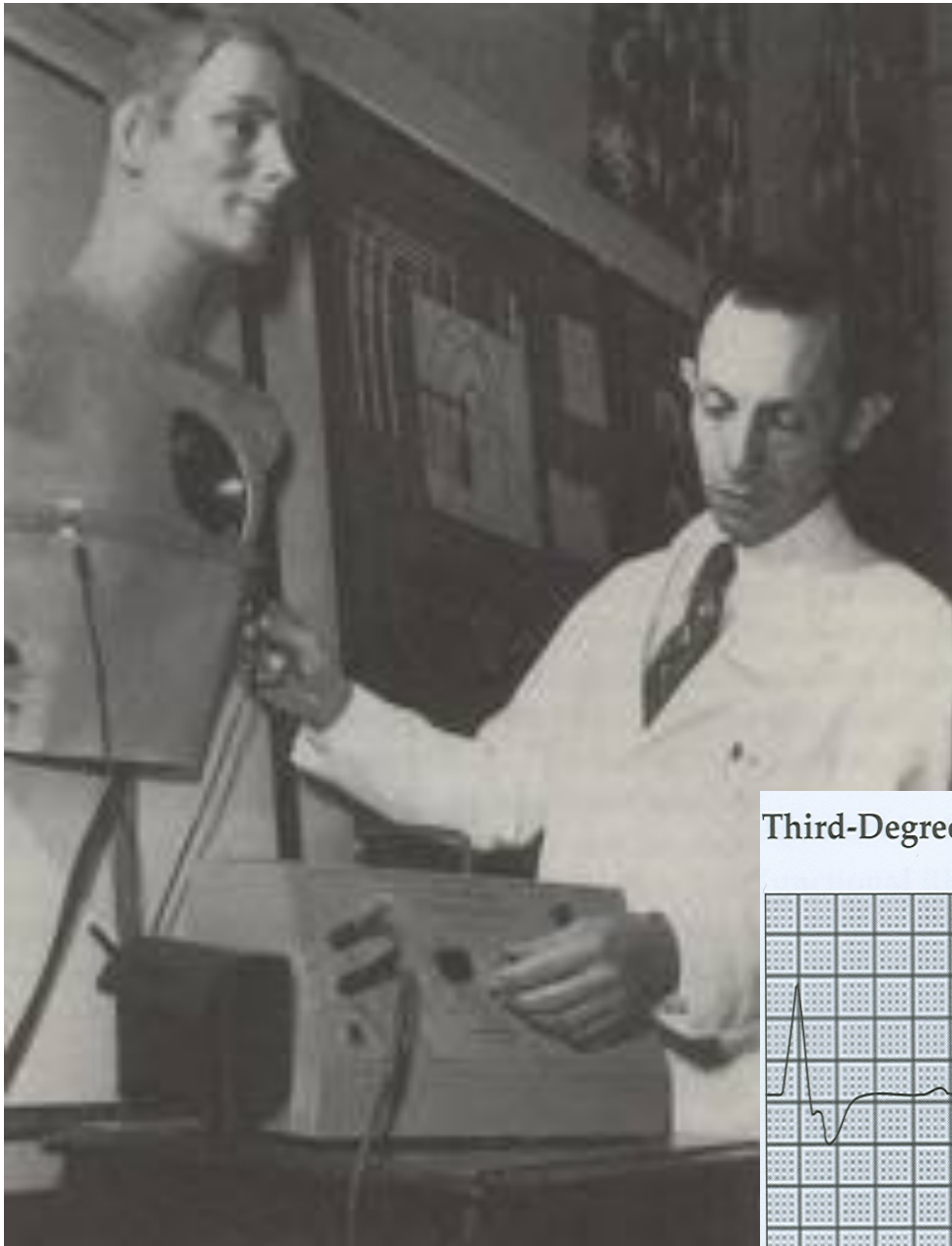


- “There is perhaps, one invention that historians a thousand years in the future will look back and say, ‘that defined the 20th Century’ ...That invention is the contraceptive pill”
(*The Economist* 1999)

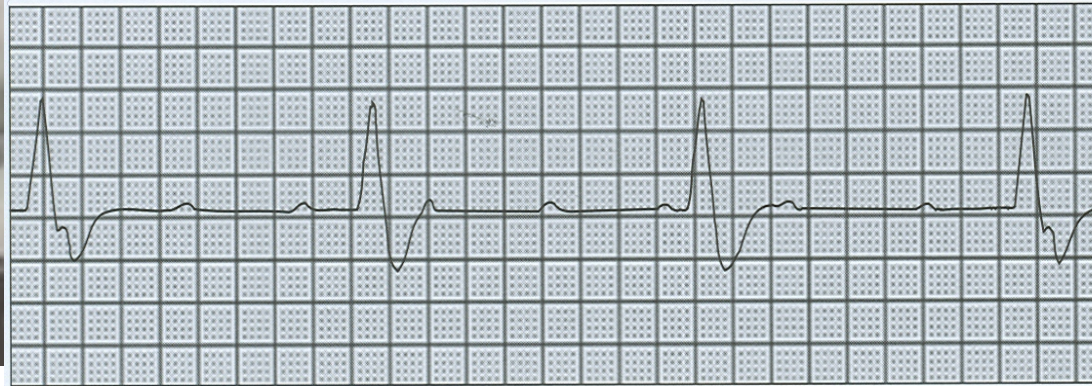
- *When Everything Changed: the Amazing Journey of American Women from 1960 to the Present.*
Gail Collins Little Brown 2009

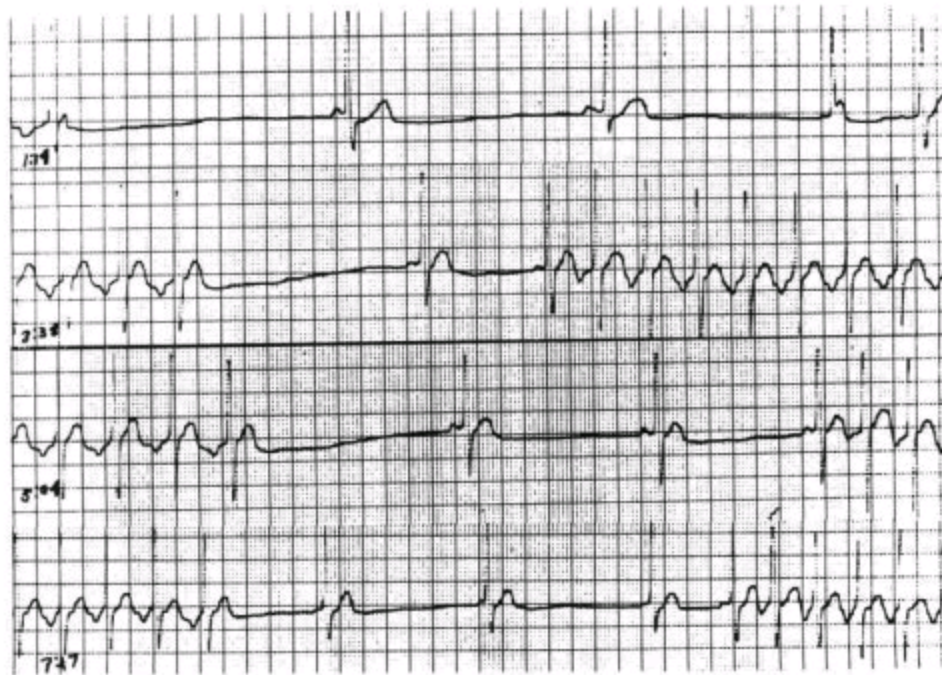
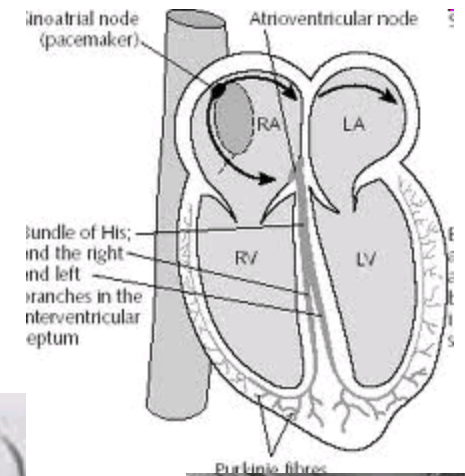


The Pacemaker

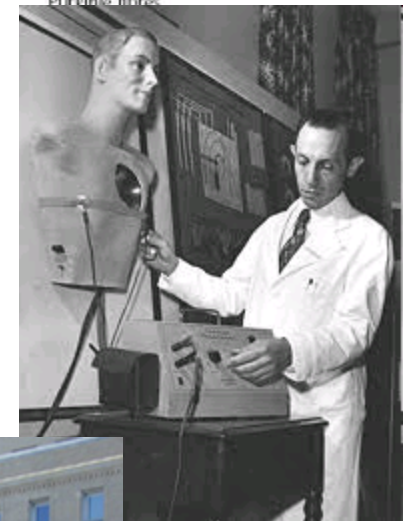


Third-Degree AV Block





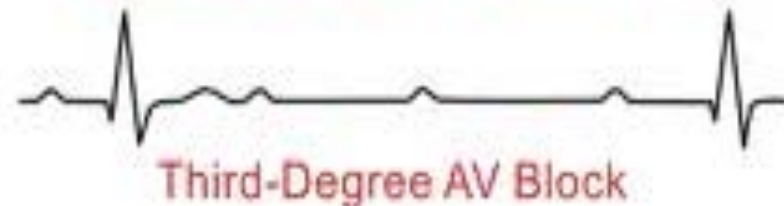
24 Hr Ambulatory ECG - Lead II



65 year old man with severe CHF;
s/p AMI 6 years before. Developed
incapacitating angina; high degree
AV block

Zoll applied what he called an
external stimulator via a hypodermic
needle

For over a period of 5 days the
patient maintained a paced rhythm
with good cardiac function



Zoll PM Resuscitation of the heart in ventricular standstill by external electrical stimulation NEJM 1952; 247:768-71

- Zoll viewed this as a temporizing treatment.
- 1952 NEJM paper “With such a machine it should be possible to defibrillate the human heart ...”
- Paper was criticized as “against the will of God”
- Later:
 - Invented AC defibrillator
 - used cardioversion to treat SVT and AF
 - first telemetry unit



Paul Zoll, M.D.

1911-1999

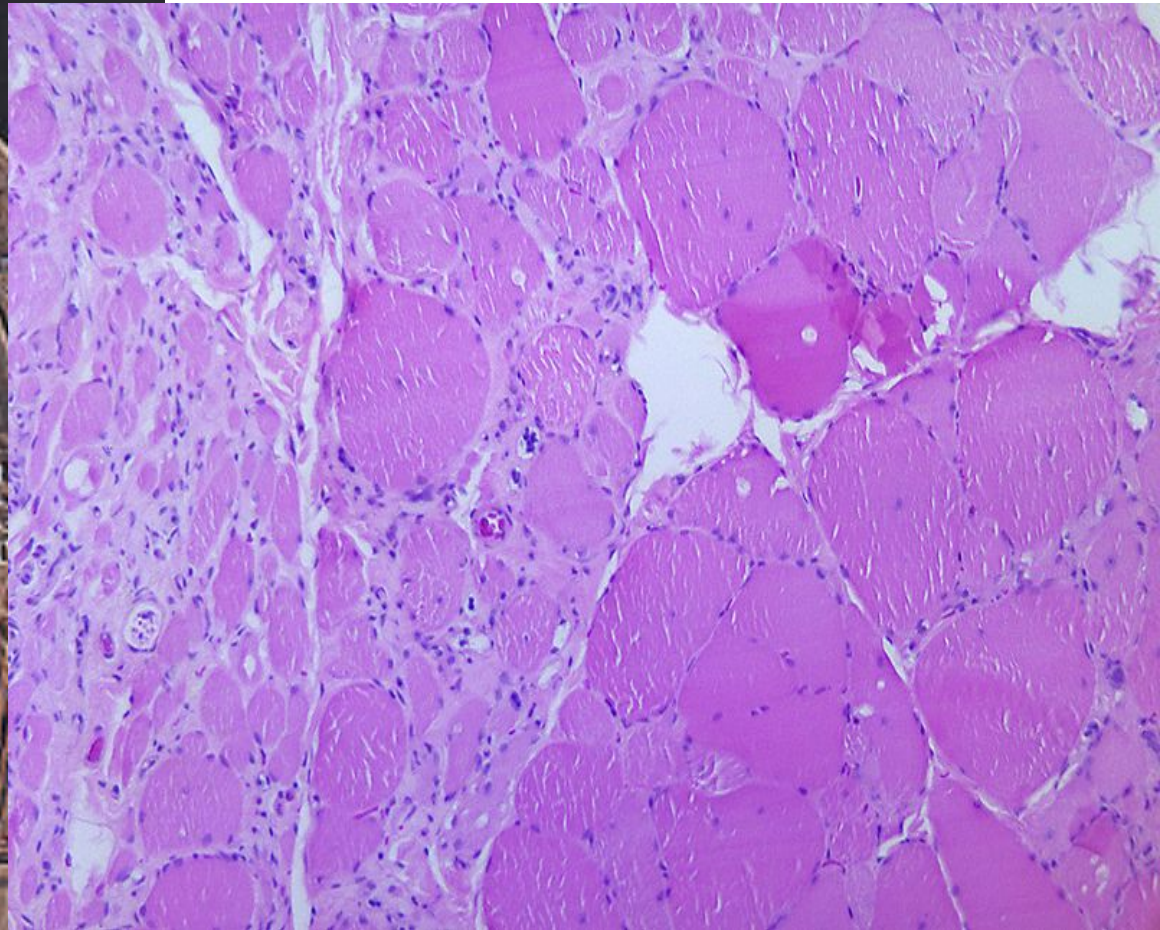
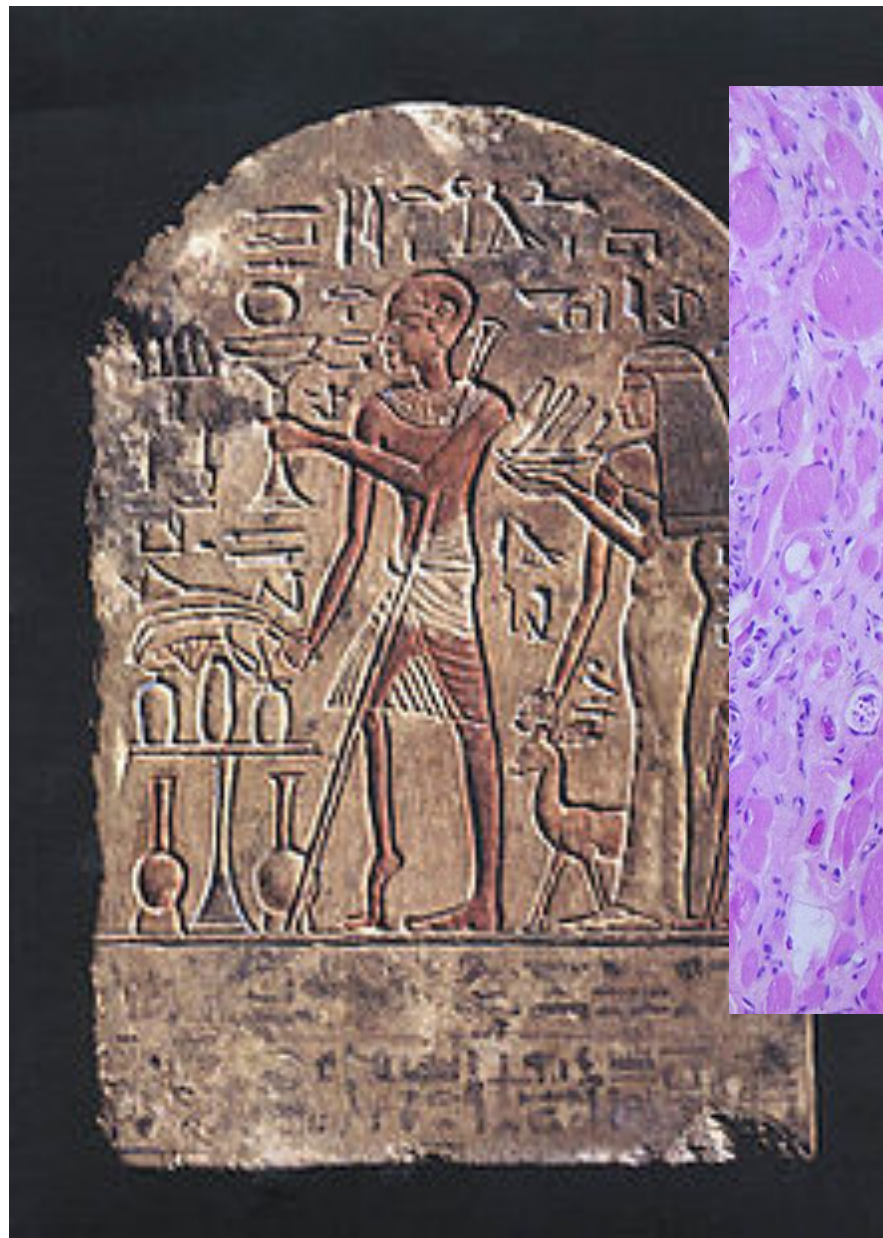


WHO declares eradication of Smallpox 1980



From Polio to AIDS: The story of 2 modern plagues











Eddie Cantor



*Your dimes
did this
for me!*



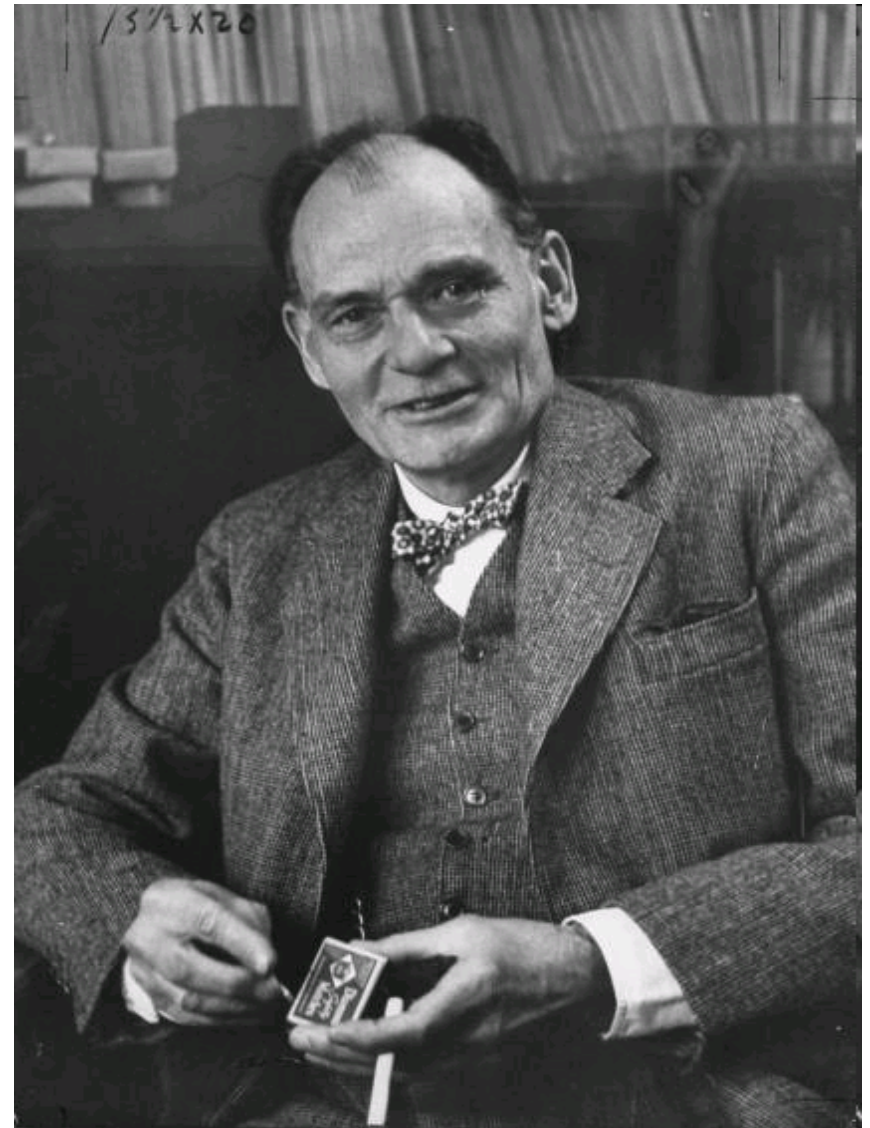
**JOIN the
MARCH
of DIMES**
JANUARY 14-31

THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS, INC.
FRANKLIN D. ROOSEVELT, FOUNDER

FDR



- **John Franklin Enders** entered Harvard to study English literature, Germanic and Celtic languages.
- He became friends with medical students and finally decided to get a PhD in bacteriology and immunology
- With **Frederick Robbins** and **Thomas Weller** develop tissue culture method to grow viruses



Polio: Enders, Weller and Robbins

- **Enders JF, Weller TH, Robbins FC:** Cultivation of the Lansing strain of poliomyelitis virus in cultures of various human embryonic tissues. *Science* 109:85, **1949**



Nobel Prize Winners: Thomas Weller, Frederick Robbins and John Enders



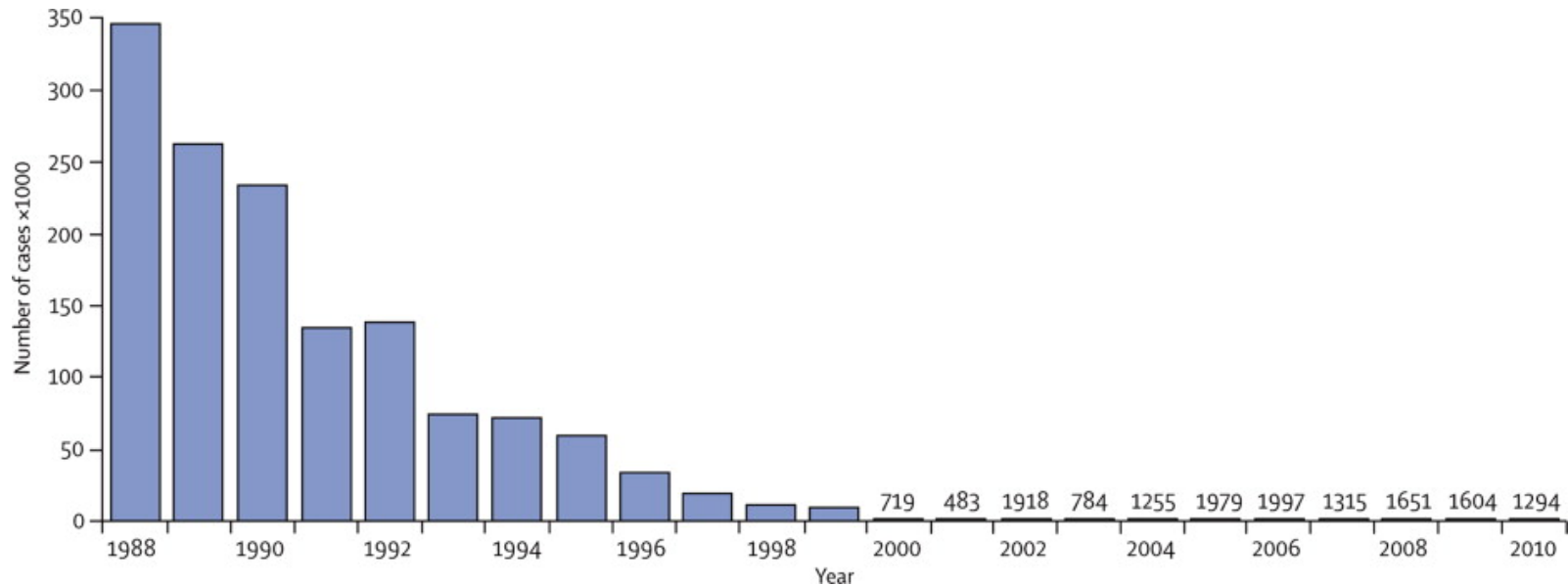
Jonas Salk and Albert Sabin



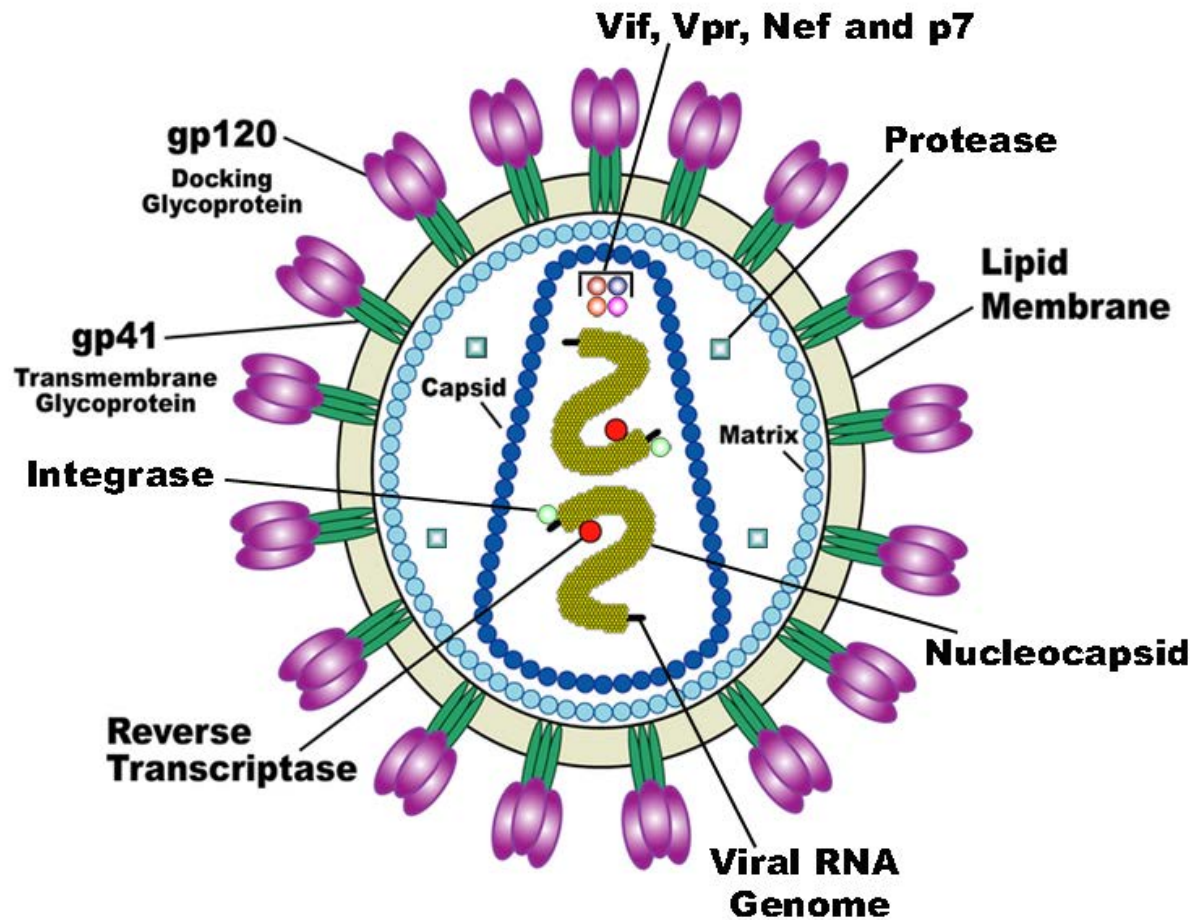


Worldwide Polio Eradication 1988-2010: cases x1000

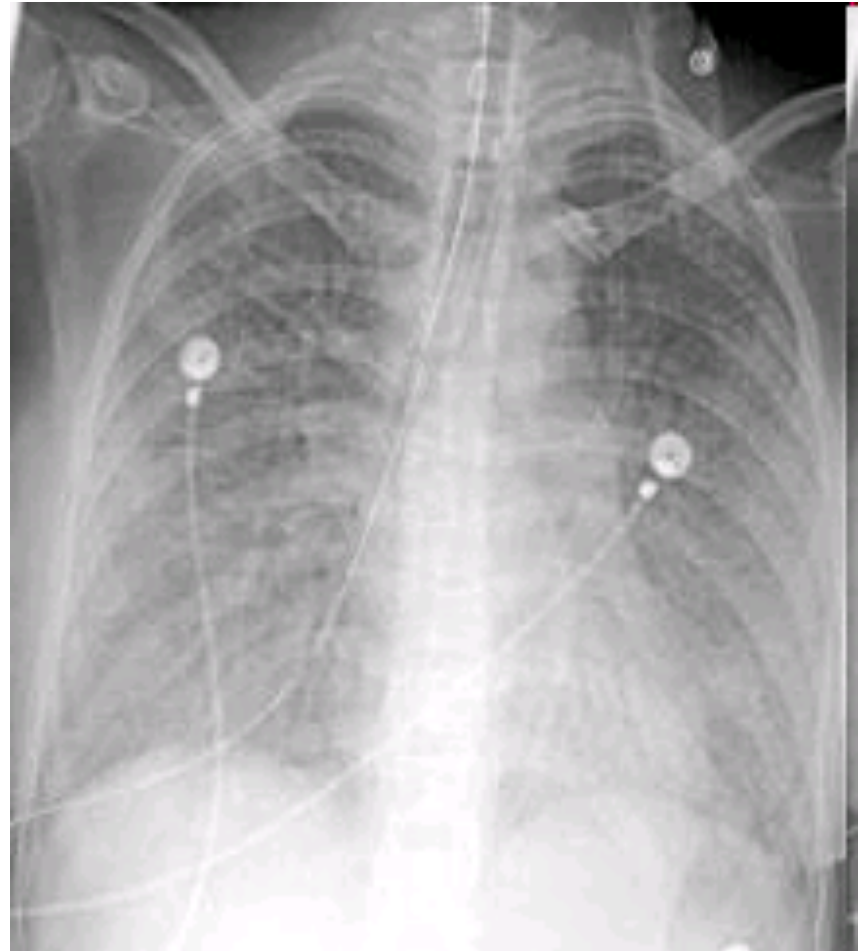
Lancet 2011; 378:549




A New Epidemic Emerges



- **1981**- Five patients with opportunistic infections were described in MMWR with no identifiable cause
 - All were MSM's
 - All had *Pneumocystis carinii* (now *jirovecii*) pneumoniaNone had cancer and were well nourished.
 - US Centers for Disease Control (CDC) (1981) *Pneumocystis carinii* pneumonia- Los Angeles MMWR Weekly 30:1-3







MMWR

**MORBIDITY AND MORTALITY
WEEKLY REPORT**

June 5, 1981

249 Den
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Pneumocystis Pneumonia — Los Angeles

In the period October 1980–May 1981, 5 young men, all treated for biopsy-confirmed *Pneumocystis carinii* pneumonia in Los Angeles, California. Two of the patients died. A confirmed previous or current cytomegalovirus (CMV) infection. Case reports of these patients follow.

Patient 1: A previously healthy 33-year-old man developed oral mucosal candidiasis in March 1981 after a 2-month illness. Elevated liver enzymes, leukopenia, and CMV viremia. The CMV titer in October 1980 was 256; in May 1981 it was 1:1024 despite courses of treatment with trimethoprim-sulfamethoxazole. He died May 3, and postmortem examination revealed

 **1981**

On June 5, the Center for Disease Control's Morbidity and Mortality Weekly Report publishes the first mention of what later is determined to be HIV. The report mentions five cases of pneumocystis carinii pneumonia in young men. The MMWR piece prompts reporting from New York, San Francisco and other cities of similar cases.

No HIV/AIDS stats available

Michael Gottlieb *“I knew I was witnessing medical history, but I had no comprehension of what this illness would become”*

- Zuniga and Ghaziani in A Decade of HAART

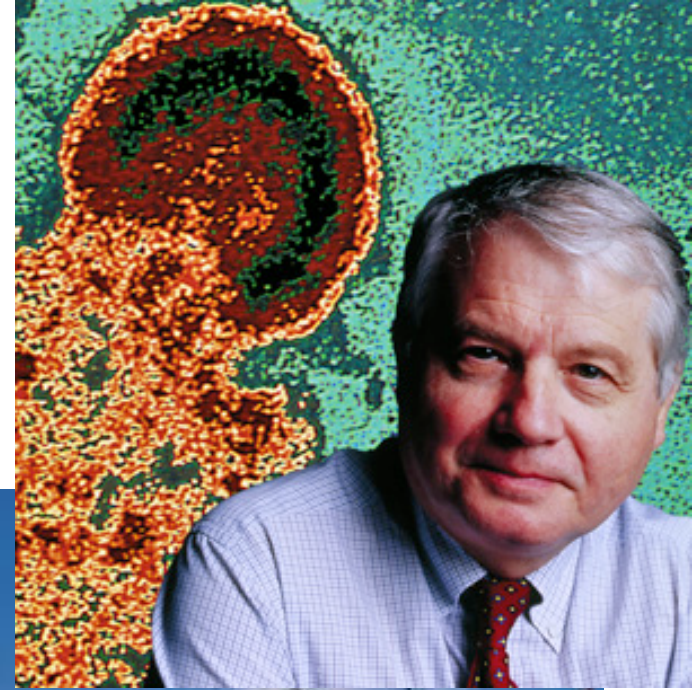


No One Could

- By 2007, 33 million infected world wide
- 6,800 new cases a day!
- 55 million people world wide have died from AIDS by 2007

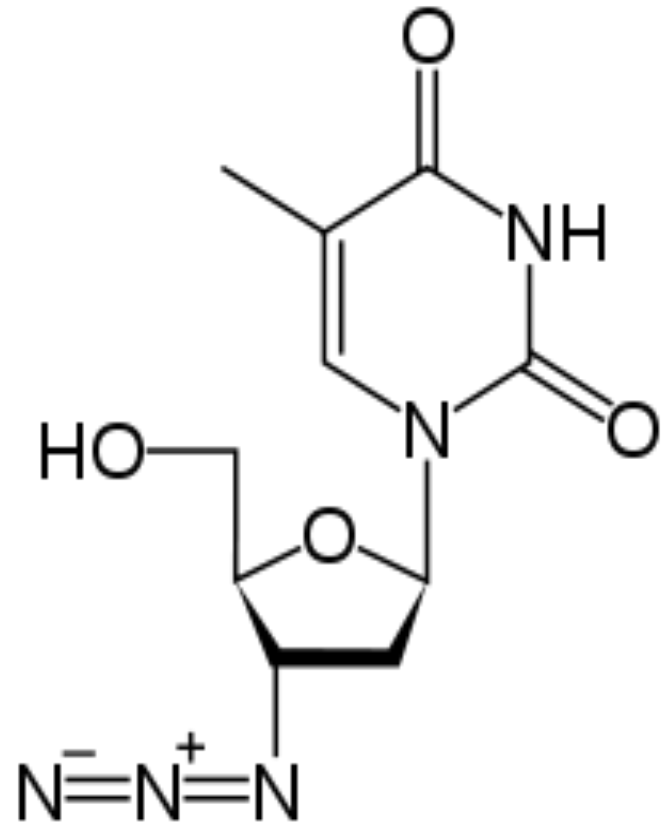


- **1983** a T lymphotropic retrovirus was isolated from a patient with lymphadenopathy at the Pasteur Institute; (Luc Montagnier)
- **1984** it was demonstrated to be causative of AIDS (Robert Gallo)
- **1985** an ELIZA assay was developed
- **1986** AZT raises CD4 count
- **1996** HAART era begins



AZT

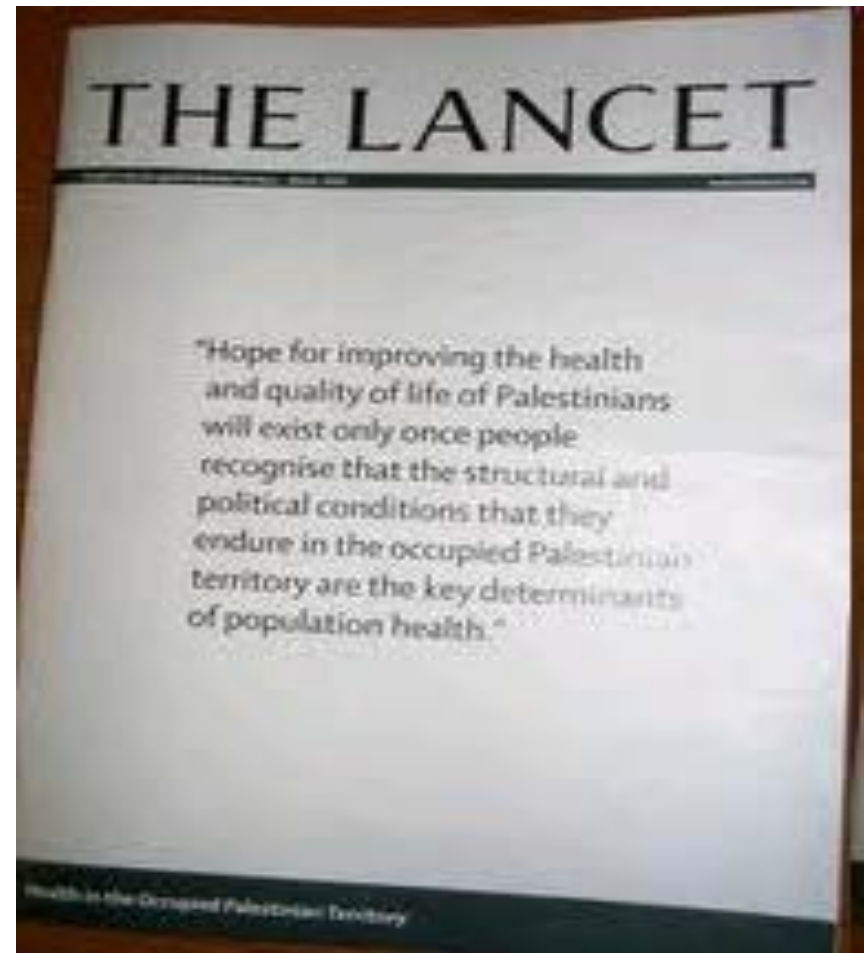
- Azidothymidine (Zidovudine) a nucleoside analog reverse transcriptase inhibitor (NRTI)
- Synthesized first in 1964; shelved because of limited activity against tumors in mice



First trial showing AZT increased CD4 count

- Robert Yarchoan et. al.
The Lancet **1986; 327:**
575–580

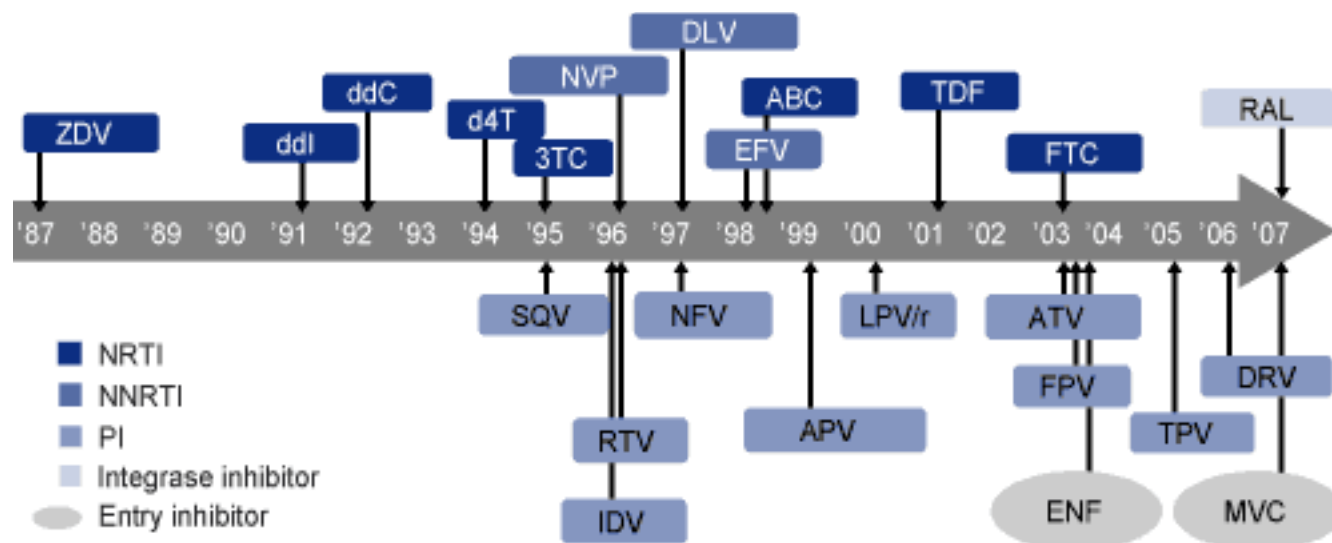
*ADMINISTRATION OF 3'-
AZIDO-3'-
DEOXYTHYMIDINE, AN
INHIBITOR OF HTLV-
III/LAV REPLICATION, TO
PATIENTS WITH AIDS OR
AIDS-RELATED
COMPLEX*



First reported trial of combination Rx resulting in a decrease in AIDS mortality

Hammer SC et. al. A Trial Comparing Nucleoside Monotherapy with Combination Therapy in HIV-Infected Adults with CD4 Cell Counts from 200 to 500 per Cubic Millimeter; N ENGL J MED [1996](#); 335:1081-1090





24 unique antiretroviral agents, at the first year of approval by the US Food and Drug Administration

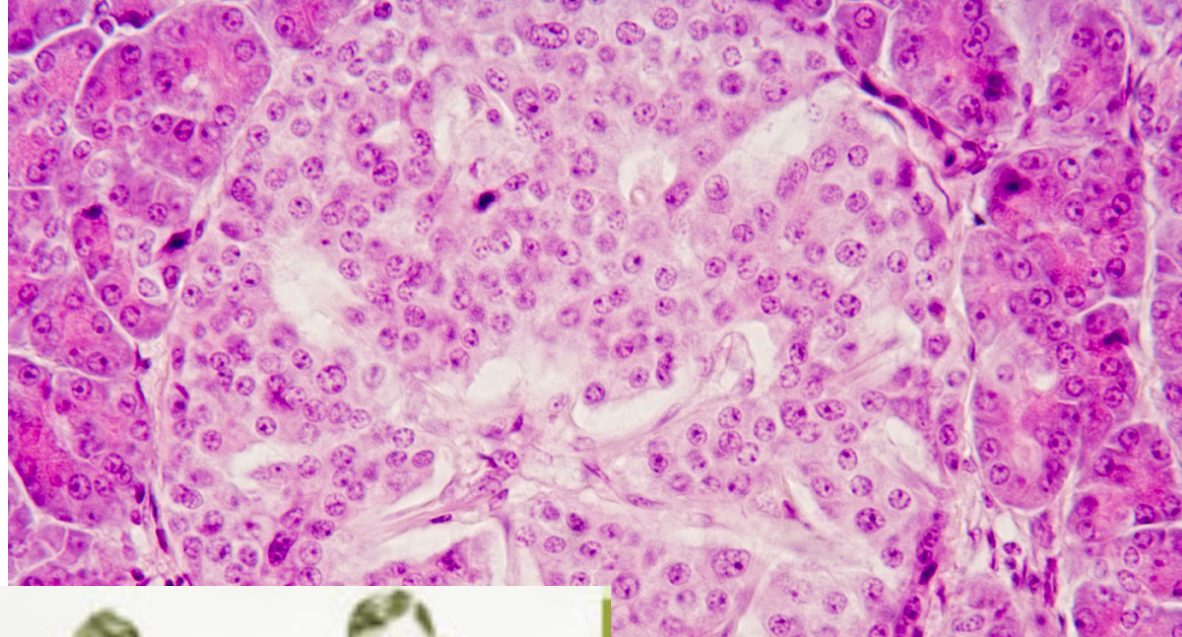
3TC, lamivudine; ABC, abacavir; APV, amprenavir; ATV, atazanavir; d4T, stavudine; ddC, zalcitabine; ddl, didanosine; DLV, delavirdine; DRV, darunavir; EFV, efavirenz; ENF, enfuvirtide; FPV, fosamprenavir; FTC, emtricitabine; IDV, indinavir; LPV/r, lopinavir/ritonavir; MVC, maraviroc; NFV, nelfinavir; NVP, nevirapine; RAL, raltegravir; RTV, ritonavir; SQV, saquinavir; TDF, tenofovir; TPV, tipranavir; ZDV, zidovudine.





Diabetologia

Journal of the European Association for the Study of Diabetes (EASD)





J.B. Collip



1922 Photograph



Case VI

Before Insulin



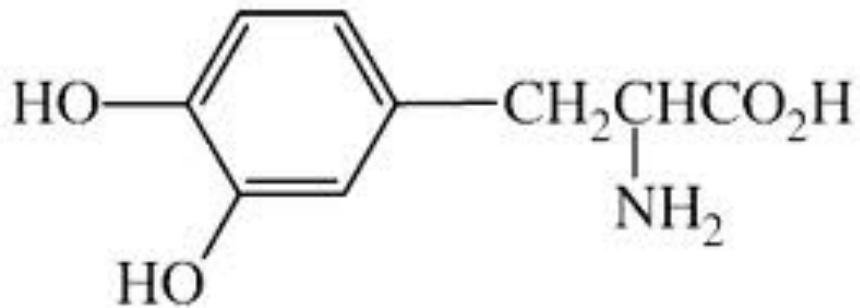
Case VI

4 Mos. After

Wellcome Images

Estimates show there are more than 15 million diabetics living today who would have died at an early age without insulin.





L-DOPA



Other Top Stories

- Advent of Placebo Controlled Double-Blind Randomized Trials.
- The first Cardiac Catheterization by Werner Forssmann on himself (Age 25)
27 years later he received the Nobel Prize



Werner Forssmann

The baby that was born twice



Lynlee Boemer

Predicting the Next 50 Years

“Prediction is very difficult, especially if it's about the future.”



Niels Bohr
Physicist, Nobel Laureate

The Next 50 Years

- **There will be vaccines to prevent Alzheimer's, Malaria, TB, HIV, Hepatitis C, Ebola, Enterovirus D68, and many cancers.**
- **Regenerative stem cells will replace organ transplantation.**
- **Bariatric surgery will become a historical footnote.**

The Next 50 Years

- **Imaging technology and biomarkers will enable early identification and aid in eradication of tumors.**
- **Immunotherapy will be the key to cancer treatments and cut cancer mortality by over 50%.**
- **Democratization of knowledge will occur. Supercomputers will allow citizens to access health information. Non-invasive sensors in our clothes will monitor a ton of information.**
- **Personalized medicine will be common practice.**

The Next 50 Years

- **Nanotechnology and nanobiomedicine will flourish and permit more precise diagnosis and targeted therapies.**
- **There will be greater scientific understanding of the role of gut microbiota leading to novel therapies.**
- **Exploration of the workings of the brain and consciousness will be undertaken and provide masterful insights.**

The Next 50 Years

- **Social and political changes will have a major impact in addressing health on many frontiers**
- **Healthcare will be available and affordable for all U.S. citizens. Primary Care Medicine will be celebrated as the “Heroes Profession.”**
- **Patients will take a pill that will “mimic exercise” to combat the metabolic syndrome.**
- **Life expectancy in the United States will exceed 100 years.**



Penicillin as a Chemotherapeutic Agent E Chain, HW Florey, AD Gardner et al. The Lancet **1940**; 2: 226-28

“The results are clear cut and show that penicillin is active *in vivo* against at least three of the organisms inhibited *in vitro*...Penicillin... is particularly remarkable for its activity against the anaerobic organisms associated with gas gangrene.”

