

# Precision Medicine: Treatment tailored to you



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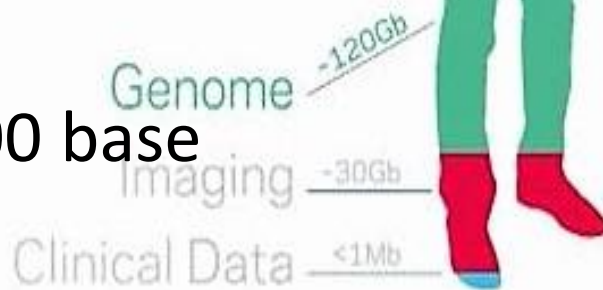
National Institute of Neurosciences and Hospital

# Rich enough!

☐ 75 to 100 trillion  
cells

☐ 20,000 to 25000  
gene = 120 GB

☐ 3000,000,000 base  
pairs



Perhaps 2Tb  
of Data



Out of 3 billion base pairs 3 million are different

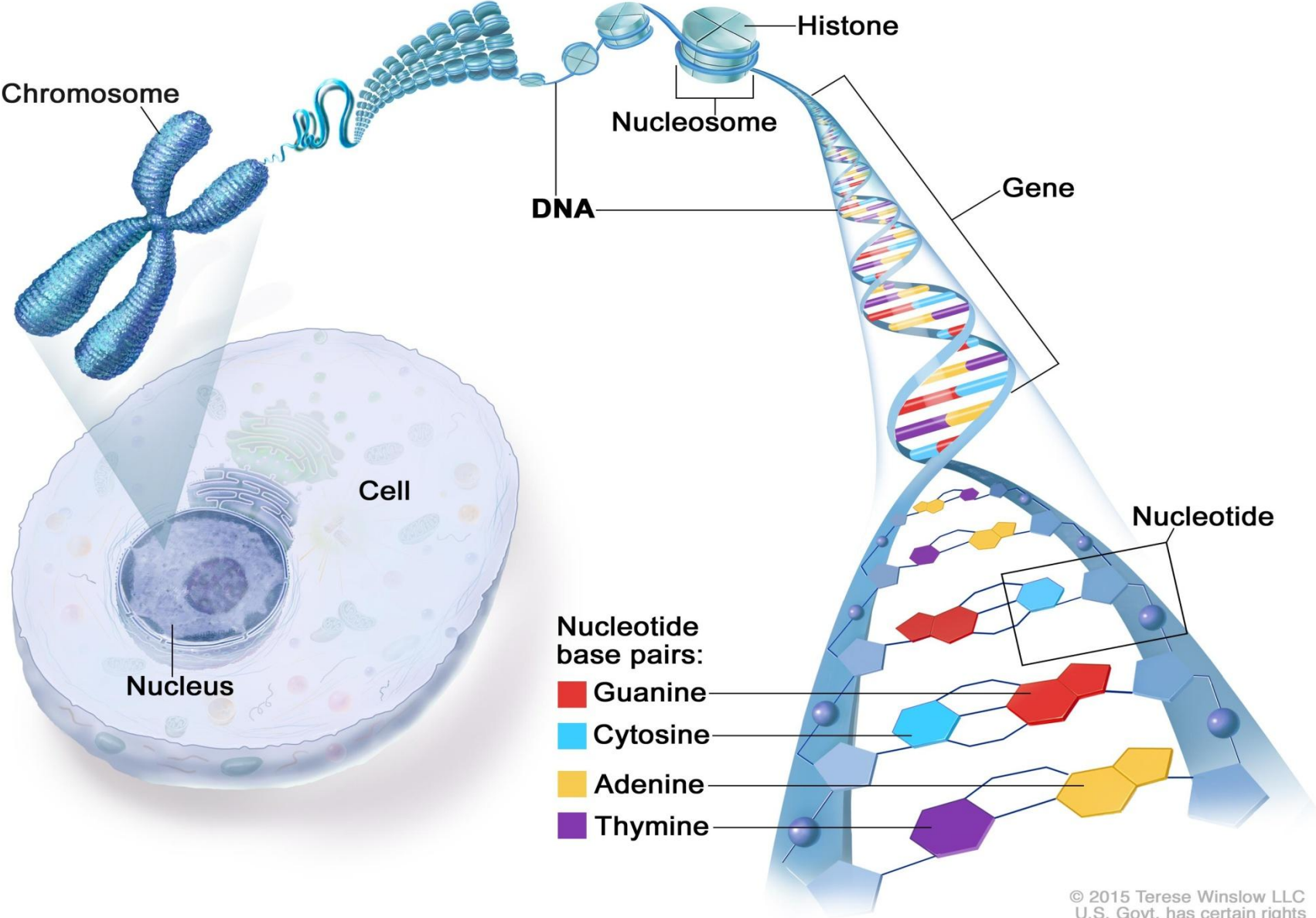




*"One Size Fits all"*

I'm Sure He'll Fit...

# DNA Structure



# The Impossible Job of a Clinician...

Info from Dr Google

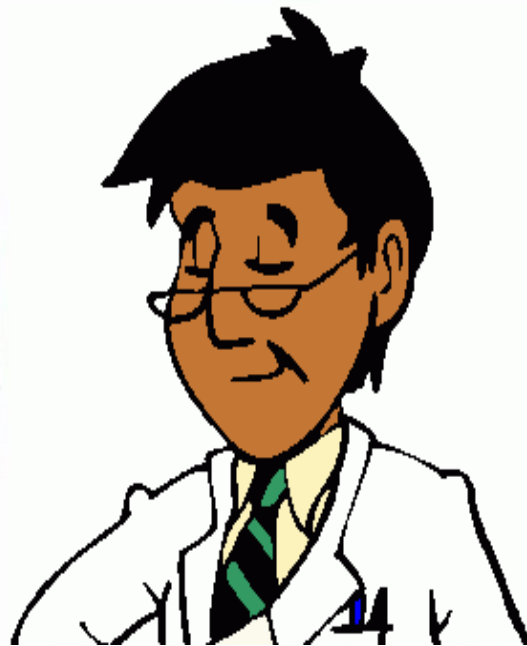
Missing Clinical Data



Soon...a Tsunami  
of new data

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10101011010101010101011010101010101001101
11010100010110101010101111101010110101010
10101011010101010101010101010101010101010
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17 New Academic  
research papers / day



"Evidence Based  
Medicine" decision  
making...??

15  
Minutes  
to make a  
decision



# Can we do something more accurate ?



- ✓ Full mapping of human genome
- ✓ Huge medical literature on the web

# The new focus is on

Unique Genetics,

Unique Environmental

Unique Lifestyle factors

Of

Individual patient





by Frits Ahlefeldt

# Pursuit for precision

Jean-Baptiste Denis, court physician to King Louis XIV transfused lambs' blood into human

Transfusion the blood of other animals into humans was prohibited, by an act of the Chamber of Deputies in 1668

The human ABO blood group were discovered by Austrian-born American biologist Karl Landsteiner in 1901

The discovery of the Rh typing by Landsteiner and Alexander Wiener in 1940

# Early Examples of Personalized Medicine

*1907: Reuben Ottenberg - blood compatibility test for transfusion*

*1956: The genetic basis for the selective toxicity of fava beans (“favism”)*

*1977: Cytochrome P450 2D6, enzyme responsible for metabolism of drugs*

# What is new?

- The revolutionary development in medical and pharmaco genetics, Biomedics and computing medicine
- Promise for developing targeted therapeutics

# Precision Medicine

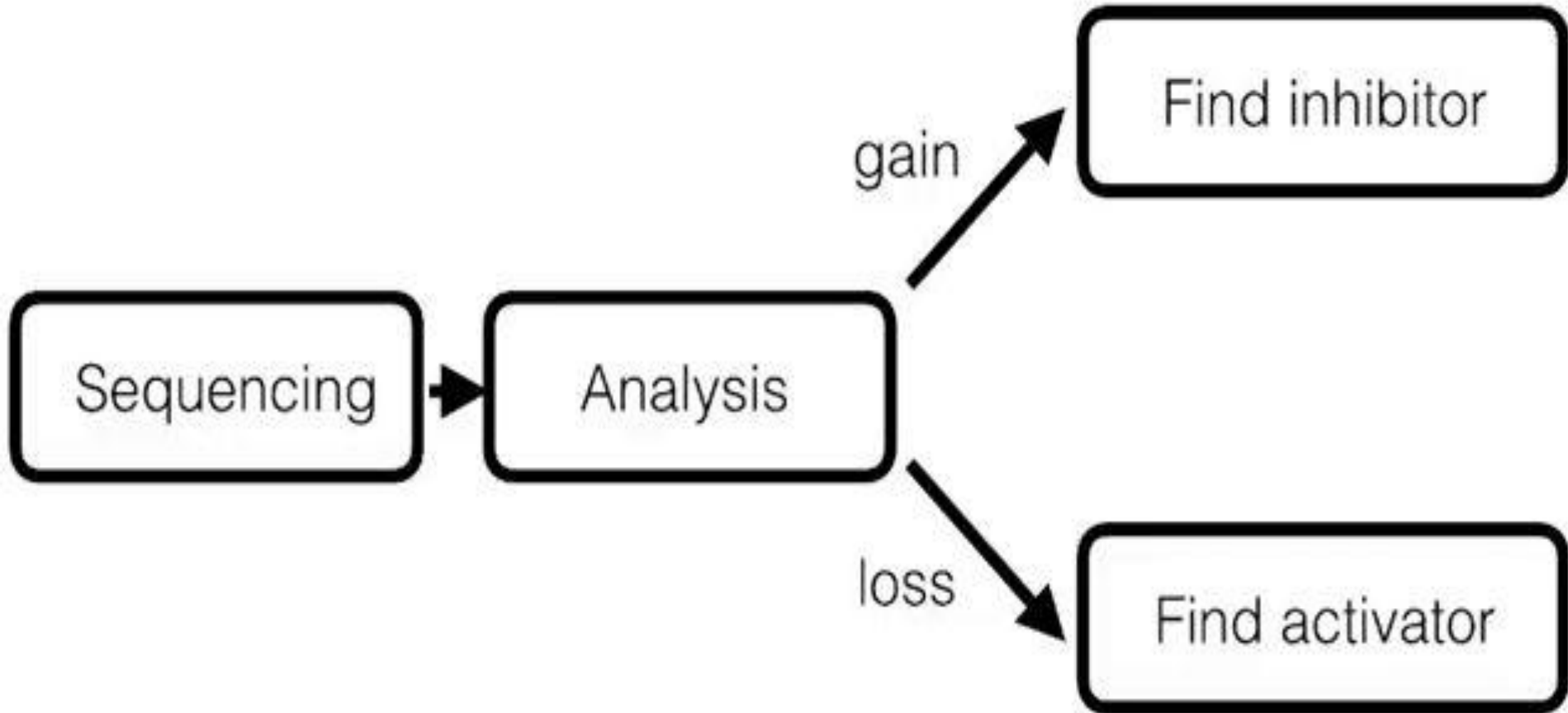
"an emerging approach for disease treatment and prevention that takes into account the individual variability in

genes,

environment, and

lifestyle for each person."

# Targeted therapy



# FDA approved Targeted therapies

- Herceptin<sup>®</sup>, the first approved genetically-guided therapy for HER 2 positive breast cancers.
- Ivacaftor is Targeted against specific genetic mutation –G551D mutation, One of the 100 known mutations responsible for Cystic Fibrosis.



## THE PRECISION MEDICINE INITIATIVE



*“Doctors have always recognized that every patient is unique, and doctors have always tried to tailor their treatments as best they can to individuals. What if matching a cancer cure to our genetic code was just as easy, just as standard? What if figuring out the right dose of medicine was as simple as taking our temperature?”*

*- President Obama, January 30, 2015*



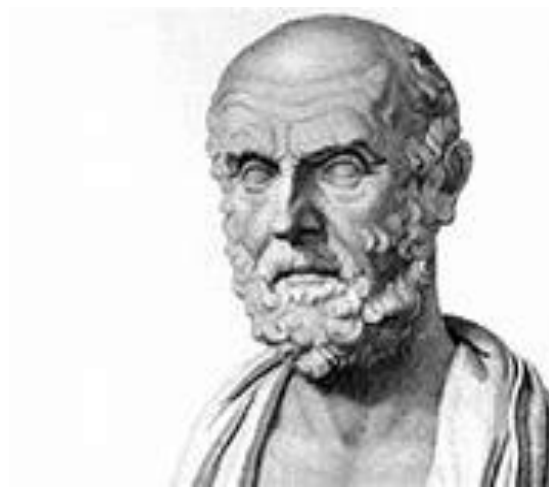
# Don't forget



- Who we are,
- What illnesses we suffer, depends not only on our genes, but also on a complex interaction of environmental, genetic, social and cultural factors

# Conclusion

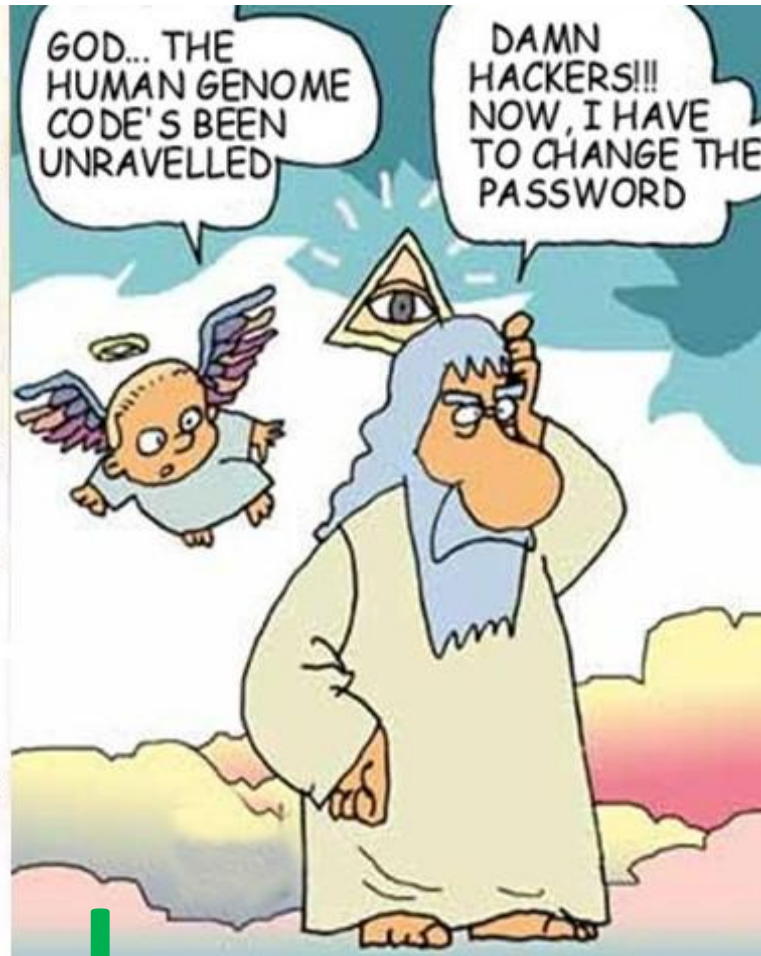
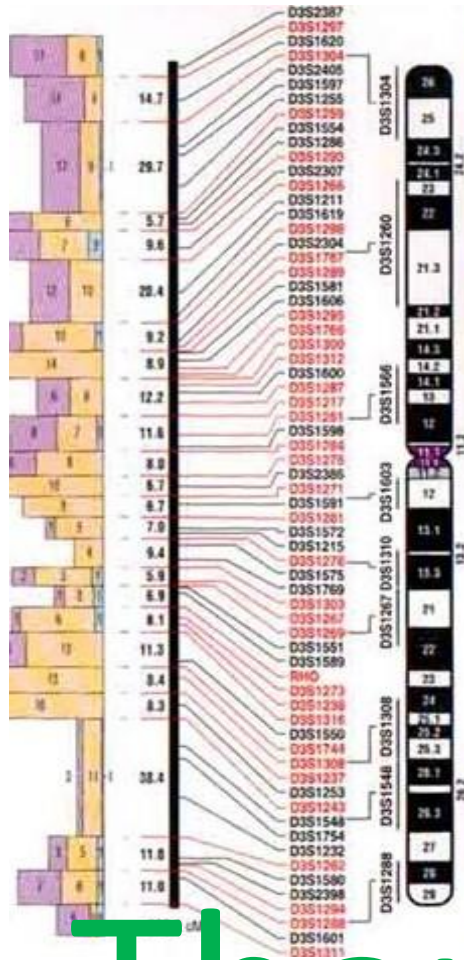
- Opens New horizon to cure the incurables
- Precision oncology is promising
- Lab tests are **not** always black and white,
- For the grey cases rely on Art of clinical medicine
  - Doc-patient relationship, clinical skills



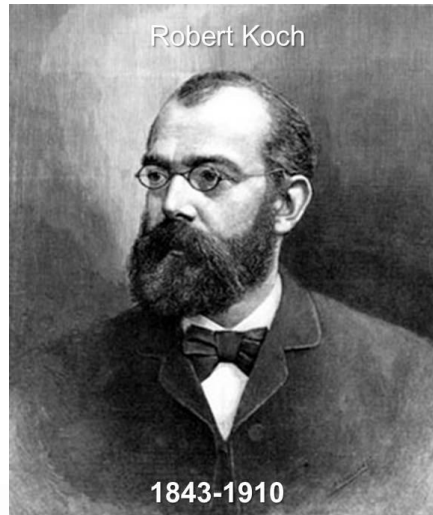
It's far more important to know what person  
the disease has than what disease the person  
has.

**“The good physician treats  
the disease. The great  
physician treats the patient  
who has the disease.”**

**William Osler**



Thank you



Pre 1970

1970 to Today

Future

Intuitive  
Medicine

Evidence Based  
Medicine

Precision  
Medicine

# Term: Precision and Personalized medicine

- Lots of overlaps
- word "personalized" could be misinterpreted to imply that treatments being developed for each individual ?
- Many use the terms interchangeably