

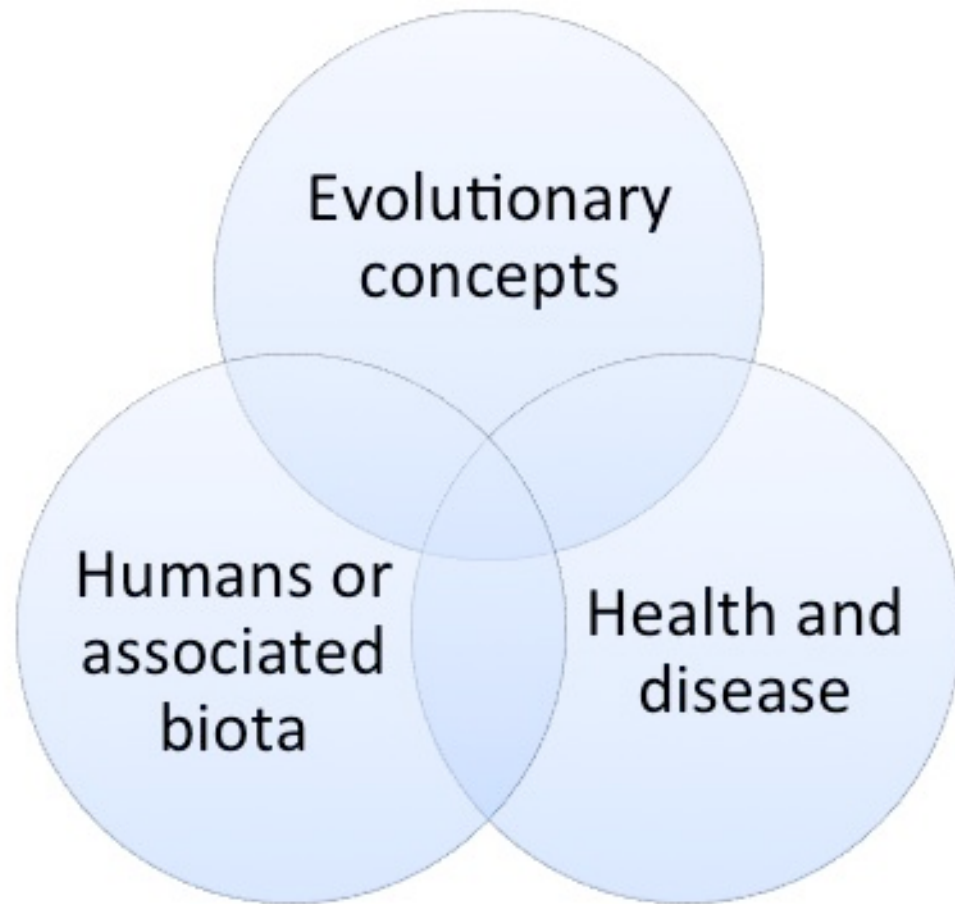


Evolutionary Medicine

with Joe Alcock, MD

FRIDAYS
7PM ET

INERTIATV



What is Evolution?

- Population change
- Genetic change
- Natural selection: non-random change
- Drift: random change
- Occurs all the time

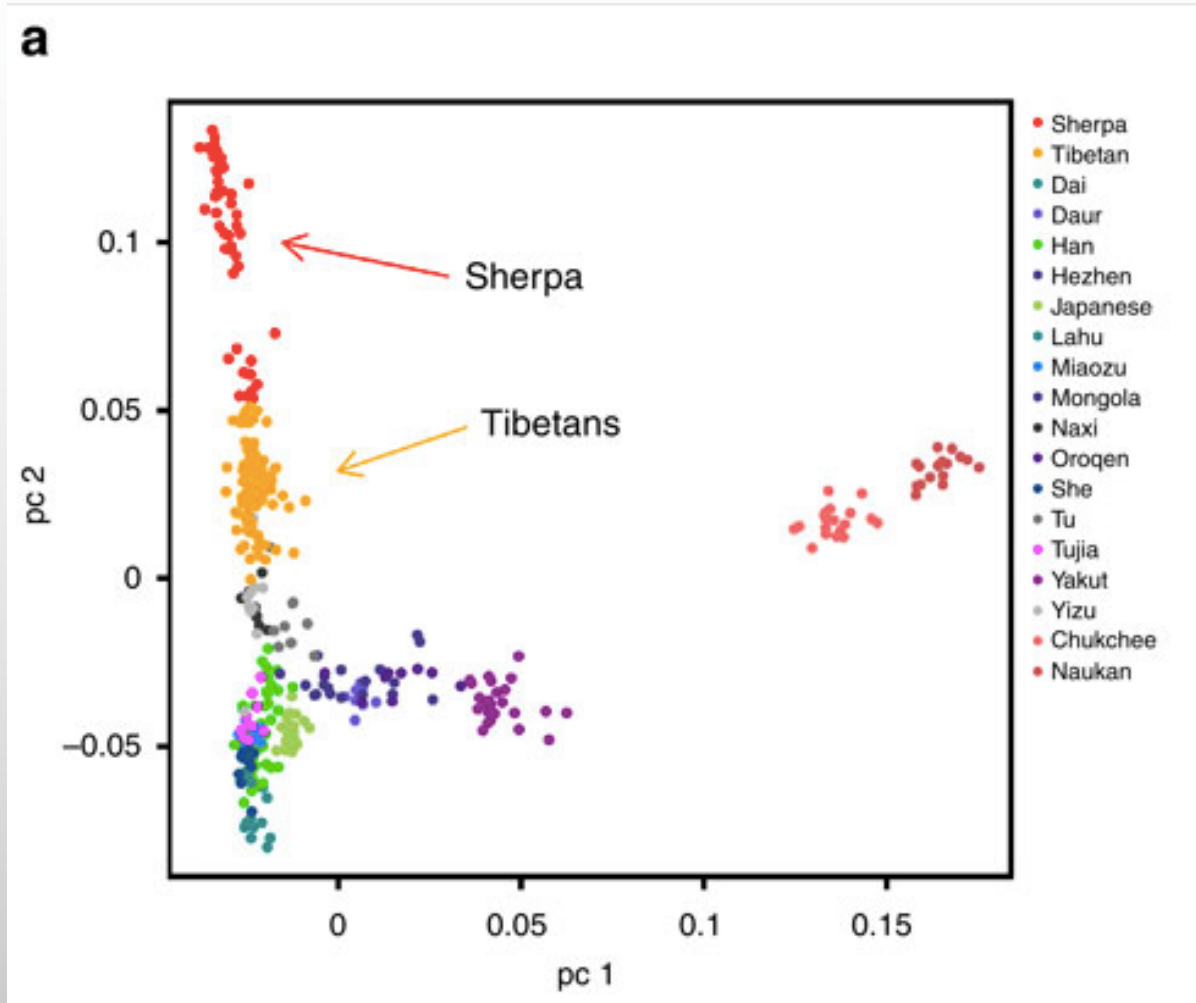


BY JOHN HAWKS

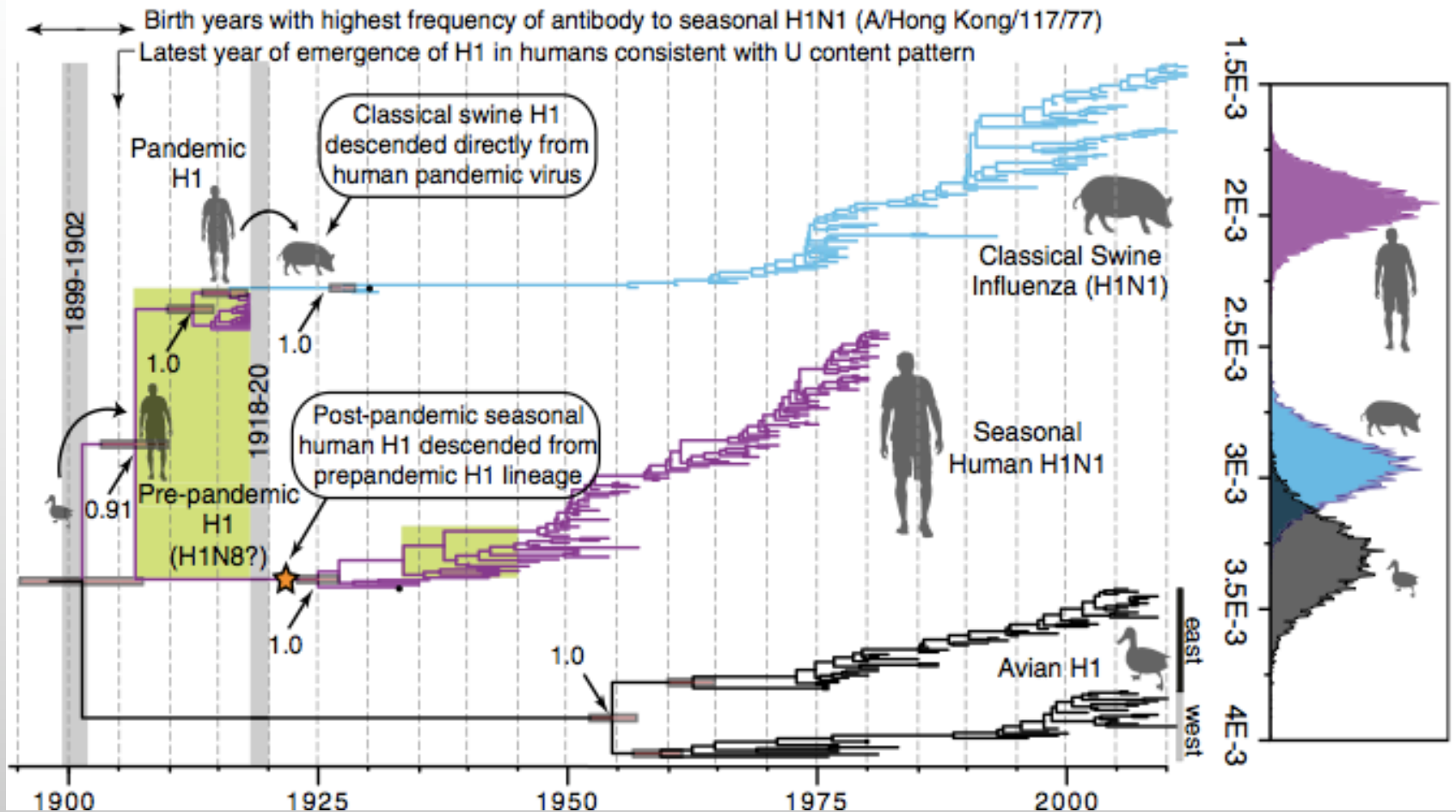
Population Change



Genetic Change

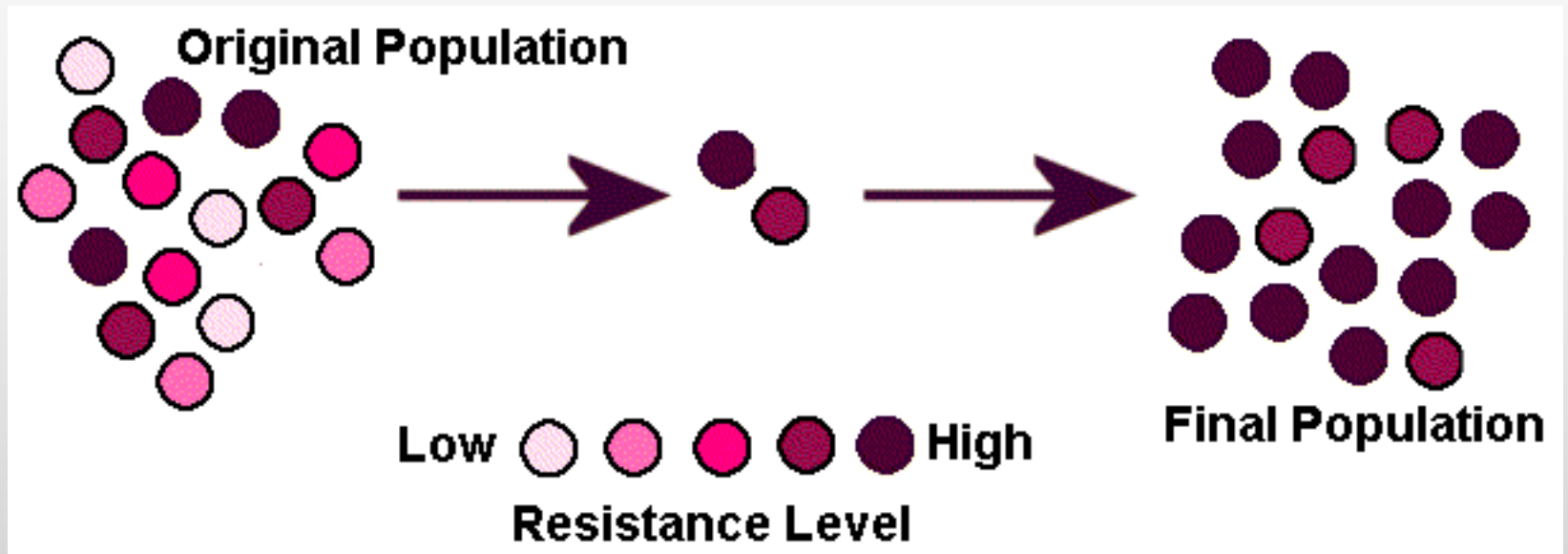


Genetic Change



Non-random Change

Natural Selection



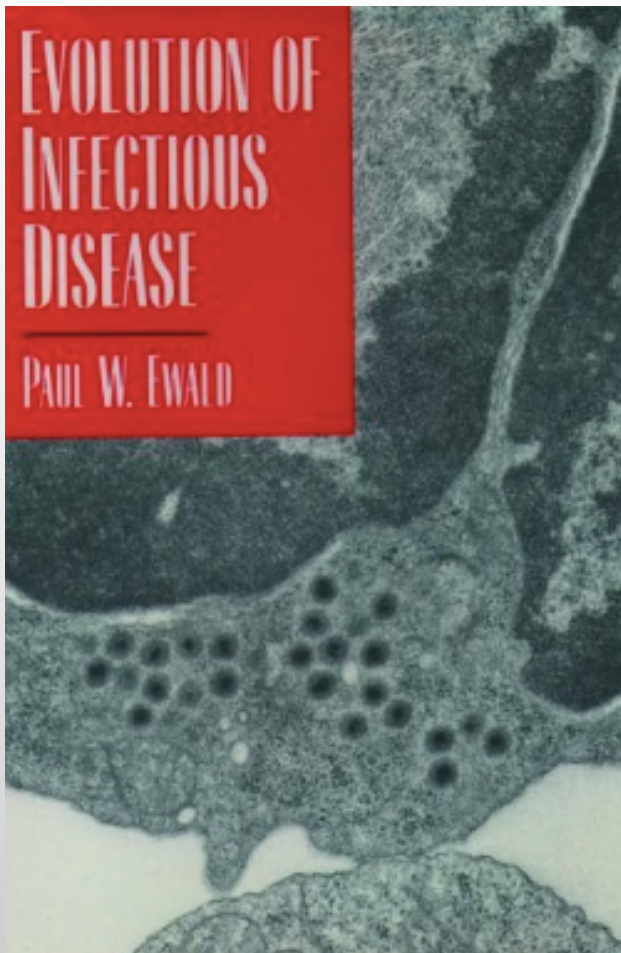
Random Change

Genetic Drift



Cancer



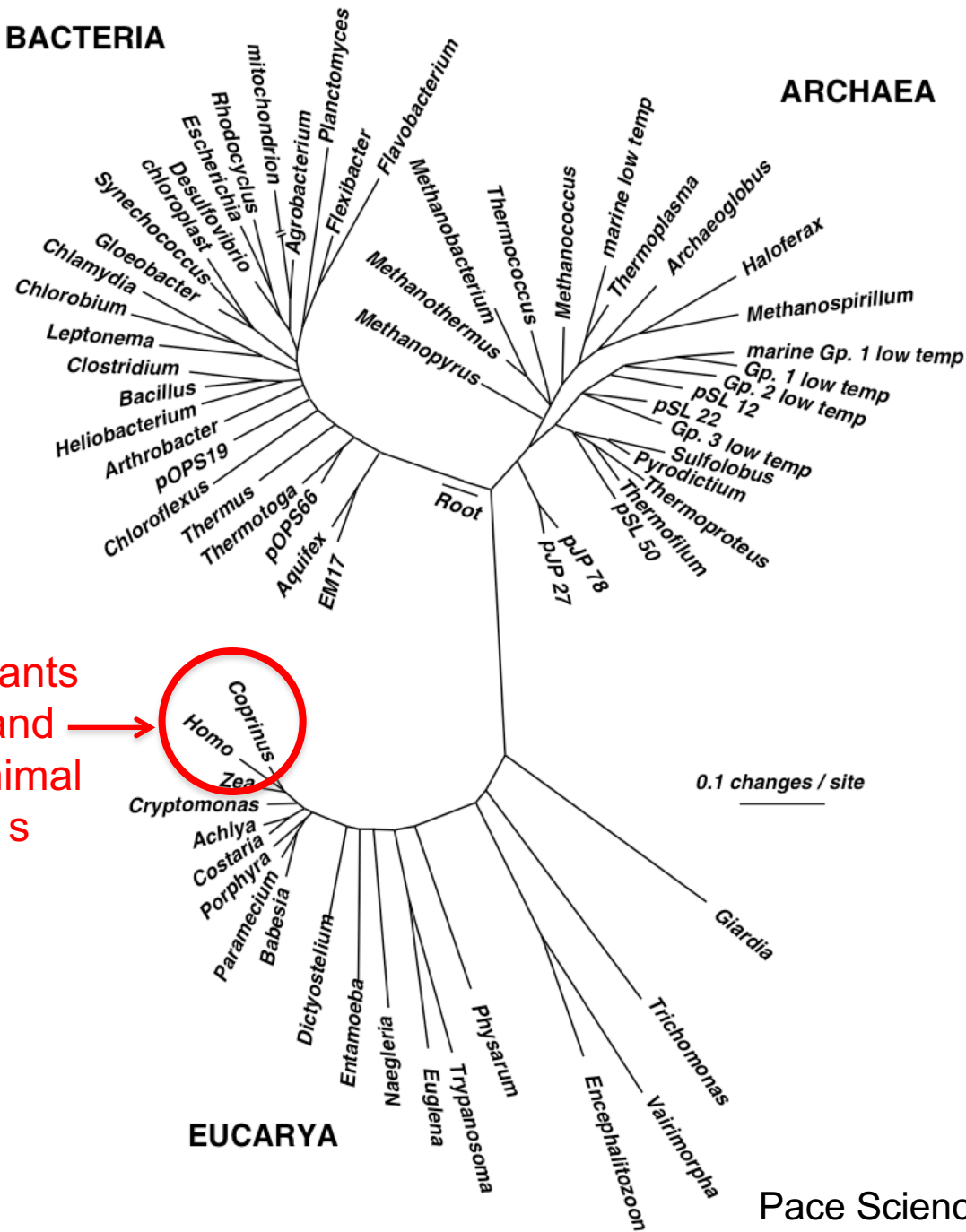


BACTERIA

ARCHAEA

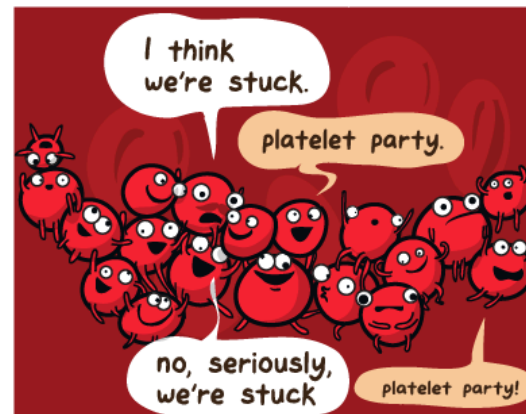
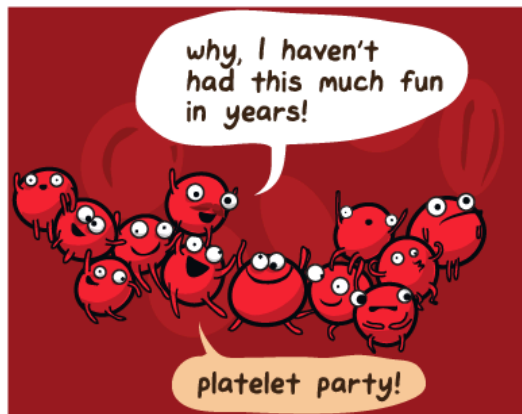
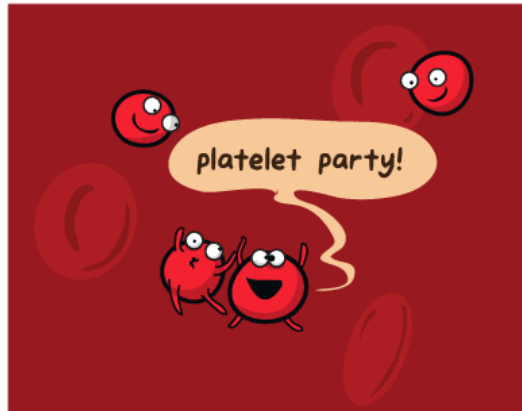
Plants
and
animals

EUCARYA





Serena Williams is speaking out for equal pay for women. Getty Images



AAMC-HHMI

Scientific foundations for future physicians

“Describe the functional elements in the human genome, their evolutionary origins, their interactions, and the consequences of genetic and epigenetic changes on adaptation and health”

Biological and Biochemical Foundations of Living Systems

Foundational Concept 1

Biomolecules have unique properties that determine how they contribute to the structure and function of cells, and how they participate in the processes necessary to maintain life.

Evolution (BIO)

- Natural selection
 - Fitness concept
 - Selection by differential reproduction
 - Concepts of natural and group selection
 - Evolutionary success as increase in percent representation in the gene pool of the next generation
- Speciation
 - Polymorphism
 - Adaptation and specialization
 - Inbreeding
 - Outbreeding
 - Bottlenecks
- Evolutionary time as measured by gradual random changes in genome

Making evolutionary biology a basic science for medicine

Randolph M. Nesse^{a,1}, Carl T. Bergstrom^b, Peter T. Ellison^c, Jeffrey S. Flier^d, Peter Gluckman^e, Diddahally R. Govindaraju^f, Dietrich Niethammer^g, Gilbert S. Omenn^h, Robert L. Perlmanⁱ, Mark D. Schwartz^j, Mark G. Thomas^k, Stephen C. Stearns^l, and David Valle^m

VIST

- Variation
- Inheritance
- Selection
- Time



WHO report: Antibiotic resistance happening right now all over the world



CHARLIE COOPER  **HEALTH REPORTER** | Wednesday 30 April 2014

True?
Interesting?
Important?

- Misunderstanding of adaptation in human biology
- Acting as an agent of selection
- Failure to recognize how competition between genomes causes disease.

Interfering with adaptations



Fever (Hatsunetsu) by Yumiko Kayekawa

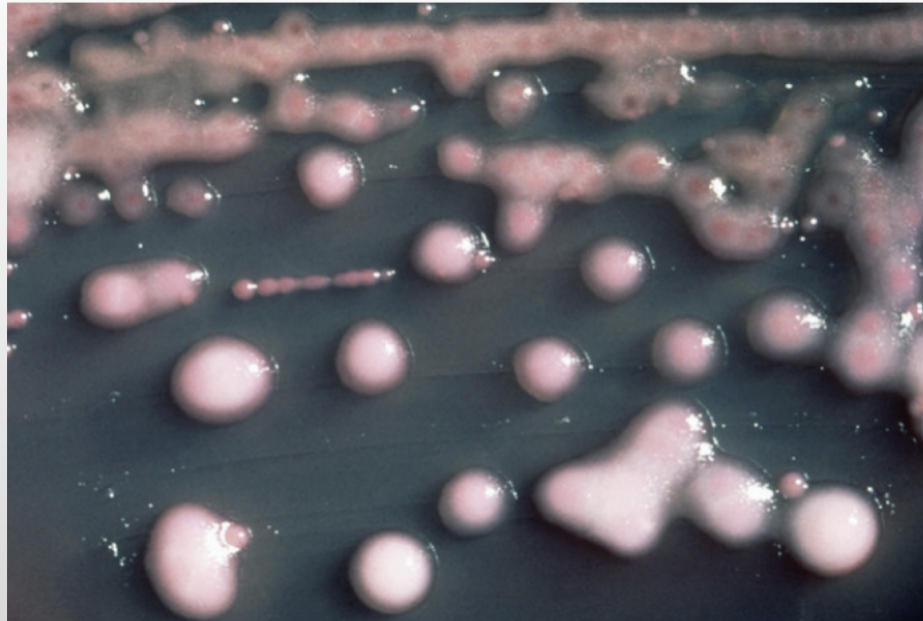
Not recognizing mismatch



Unwitting agent



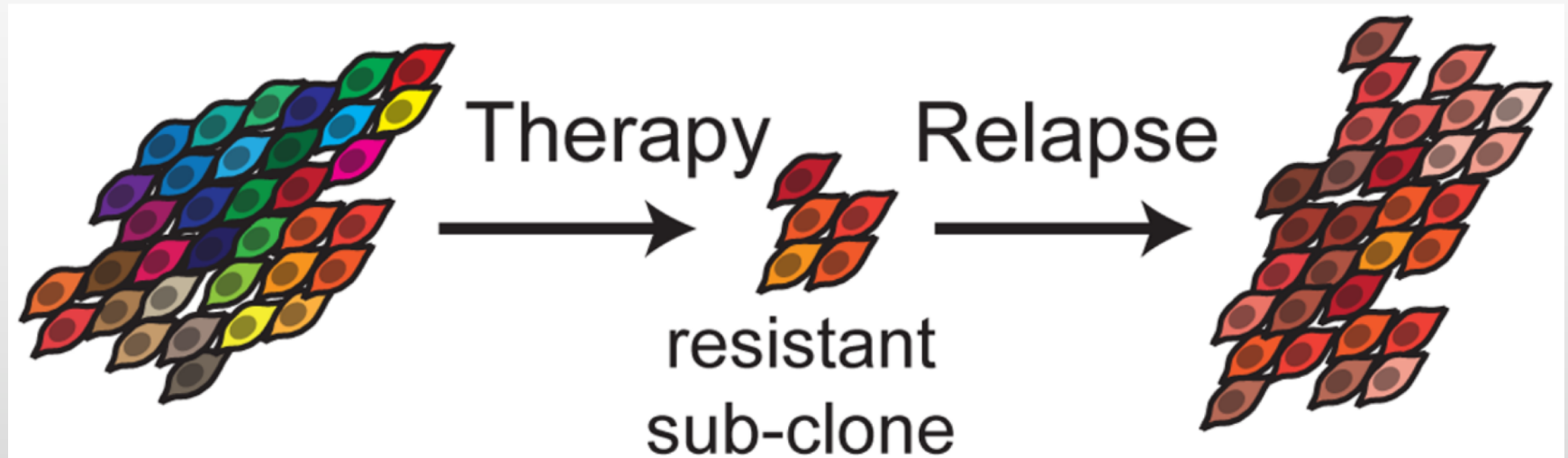
Unwitting agent of selection



Agent of selection - virulence



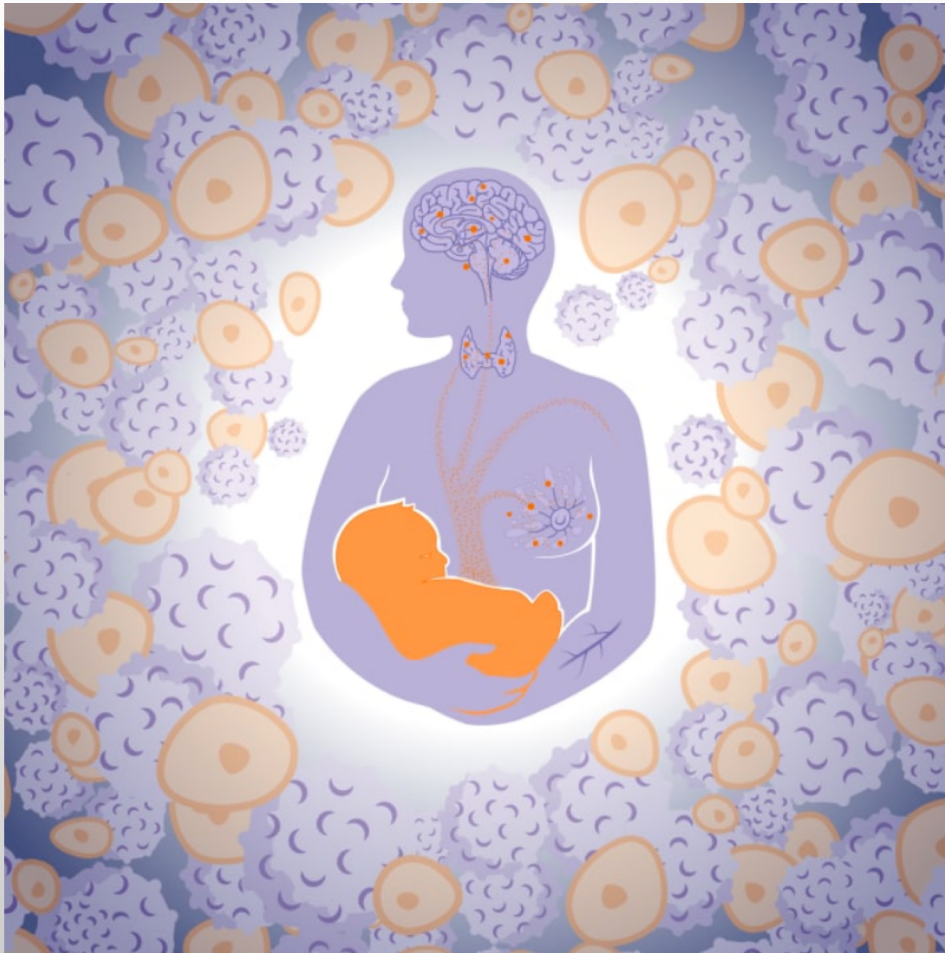
Agent of selection - cancer



Not recognizing genomic conflict



Not recognizing genomic conflict



Not recognizing genomic conflict



Microbiome

- ~30 trillion microbes
- 10x microbial genes



Wasting research dollars



Lilly

Lilly Announces Withdrawal of Xigris® Following Recent Clinical Trial Results

Killing patients

- Failing to adopt evidence-based practices



UCLA EVOLUTIONARY MEDICINE

interdisciplinary center

PEOPLE PUBLS EVMED MONTH 2ND WEDNESDAYS COURSES TALKS GET INVOLVED SUPPORT US CONTACT US

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Life Sciences
ARIZONA STATE UNIVERSITY



ASU SCHOOL OF
HUMAN EVOLUTION
& SOCIAL CHANGE
ARIZONA STATE UNIVERSITY

The Center for Evolution, Medicine, & Public Health

<http://EvMedCenter.org>

Randolph Nesse, Director