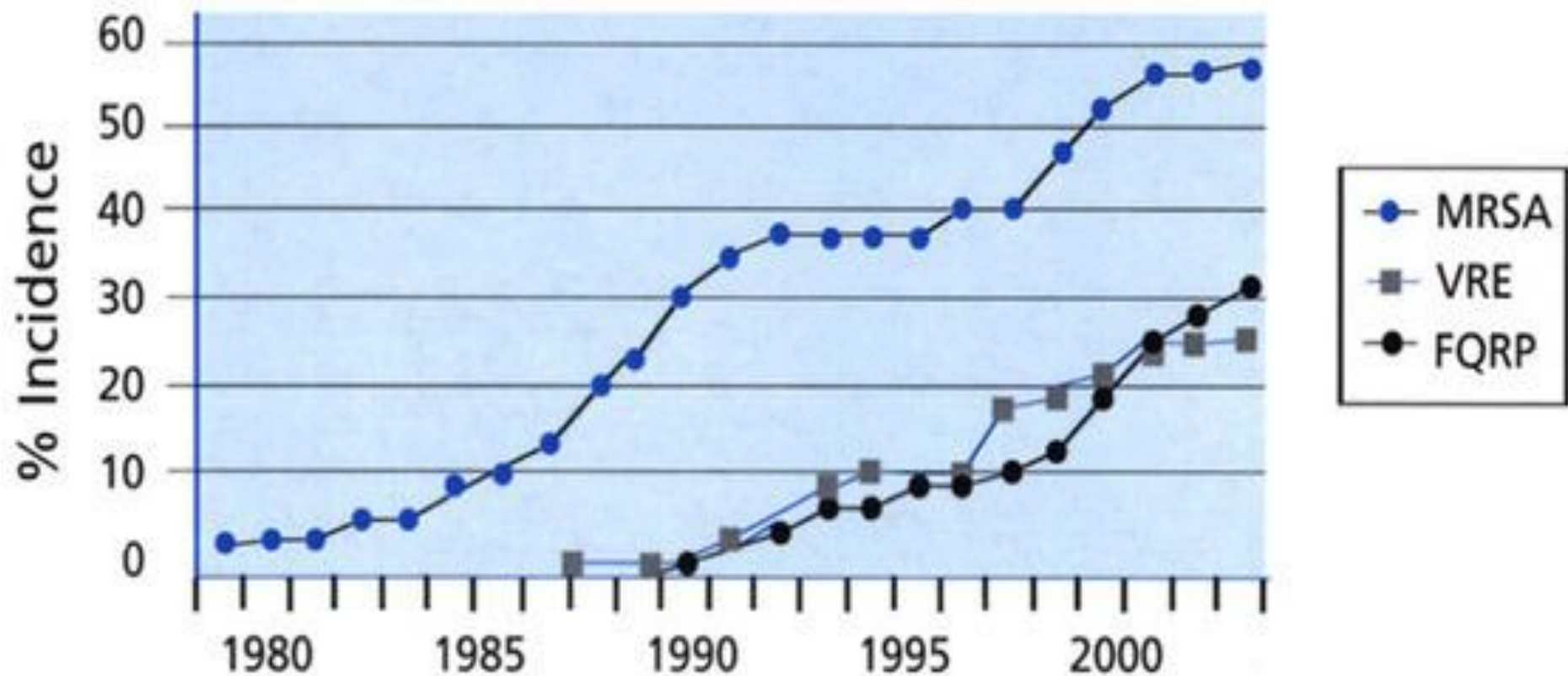


Bio-Strike

A photograph of a wooden door opening into a lush green forest. The door is made of vertical wooden planks and is slightly ajar, revealing a path leading into a dense forest. The forest is filled with tall trees and thick undergrowth, including many ferns. The ground is covered in fallen leaves and branches. The text is overlaid on the right side of the image, in a white, sans-serif font.

Rüdiger Trojok
ITAS, University Karlsruhe
Technikfolgenabschätzungsbüro
beim Bundestag
Opentechsummit, Berlin
14.05.2015

Tragedy of the Commons: Antibiotics crisis



MRSA = methicillin-resistant *Staphylococcus aureus*; VRE = Vancomycin-resistant enterococci
FQRP = Fluoroquinolone-resistant *Pseudomonas aeruginosa*

Antibiotic crisis

overuse of antibiotics



spread of
antibiotics in
environment

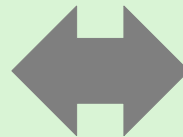
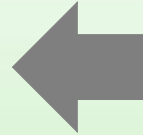


development of
resistant bacteria
by mutation



Antibiotic crisis

overuse of antibiotics



spread of
antibiotics in
environment



resistance genes
render antibiotics
useless

development of
resistant bacteria
by mutation



spread of resistance
genes by Horizontal
Gene Transfer

Antibiotics Crisis

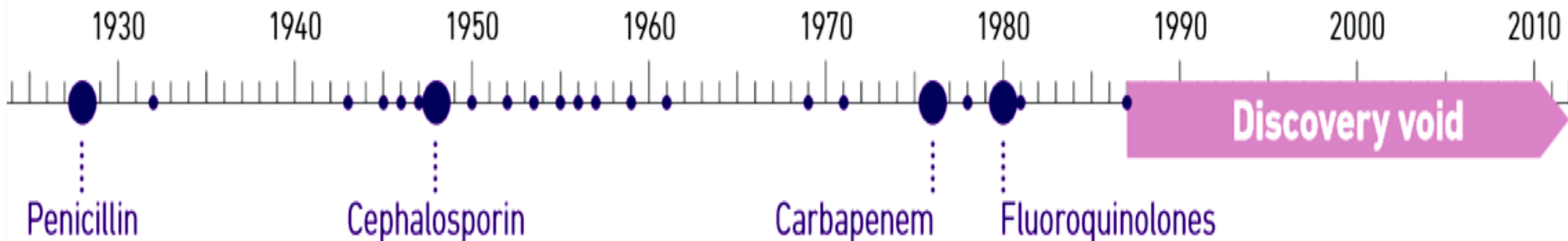
Market failure

1990

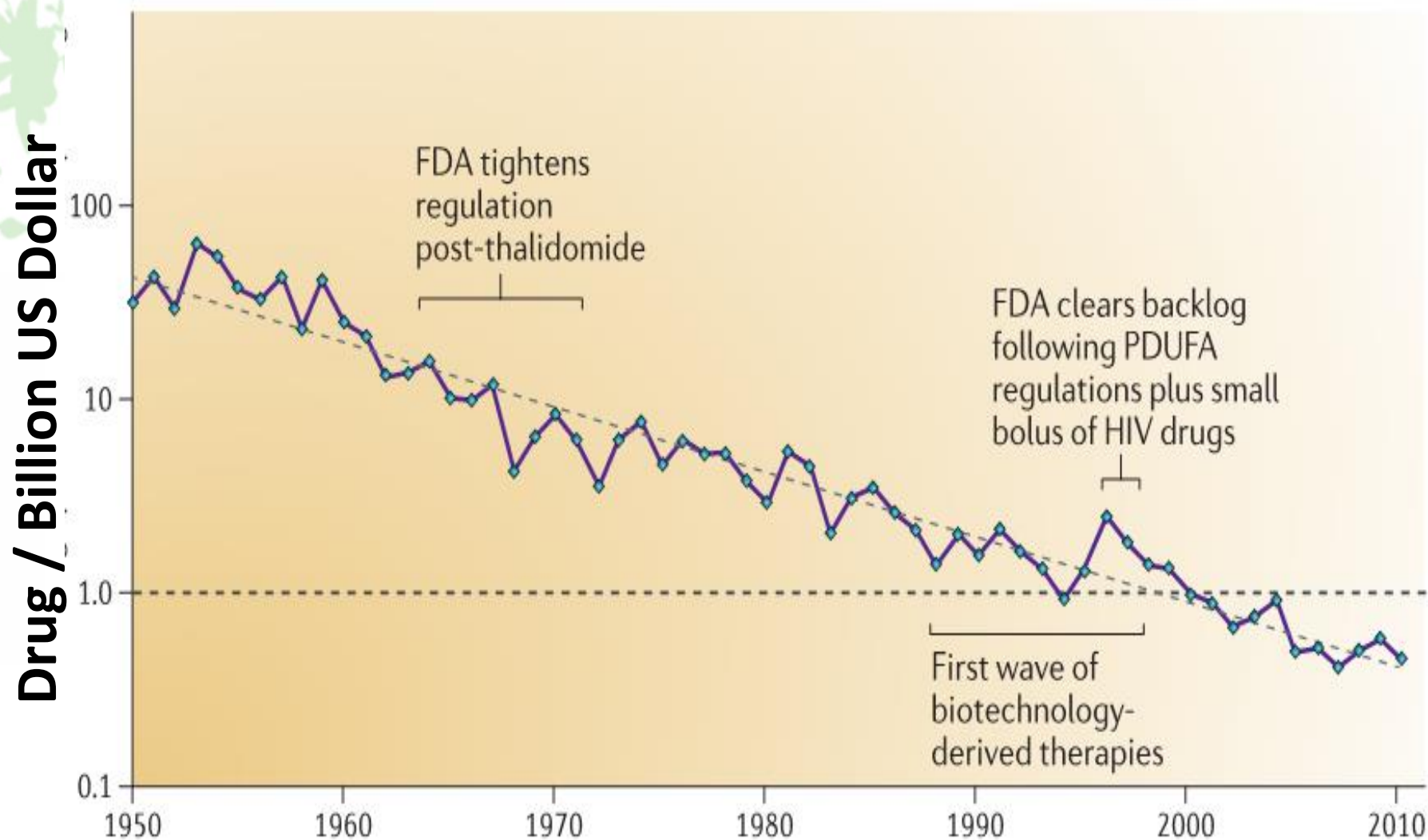
- 18 companies,
- 10 new antibiotics

2011

- 4 companies,
- 2 new antibiotics



Antibiotics Crisis



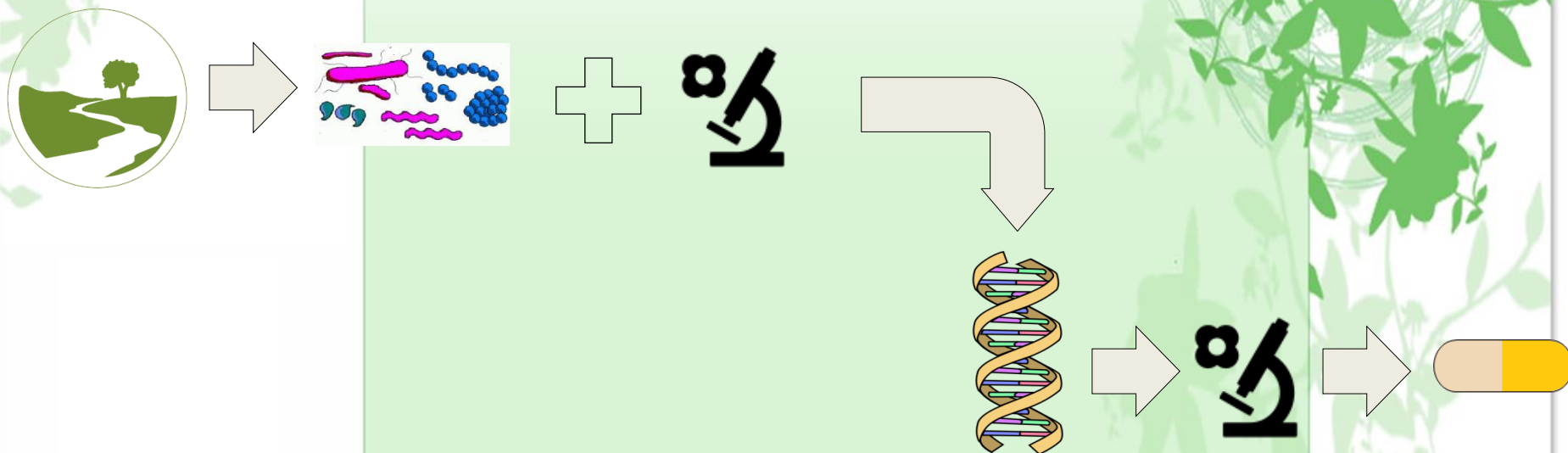
Solutions

- Reduce antibiotic consumption
 - Regulation
 - Management
 - Education
- Research new antibiotics
- Find entirely new cures...

→ Citizen Science Initiative Biostrike !

Biostrike

Scenario I



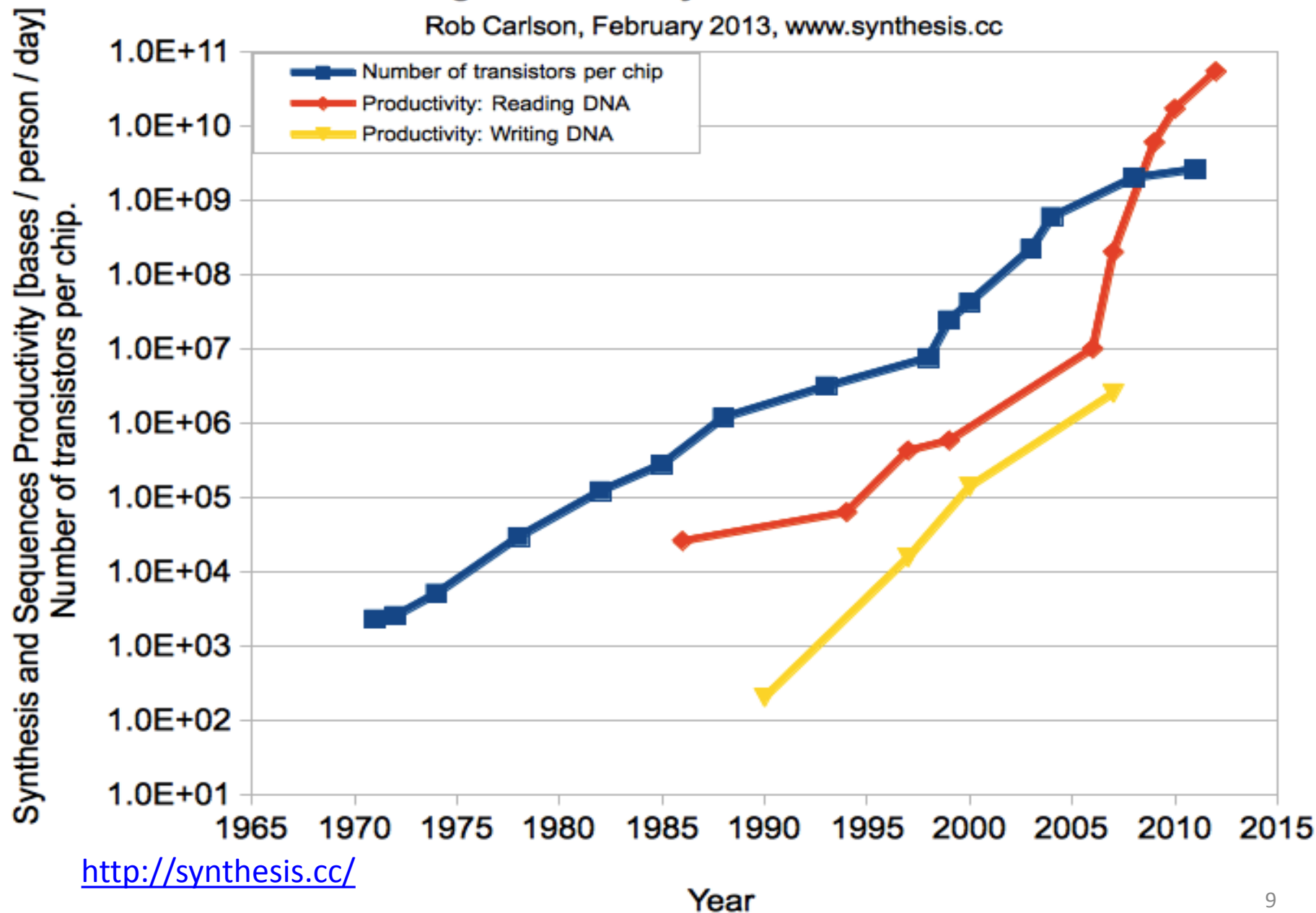
Decentralized

RESEARCH

Centralized

Productivity in DNA Synthesis and Sequencing Using Commercially Available Instruments

Rob Carlson, February 2013, www.synthesis.cc



Bio-Language

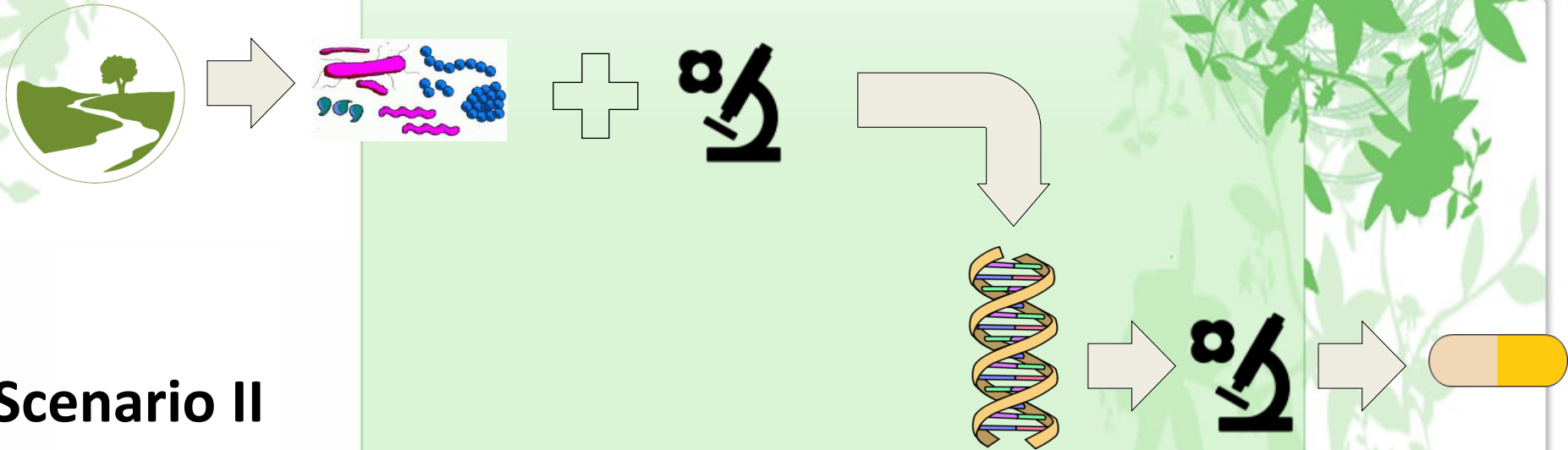
AGTC



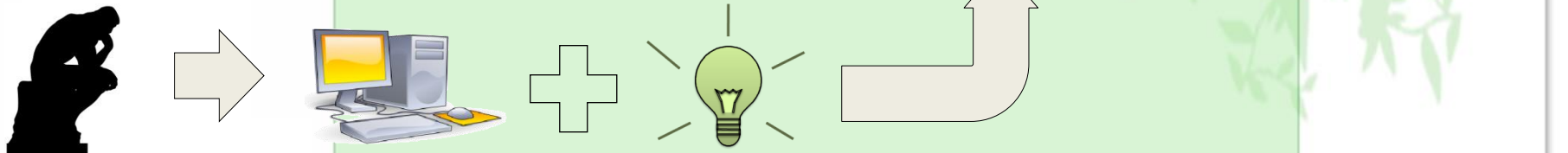
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ACGATATATTACGGGGGGTAGCTCGACTTACGTACGTCATGC
CACGTCAGTCAGTAGTCAGTACTGACTACGTGTACTTTTTG
TACGTACGGAAAACTATCGGAAACGCATGCAGTACGTAC
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GCCCCACACTGATGCGCGGACTGGGGCGGGCAAATTGGCC

Biostrike

Scenario I



Scenario II

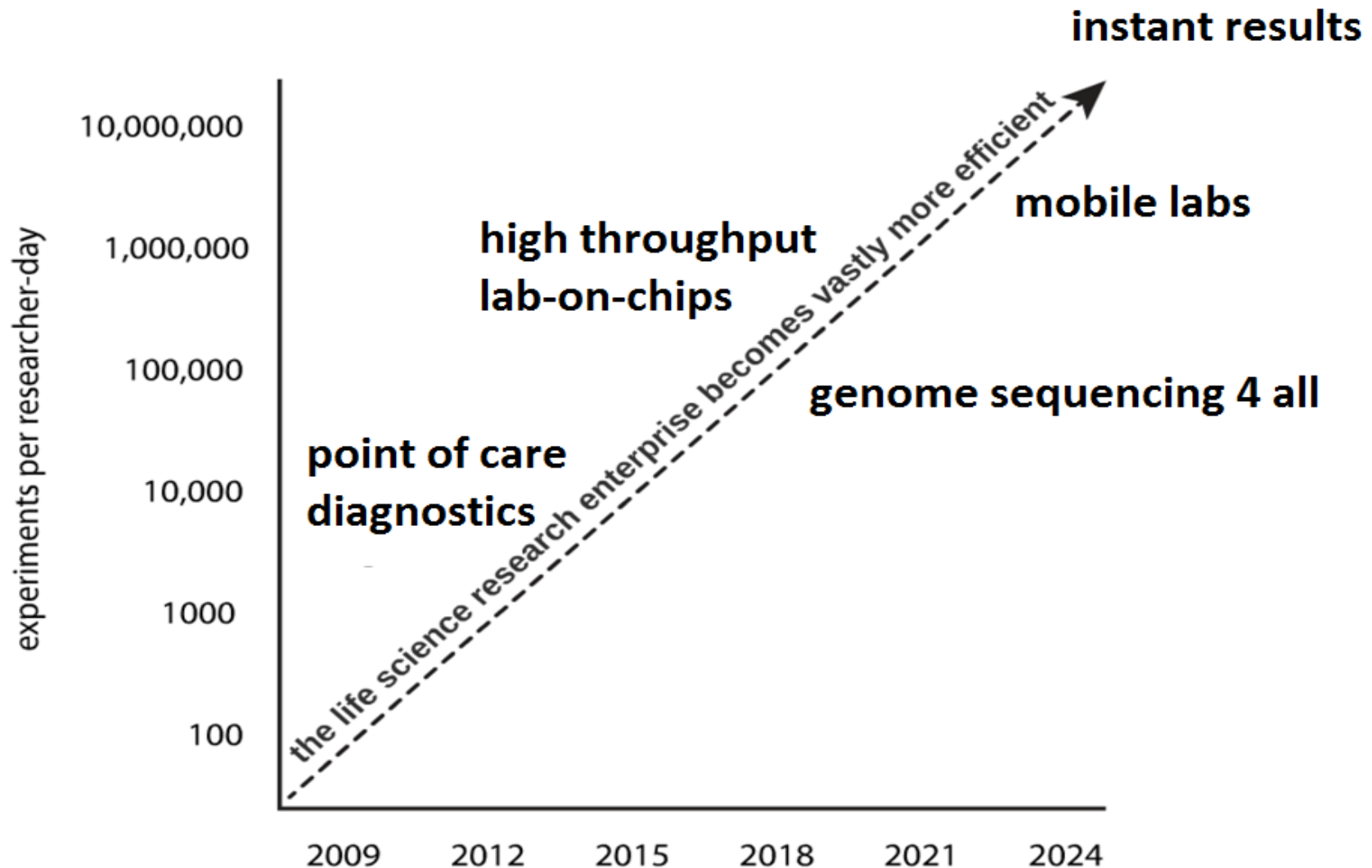


Decentralized

RESEARCH

Centralized

Moore's law for Biolabs



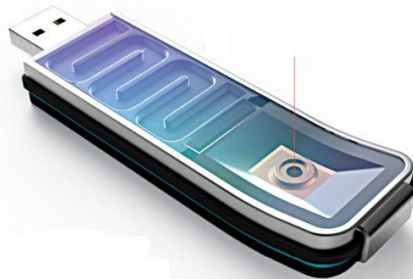
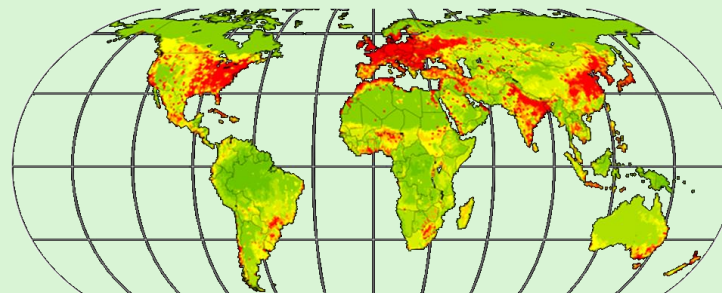
Digital biology



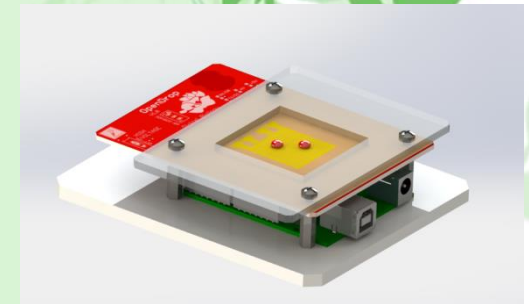
Digital Biology

AGTC

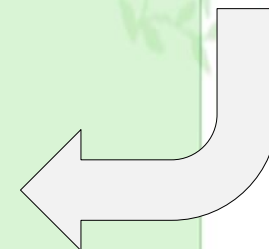
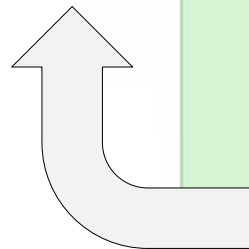
Analog Biology



**Nanopore
Sequencing**

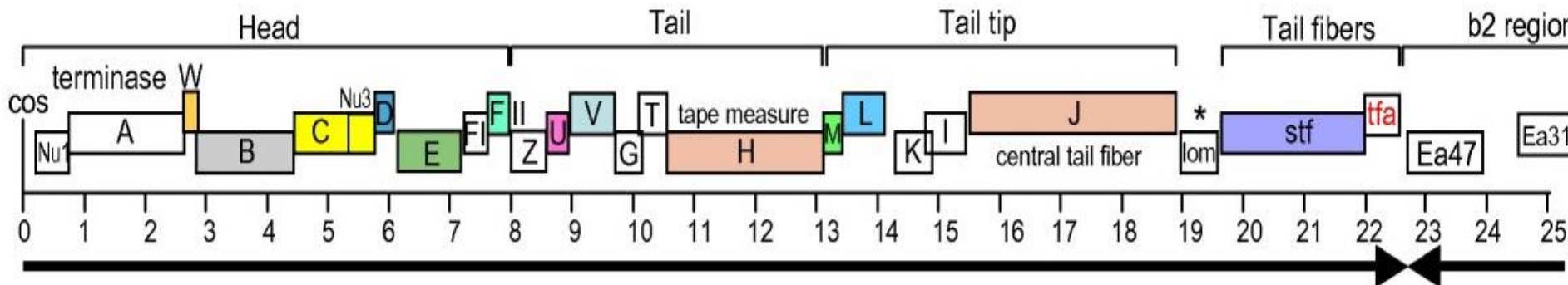
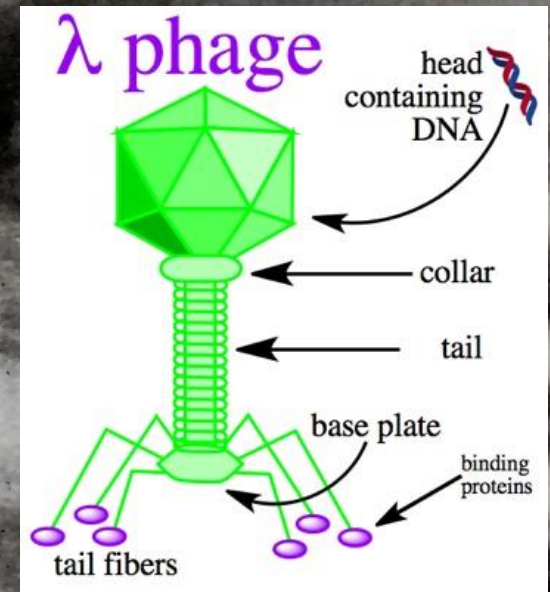


**Microfluidics
Synthesis**



Phage Therapy

- Well known since 100 years
- Programmable
- Highly specific
- Safe

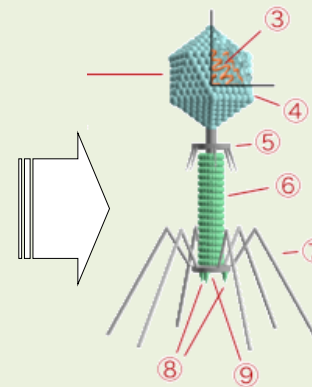
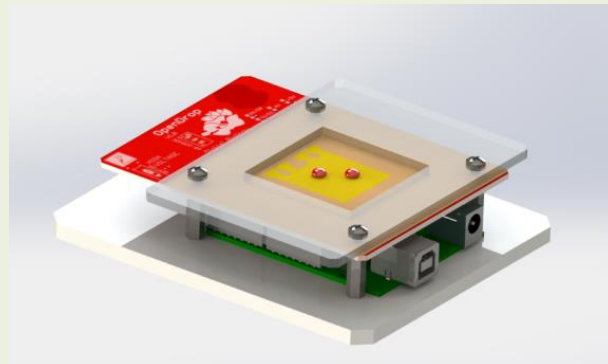


Biostrike

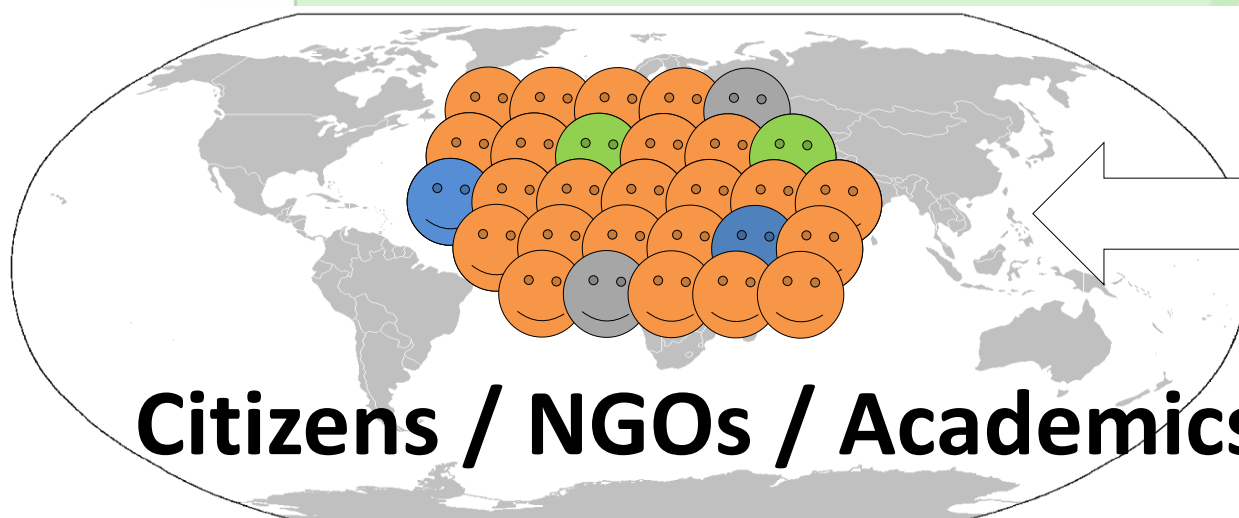
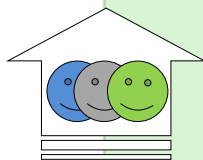
Wetware

Hardware

Software



**Bio-Commons
License**



**Personalized
Phages**



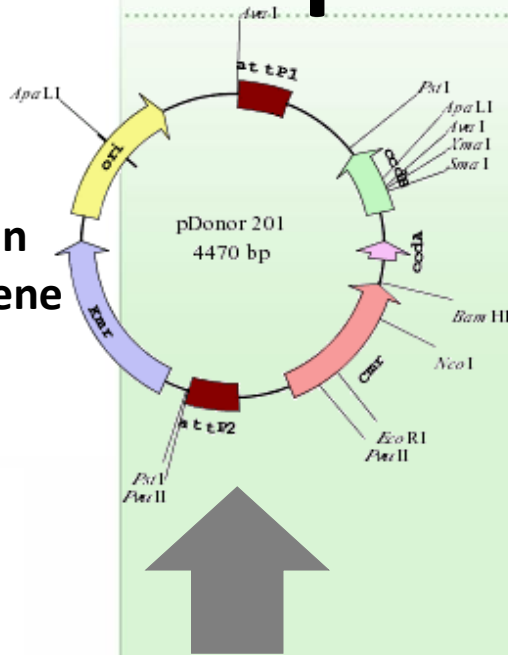
bio | commons

RESEARCH GROUP FOR BIOVALUE AND SOCIETY

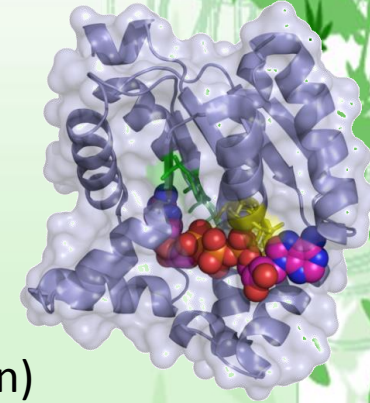


Ampicillin Resistenz

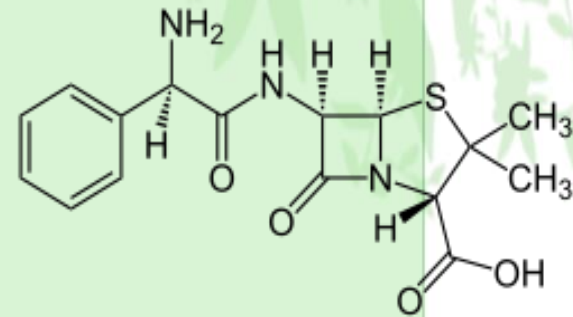
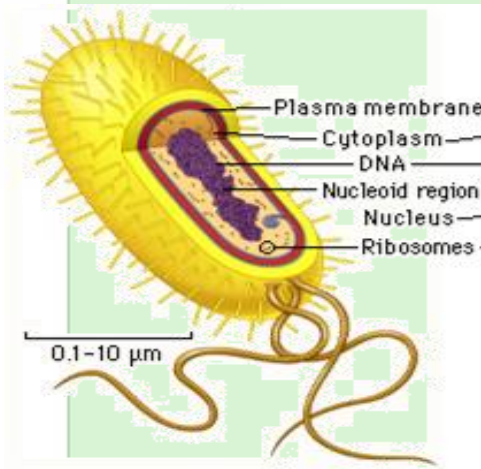
**Plasmid
With Ampicillin
Resistancce gene**



**beta-lactamase
(destorys Ampicillin)**



**Bakteria
With cell wall
(grampositiv)**



**Ampicillin
(blocks D-Alanin-Transpeptidase)**