

# Of Bacteria and Man

Why we need to run faster just to stay in  
the race

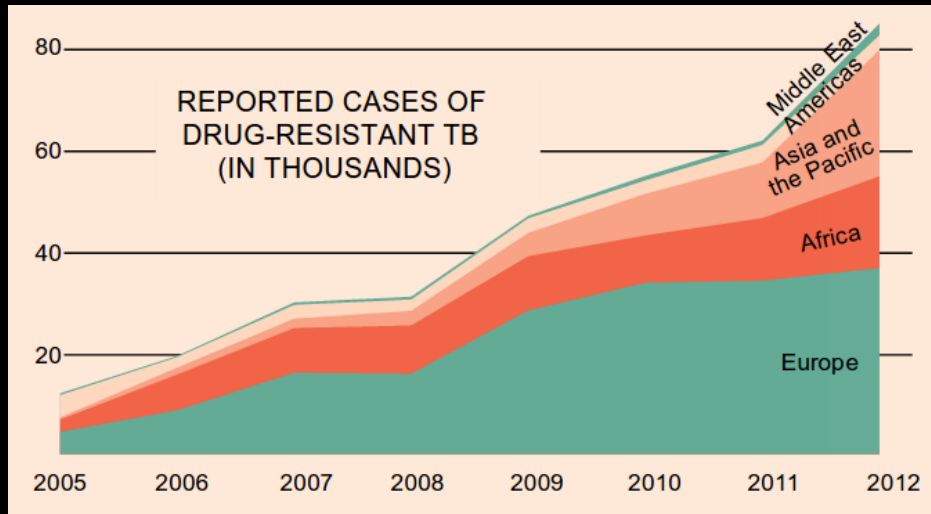
# Welcome



# Future?

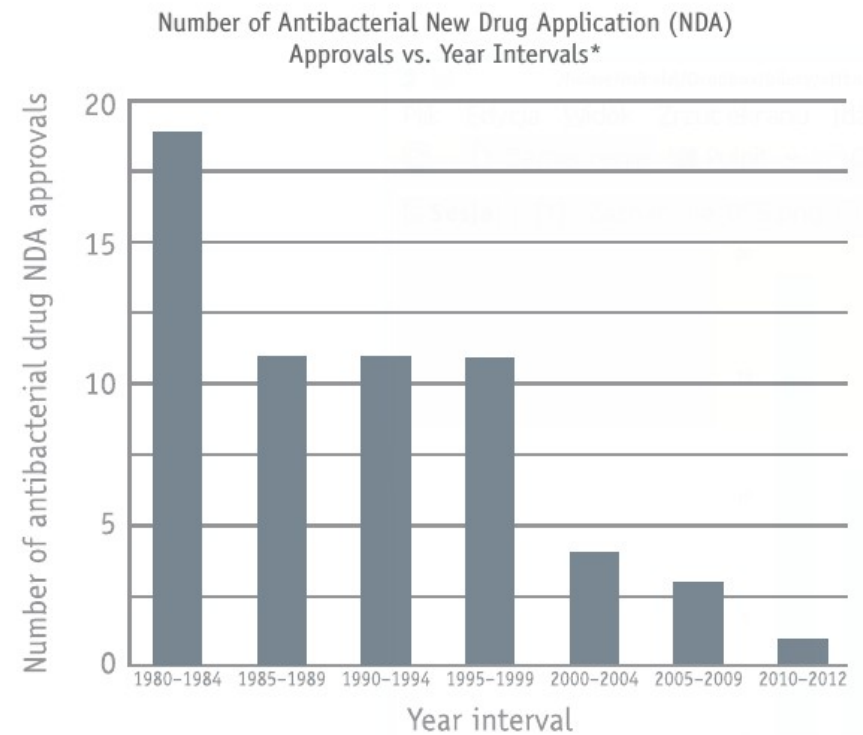


# The cause



*„It takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that”*

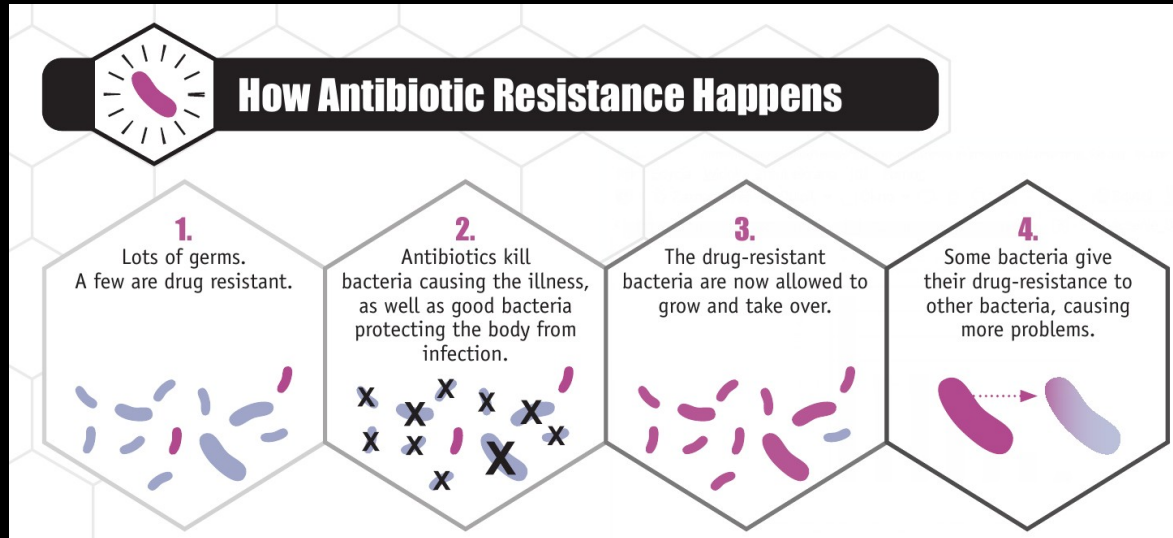
*The Red Queen*



\*Intervals from 1980-2009 are 5-year intervals; 2010-2012 is a 3-year interval. Drugs are limited to systemic agents. Data courtesy of FDA's Center for Drug Evaluation and Research (CDER).



# The root of all evil

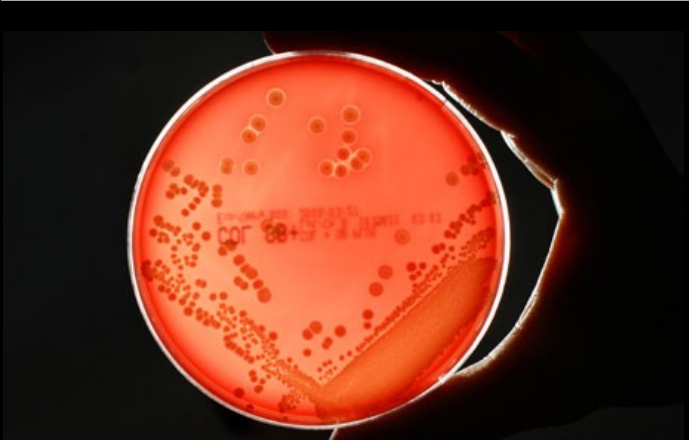


# Not all bacteria are bad

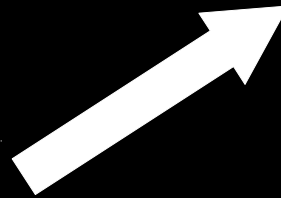
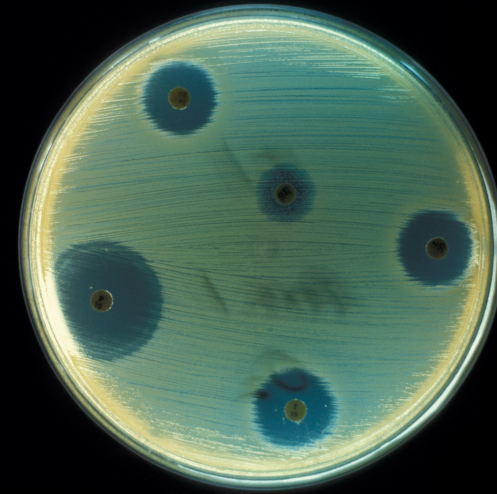




# Targeting - diagnostics



# „The old way”

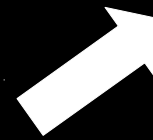
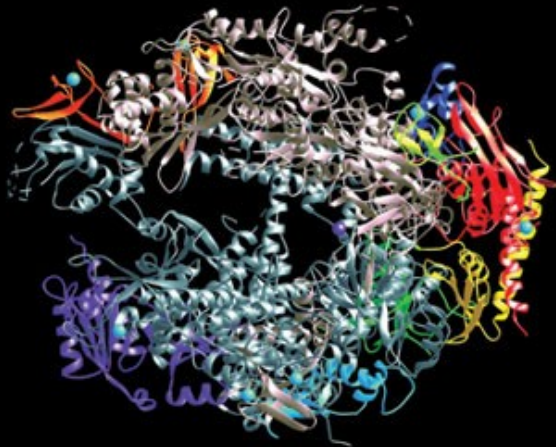
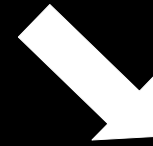




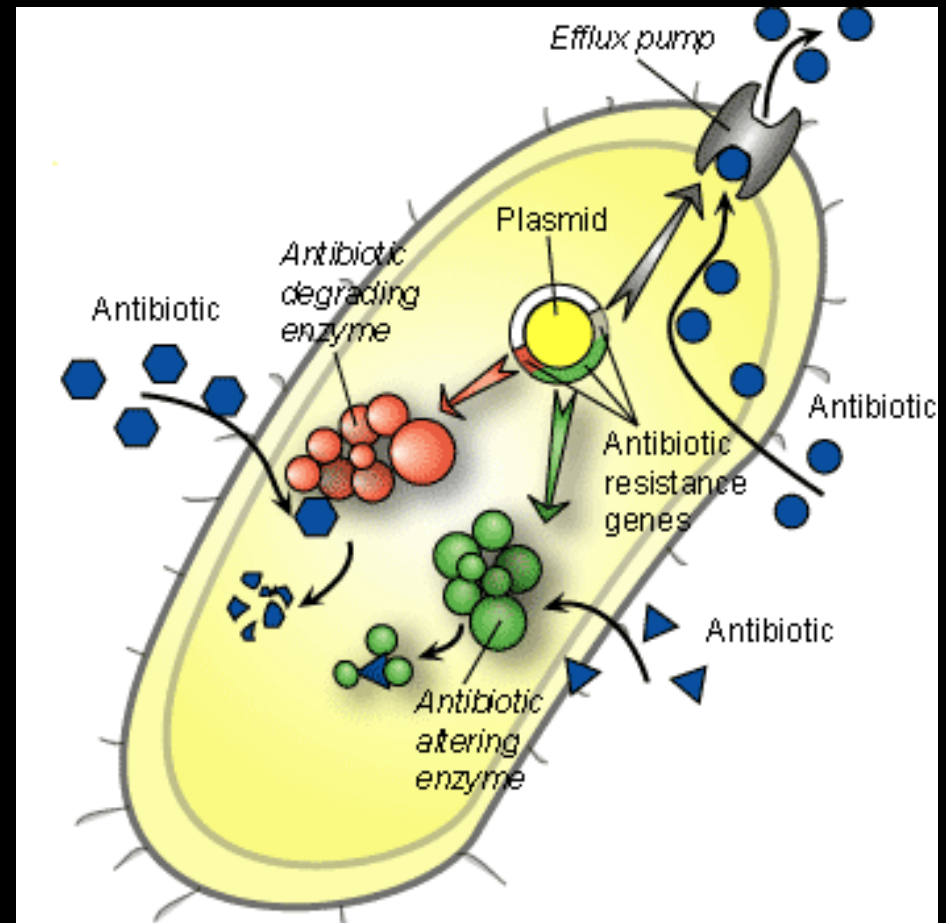
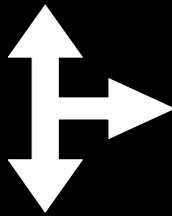
# „The old way”

- Reliable
- Just works
- Slow – days to a week
- Labor-consuming

# Modern approaches



# Modern aproaches





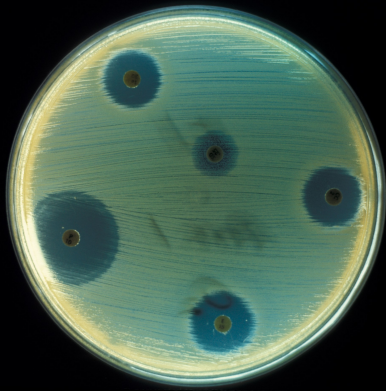
# Modern aproaches

- Fast - hours
- We can only find, if we know what we're looking for.

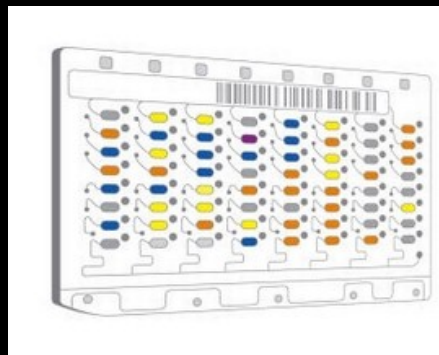
# The 3<sup>rd</sup> way

*„If brute force doesn't work, use more.“*

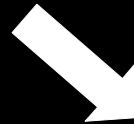
# More brute force



Multiply  
Scale-down  
Automate



64

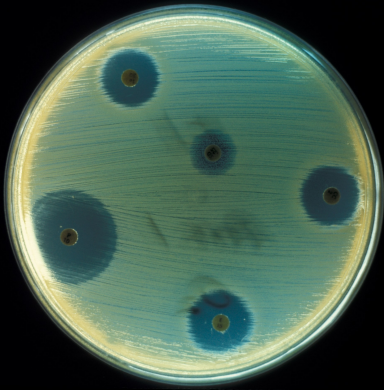


3-17 hours





# Even more brutal force



Multiply  
Scale-down  
Automate

x1000

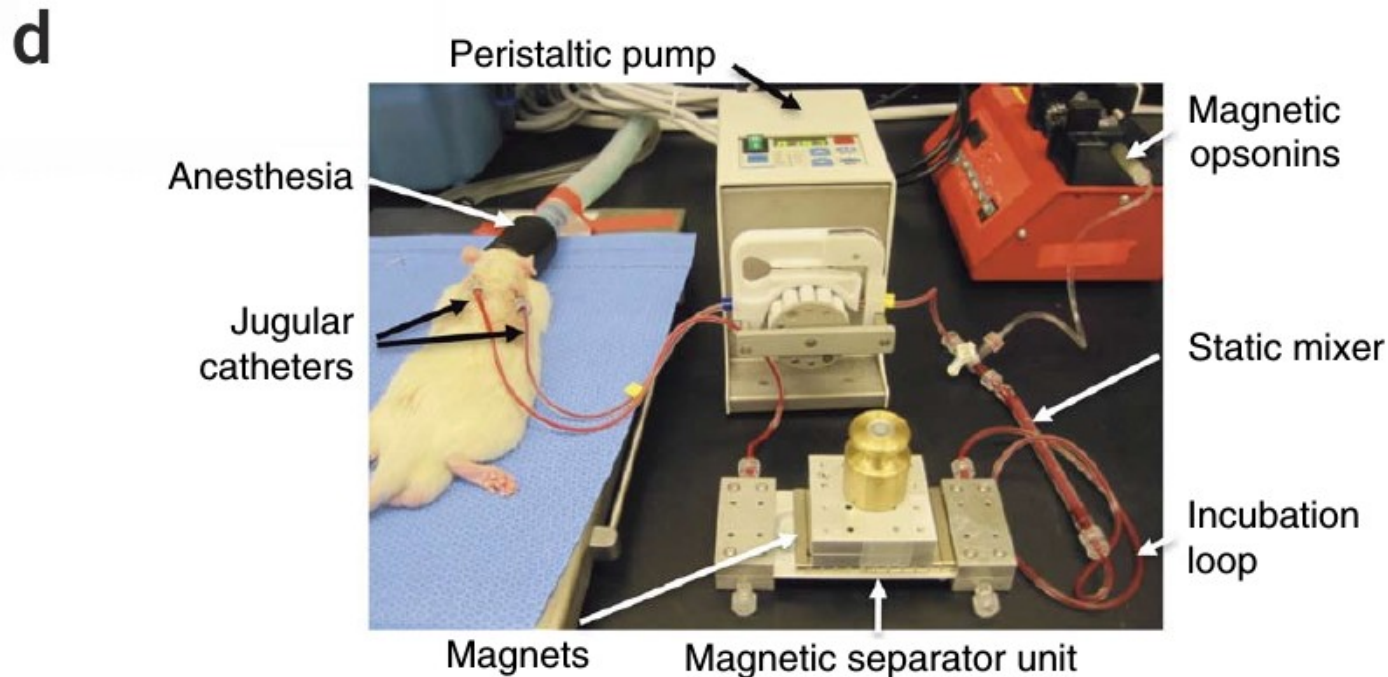
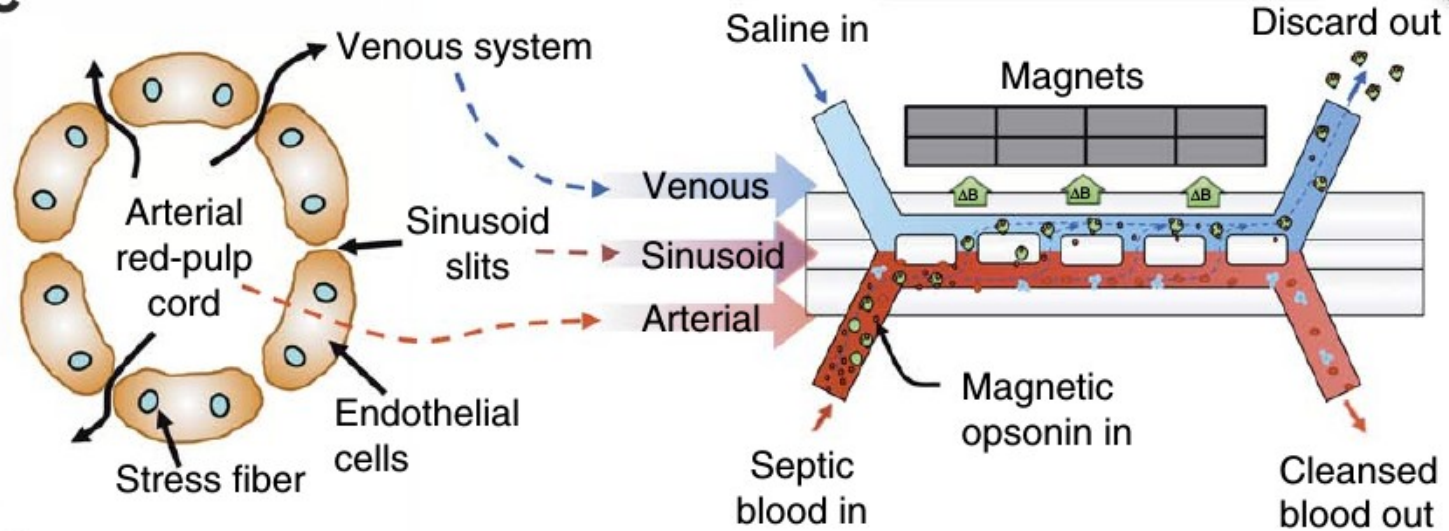
# Microfluidics

# Microfluidic in diagnostics

- Small droplet size – fast bacteria growth
- Lower detectable signal takeoff
- Power of big numbers
- No reliable commercial technology so far for bacteria culturing or antibiotic testing



# Other approaches



# Summary

