Only the mediocre are always at their best

Seuls les médiocres sont toujours à leur meilleur

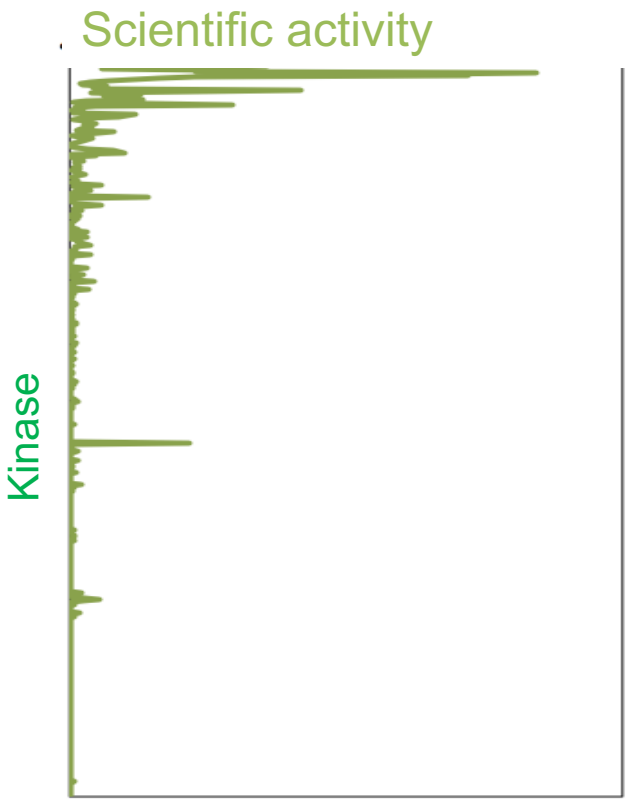
Jean Giraudoux

Are we at our best?

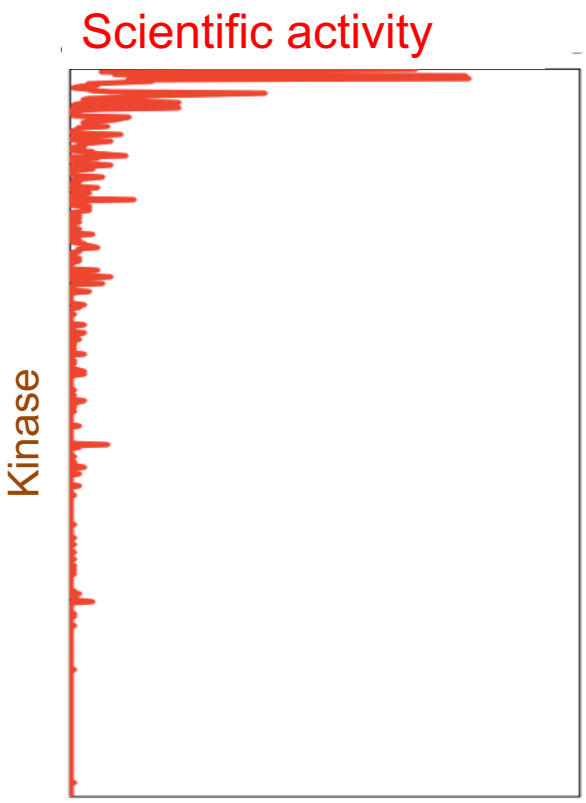
- >$250B a year invested in biomedical research
- For many diseases, we still don't even understand molecular mechanisms, let alone how to design a therapeutic strategy
- Medicines are not affordable for most people in the world

Redundancy is one cause

Global science in 2016



Canadian science in 2016



SGC – focusing on the "ignored"

- Founded 2003, an "open science" consortium to help understand human biology and find new drug targets
  - Major focus is to generate high-quality research tools (evidence-based decision)
  - Main focus is on the lesser studied proteins
  - To minimize waste, we share freely and never patent, as a core principle

- Top-down, organized university-based laboratories in 6 countries, ~300 scientists

- Laser focus on high quality science
  - 2.5 papers per week, >300 in journals with impact factor >10
  - 13% of all human protein structure information in public domain
  - Leading reputation for reproducibility (electronic lab books since 2005)

Our aim by 2030

- Have developed a freely available molecular modulator(s) for every human protein, to enable fundamental discoveries.
  - Tools to seed discoveries

- Create large sharing network that includes clinicians and patients as partners in fundamental science and drug discovery
  - Humans are the only relevant experimental model

- From our scientific insights, create large numbers of open drug discovery companies to advance drugs to regulatory approval, with the primary objective of affordability.
  - We need to re-brand “innovative drug discovery” as “experimental medicine”

- We can only do all this if align and gain trust of all people – we need to be the most aggressive open science organization in world
  - We need to be *uncomfortably* open

Open science is key to success

Open science

- more efficient way to innovate
- reduces redundancy
- improves reproducibility
- more fun

*"**Open science** is not the aim, but the solution"*

Open science impact

• Open structural biology	13% of world's human protein structures
• Open chemical probes	>10,000 samples sent, referenced in 3,000 papers
• Open hospital network	New indication for drug; new commitments of $5M
• Open lab notebook (Rachel)	>7,500 visitors; 15 new collaborations
• Open academic institutions	Two new investment by pharma in basic science ($3M)
• Open chemogenomic libraries	9 companies have donated >1,000 advanced compounds
• Open drug discovery	Company formed – CEO identified – $3M raised

The lab note book situation

- Avg. time between experiment and wide public disclosure is years
- There are a million biomedical researchers
- The system effectively condones 1-2 million years of scientific delay, each year
  - How many roads were not taken?
  - How many redundant experiments were performed?
- Is there any rational reason not to share?
- Why does the public fund science? To make our CV's better?

My lab note book aims

- Accelerate discoveries by sharing freely and quickly
- Create a broader culture of sharing
- Elicit scientific input into our experiments
- Reduce wasteful experiments
- Increase stakeholder engagement in science
- Increase reproducibility – have record of negative data

My lab note book concerns

- How do we measure success?
- How do we reward success?
- How do we make the notebooks searchable?
- How does one reference someone's lab notes?

How funders might help

- Create metrics (downloads?) that reward data/notebook generators
- Insist funded scientists use electronic lab notebooks