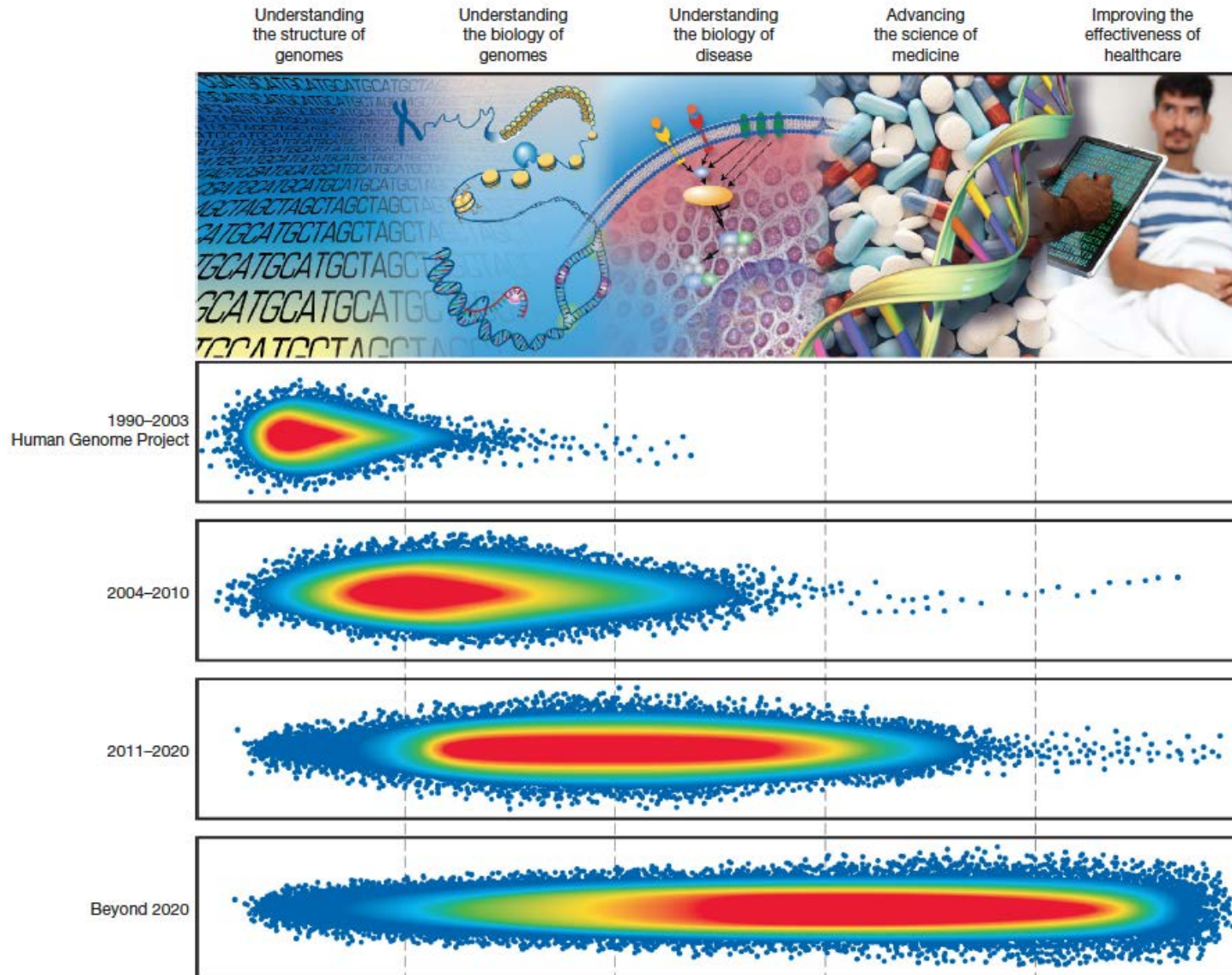




Genomic research and precision medicine

Jacques Fellay
EPFL School of Life Sciences
Swiss Institute of Bioinformatics
Lausanne, Switzerland

Genomic medicine: a revolution in the making



Human genomics beyond the clinic

“Invention of the year” 2008:

TIME

Wednesday, Oct. 29, 2008

1. The Retail DNA Test



23andMe

Company

Press Releases

23andMe Genotypes One Millionth Customer

Direct-to-Consumer Genetic Testing Company Reaches Milestone; Increases Potential for Genetic Research

Mountain View, Calif. – June 18, 2015 – 23andMe, Inc., the leading personal genetics company, today announced it has genotyped more than one million people worldwide. By accessing their own DNA to learn more about themselves, 23andMe customers have helped

TIME

Wednesday, Oct. 29, 2008

21. The Synthetic Organism

Man makes life! Or almost. (...) It will be possible generate an endless list of organisms that can perform all sorts of molecular magic, from turning sugar into fuel or digesting oil spills in oceans to even churning out cures for disease.

TIME

Wednesday, Oct. 29, 2008

40. The Seven New Deadly Sins

The Vatican updated the traditional seven deadly sins with seven new social sins, to bring the list into line with the temptations of the modern world.

The additions: bioethical sins, morally dubious experiments that harm human embryos, drug abuse, polluting, social injustice, accumulating excessive wealth and creating poverty.



Genomic medicine

TODAY

- Mendelian diseases (rare functional variants)
- Pharmacogenetics: 170 gene-drug pairs in the FDA “Table of Pharmacogenomic Biomarkers in Drug Labels”, but only 40 genes involved
- Cancer genomics
- Non-invasive prenatal testing (maternal blood sequencing)



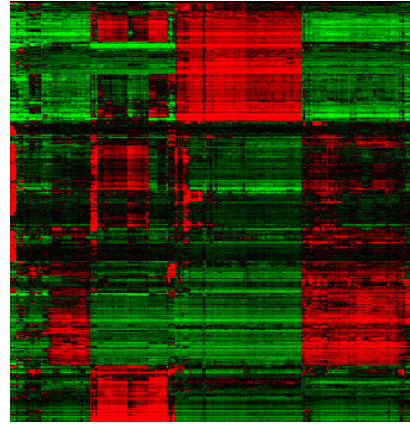
Genomic medicine

TOMORROW

- “Universal sequencing”
- Complex trait genomics (genome data in every health record) – will require an in-depth understanding of functional genomic variation
- DTC genomics brought to doctors

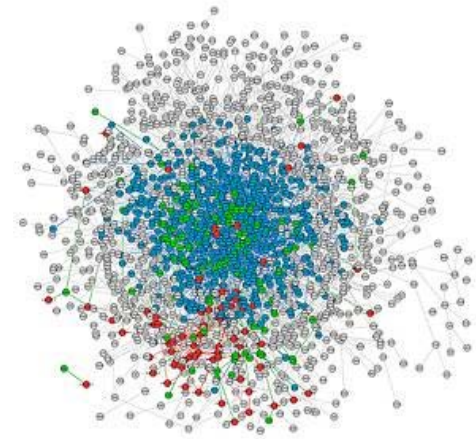


Epigenome



Transcriptome

Proteome



Metabolome



Metagenome



Perspective

- Genomic-based medicine is around the corner
- Genomic-based medicine is only the beginning of “big-data-based” personalized healthcare