

From Art to Science

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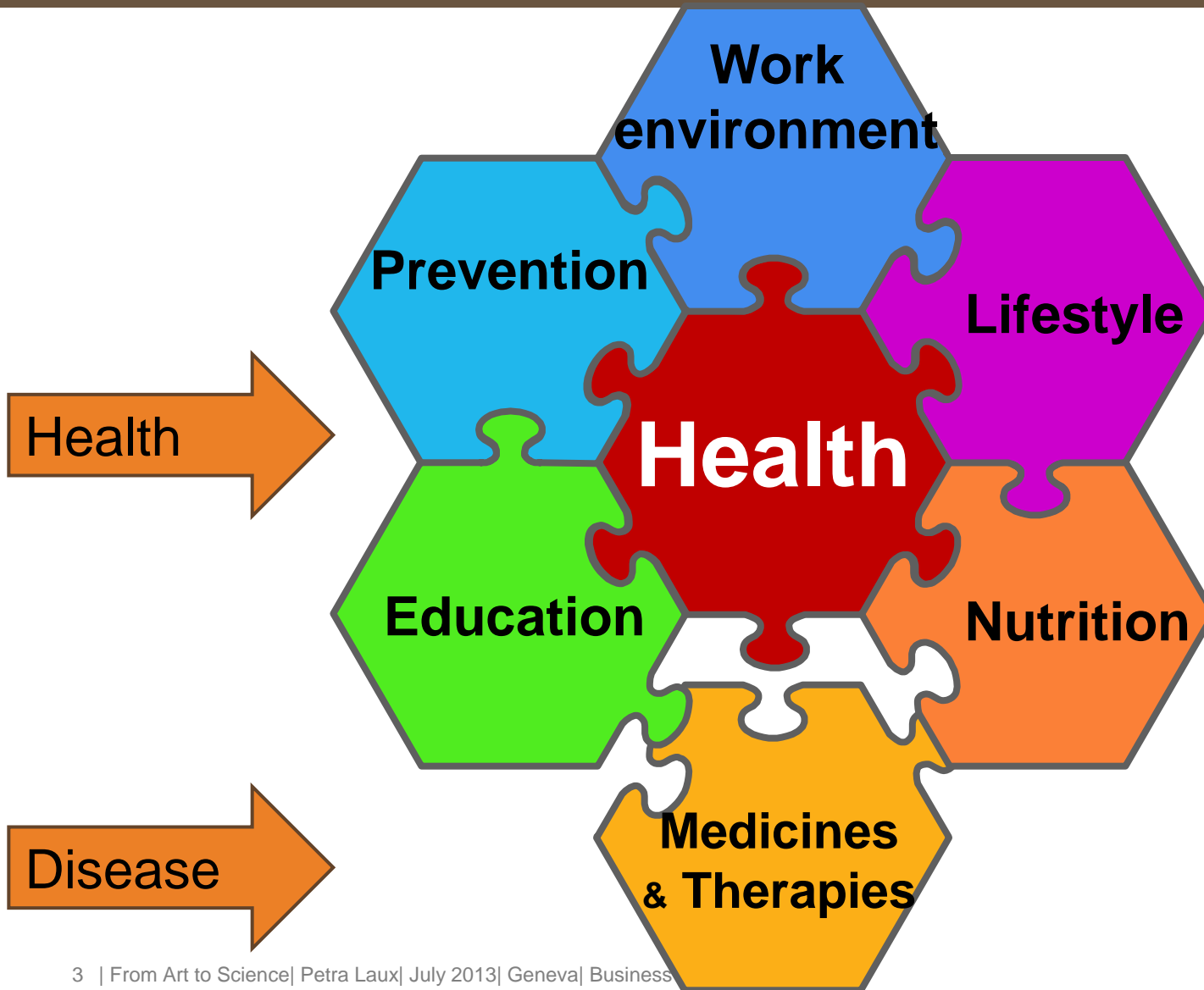
Every body is different

*"If it would not be about the
variability among individuals
medicine could well be a science
and not an art"*

Sir William Osler 1849-1919

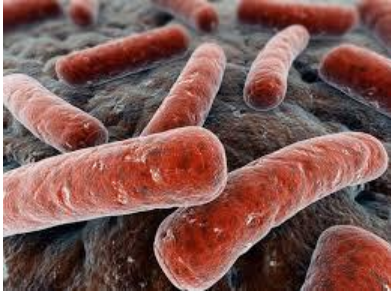


Health relies on many more components than treating disease



The need: Treatments for old and new diseases

Fighting Invaders



- Parasites
- Bacteria
- Viruses

Stopping Deterioration



- Alzheimers
- Arthritis
- Blindness
- Deafness
- Osteoporosis
- Frailty

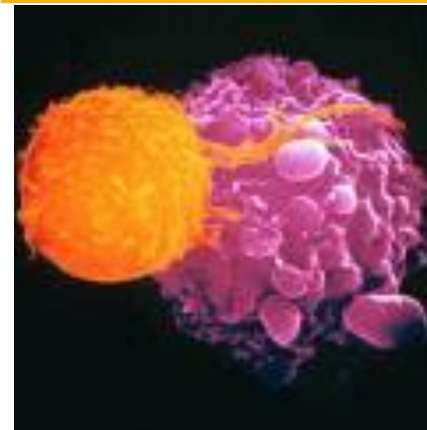
Beating Bad habits



- Diabetes
- CV disease
- Lung disease



Controlling Hyper actives



- Cancer
- Autoimmune

Historical achievements

From pain relief to disease modifying treatments

1900

Pain relief



1920/30

Surviving infections



1950/60

Controlling inflammation
Preventing Polio et all



1970/80

Surviving organ loss
& cancer



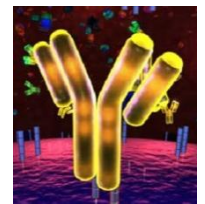
1990

Controlling CV risk

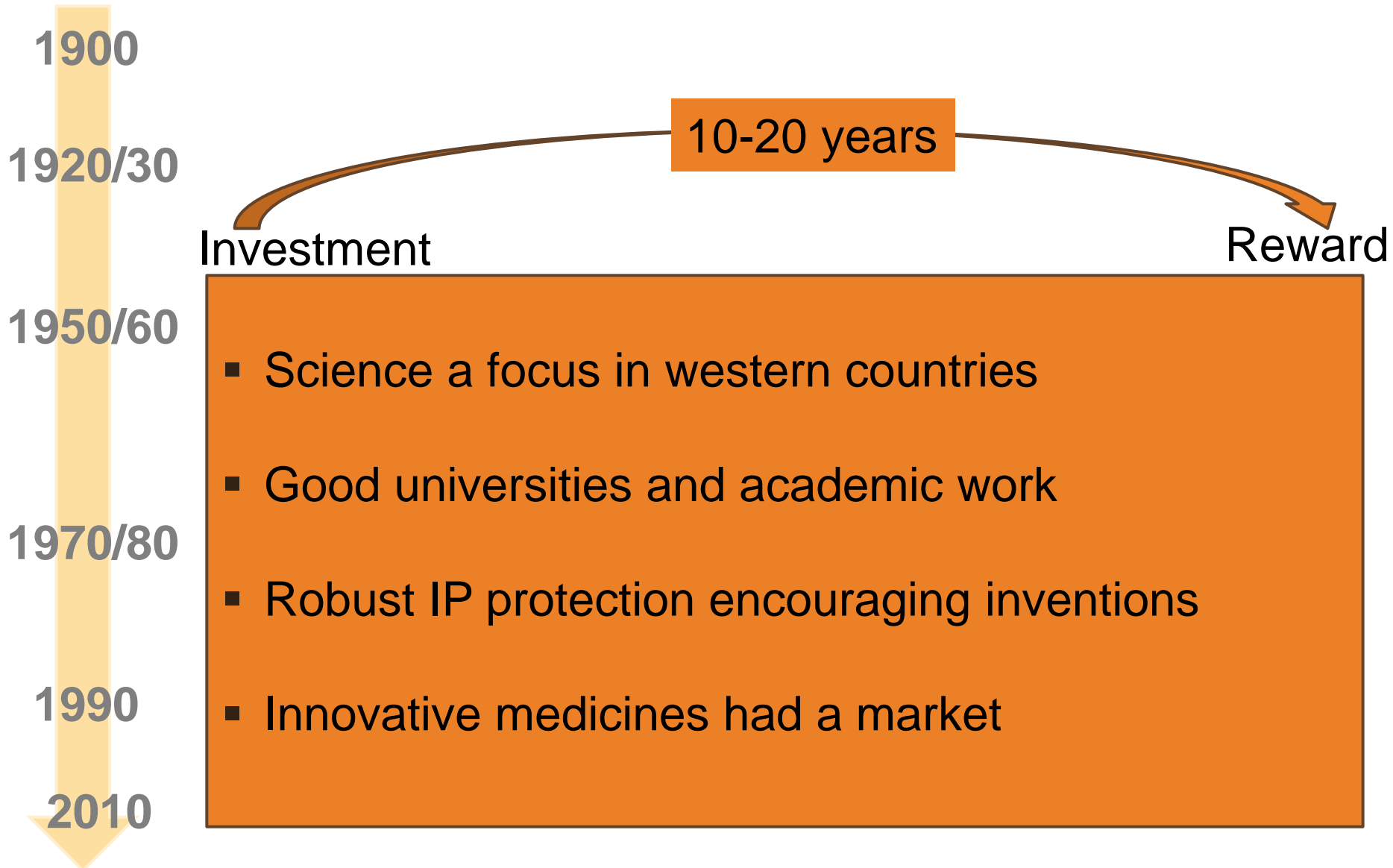


2010

Complex diseases, Less side effect



Innovation enabling environment

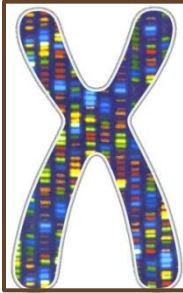


Determinants of future R&D results

- Advances in science and technology
- Wishes and fears of society
- Laws and regulations for new technologies
- Role of the Pharmaceutical industry in shaping the future



Principles for delivering treatments in the future...



New
disease
classification



Technology



Cooperation



Information
overflow



Targeted
treatments

Looking at diseases/treatments differently

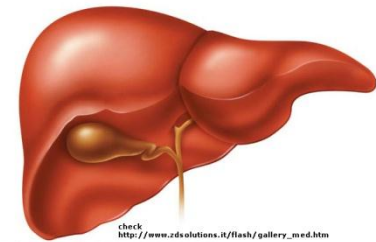
"From where to what"

Where we find it:
Organ specific



What caused it:
Pathway specific

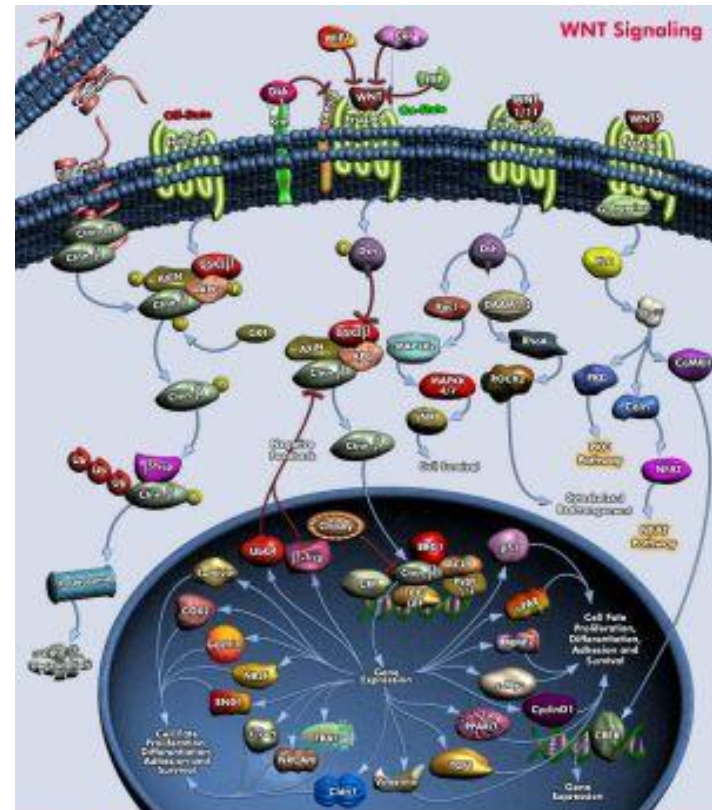
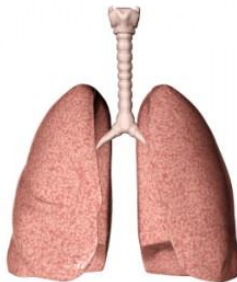
Liver



Brain



Lung



PI3K/
mTOR

Ras/
MAPK

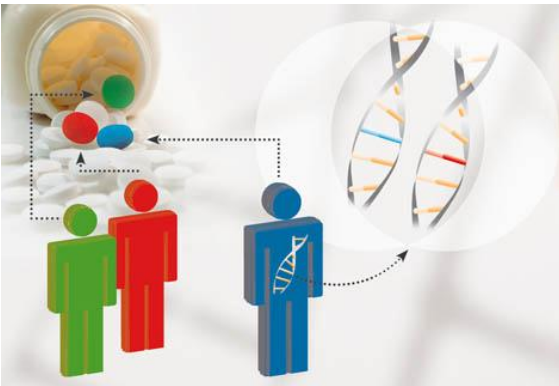
Wnt/
 β -Cat

JAK/
STAT

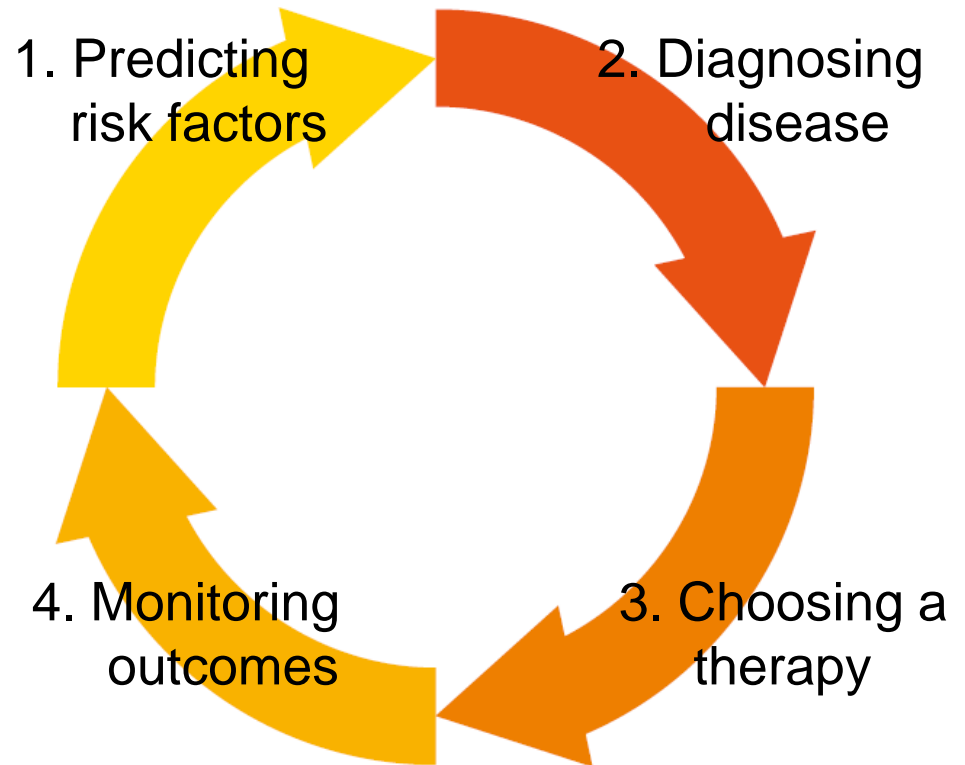
c-Kit

Targeted Treatments

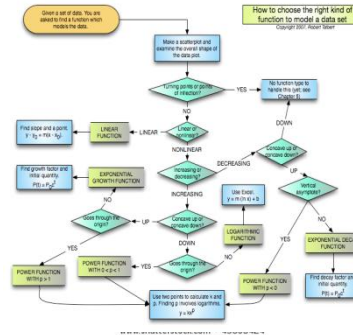
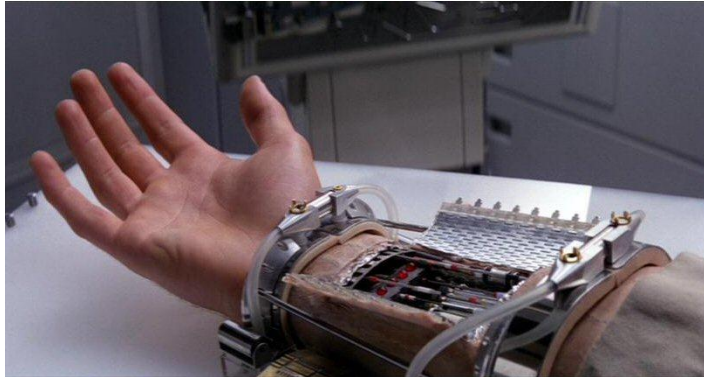
The right treatment for the right patient at the right time



- Genetics & epigenetics & biom
- Disease pathway
- New mutations



Technology enabled „diagnosis, treatment & monitoring“



Information overflow



- Genetic Data
- Diagnostic data
- Electronic Health Records
- Behavioral information
- Therapy specificities



Who requests it?
Who owns it?
Who has access?
Where is it stored?
How is it analyzed?
Quality of conclusions?
What is acted upon?

The Problem of current drug development: Using Old Approaches to Develop New Drugs

Today



- Rigid
- System centered
- Pen and paper

Tomorrow



- Flexible
- Patient centered
- Digital

How to enable the new paradigm

The Task

- Understanding the underlying mechanisms
- Proving efficacy and safety
 - Individualized treatments
 - Effects 20 years in the future?
- Leveraging scientific possibilities
- Rewarding innovation

The Need

- Incentives for academia
- New concepts/laws to test/approve
 - Use of computer models
 - Adaptive trials/Biomarkers
 - Gene modification/therapy; Stem cells
 - Precompetitive collaborations (e.g. IMI)
- Fast adapting regulations
 - Diagnostics, Implants, Devices
 - Access and use of information
- Predictable market
- Alignment on what constitutes value
- Fair & differentiated prices

A four point plan for innovation in Europe

Facilitate	Apply		Protect
<p>Smart & effective regulation</p>	<p>Equal access at highest level aligned with social market economy</p>	<p>Outcomes-based healthcare systems</p>	<p>Agenda for the knowledge economy</p>
<ul style="list-style-type: none"> ■ Reduce unnecessary bureaucracy and cost burden ■ Improve clarity of procedures ■ Adapt legislation to advancements in science 	<ul style="list-style-type: none"> ■ Eliminate access differentials in Europe in line with social market economy ■ Facilitate speedy uptake of innovation with lean procedures 	<ul style="list-style-type: none"> ■ Use innovation to improve patient outcomes ■ Total cost/ value outcomes approach to healthcare 	<ul style="list-style-type: none"> ■ Protect intellectual property, thus foster future investments ■ Robust trade agenda for stronger industry competitiveness on global markets

Another opinion on the future: Mikhail Gorbachev



- *The future depends on what we do today*
- *We should not be taken hostage by the current mix of political and economic interests*
- *Change starts with new ideas and courageous leaders*
- *Everyone has a role to play*

Thank
You