European Commission

Final Conference of the MyNewGut project

Funding human microbiome research in the EU

Stanhope Hotel
Brussels, 18 October 2018

Dirk Hadrich
Health – Personalised Medicine
Research and Innovation
European Commission

1. Breakthrough in 2010
2. Development and trends
3. Challenges and conclusions
4. New projects starting in 2019

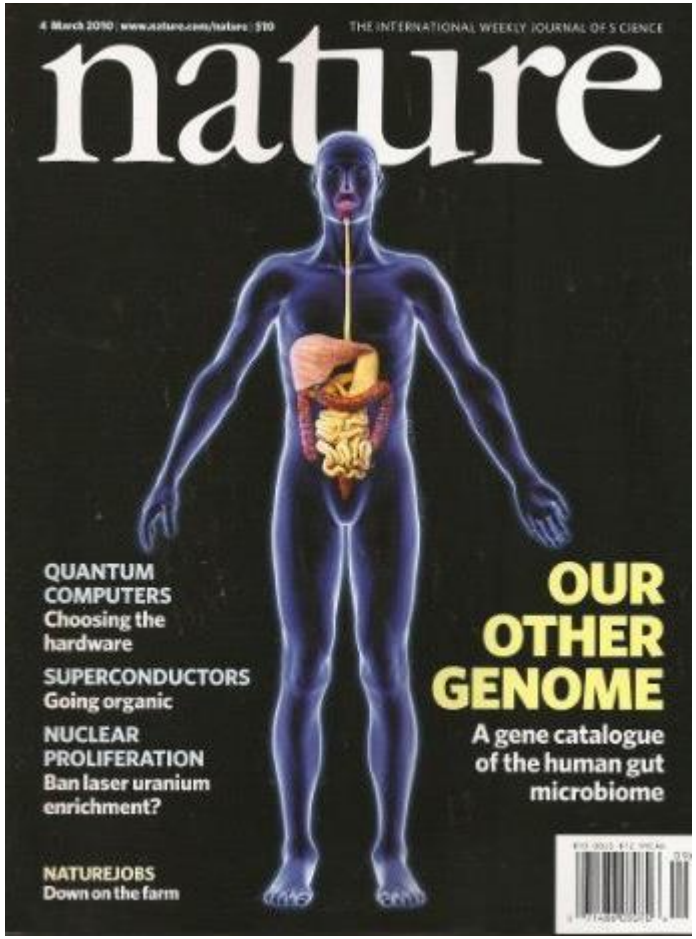
European Commission

MetaHIT

2008-2012 €11M

- Broad catalogue of 3,9 M microbial genes
- Identified >19000 different functions
- Discovered 3 distinct Enterotypes
- Low diversity is less healthy
- Established IHMC

http://www.metahit.eu/



Qin et al, NATURE 2010
Arumugam et al, NATURE 2011
Dusko Ehrlich

MetaCardis

2012-2018 €12M

- Cardiometabolic diseases
- Gut microbiome data of >2000 people
- Systems biology: Gut microbes, metabolites, lifestyle, clinical data, drugs
- Intestinal barrier damages
- Low gene richness & functional pathways
- Small intestine surface area increased
- Bariatric surgery needs to be complemented

http://www.metacardis.net/

GUT Journal 13.6.18
Pathology 9.7.2018
Laurent Genser
Karine Clement

Development and trends

- Huge hidden diversity of 100 trillion bacteria
- Isolated position of metagenomics
- Maturity of analytical technologies
- Expansion of metagenomics into other areas
- Hope on the potential of microbiome data
- Health research: Find trends in sets of big data

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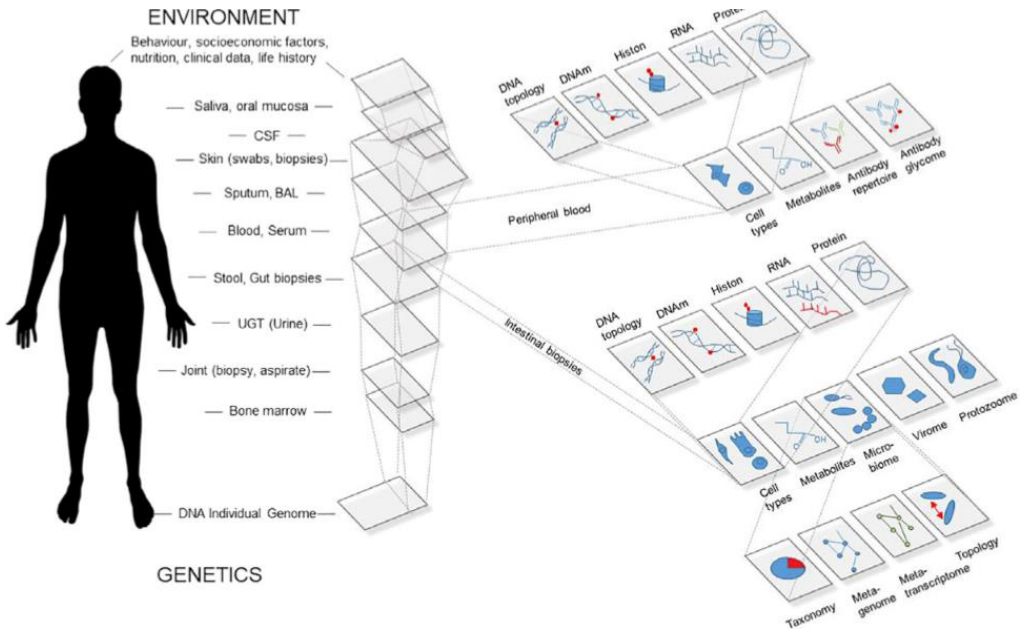
SYSCID

2017-2022 €14.5M

- Chronic inflamm. diseases
- >60% of heritable risks are unexplained by genetics
- Systems medicine
- Western diets & increased inflammation
- Maternal microbiome & microglia



http://www.syscid.eu/

Schultze et al, Immunity 17.4.2018
Christ et al, Cell 2018
Thion et al, Cell 2018

Eat2beNICE

2017-2022 €11.1M

- Maladaptive impulsivity, compulsivity, antisocial and addictive behaviours
- Effects on brain health: dietary components, lifestyle, exercise, genetics
- Promote policy changes

http://eat2benice.eu/

Concept of work packages, Alejandro Arias Vasquez

EU funded projects, budget & areas

Period		Health	Non-health	All
2007–2013 (FP7)	Projects	40	51	91
	€ M	153.4	89.6	243
2014–2017 (H2020)	Projects	73	52	125
	€ M	167.2	87.9	255
2007–2017	Projects	113	103	216
	€ M	320.6	177.5	498

Some more EU projects & their focus

EU project and ID no.	research area and keywords
ALLERGUT – 716718	allergic disorders and predisposition, environmental factors
MAARS – 261366	skin microbiomics, allergy, autoimmunity, atopic dermatitis and psoriasis
CURE – 767015	asthma, dysbiotic respiratory microbiome, phage therapy
CrUCCial – 694679	Crohn's disease and ulcerative colitis, index of pathogenic mechanisms
Eat2beNICE – 728018	maladaptive impulsivity and compulsivity and predispositions to antisocial and addictive behaviours
MultipleMS – 733161	multiple sclerosis, multi-omics, lifestyle, nutrition
INDIGO – 612116	Graves' orbitopathy, thyroid eye disease, gut-associated lymphoid tissue, biomarker discovery
FUNMETA – 293714	fungal diseases, local immune homeostasis, multi-omics, diets
INNODIA – 115797	clinical EU infrastructure to recruit type 1 diabetes patients, living biobank, biomarker discovery
FORECEE – 634570	four different female cancers, environmental factors, lifestyle, hormonal and reproductive factors
GALAXY – 668031	alcoholic liver fibrosis, gut-liver-axis, lifestyle
EnteroBariatric – 715662	bariatric surgical treatment, obesity, type 2 diabetes

Challenges

- Big vision: modulate health via microbiome
- Mechanisms are more complex
- Multi-omics, lifestyle, drugs, geography, …
- Microbes compete and adapt
- Interplay with environment (microbial transmission)
- Bigger cohorts & easy open access

UK Biobank data on 500,000 people paves way to precision medicine

10 OCTOBER 2018

- Harmonised methods to increase data comparability

  → Sample collection, storage, data processing

Conclusions: How to promote Personalised Medicine approaches in future

- Integration & Multi-disciplinarity ≠ data silos
- Involve people who hope to benefit
- Move from reactive to proactive approaches: predictive, preventive, and personalised medical solutions for the individual patient
- High impact applications for the benefit of all

nature
International journal of science
3 Oct 2018

Health topic 'SC1-BHC-03-2018':

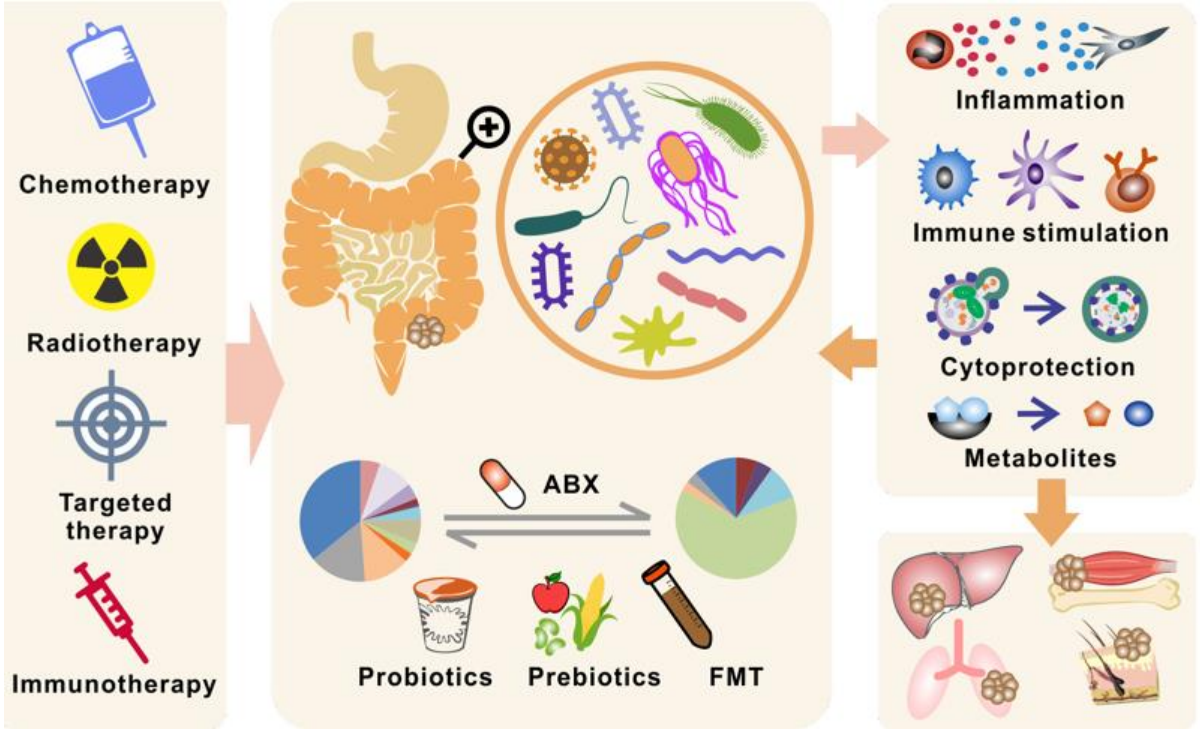
"Exploiting research outcomes and application potential of the human microbiome for personalised prediction and prevention of disease"

- Existing data and new complementary data
- Functionalities, healthy conditions, resilience
- -omics, dietary data, lifestyle, …
- Clinical tools for predicting and preventing
- € 10-15 M (total budget € 50 M)

→ Deadline 18 April 2018: 27 applications

ONCOBIOME

2019-2023
€15M



- Gut Microbiome Signatures for 4 types of cancer ("Cancer Microbiota Atlas")
- large cohorts enrolling >9,000 cancer patients across 10 countries
- Prediction of treatment response
- Influence cancer progression (companion diagnostic tests)

Laurence ZITVOGEL

http://cordis.europa.eu/home_en.html

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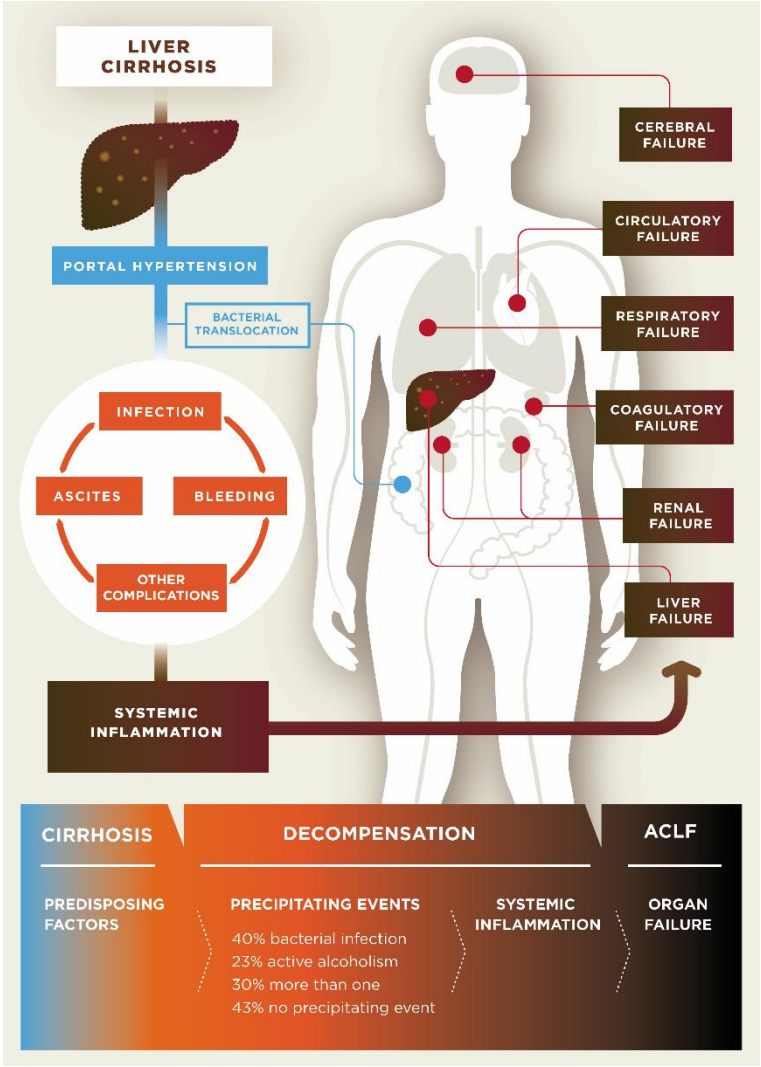
MICROB-PREDICT

2019-2024 €15M

- Acute-on-chronic liver failure
- Microbiome data of >10.000 patients
- Find functional microbial traits and interactions
- Validated tools for clinical and therapeutic decisions
- Easy-to-use nanobiosensors (PoC)
- Patient Organisation involved



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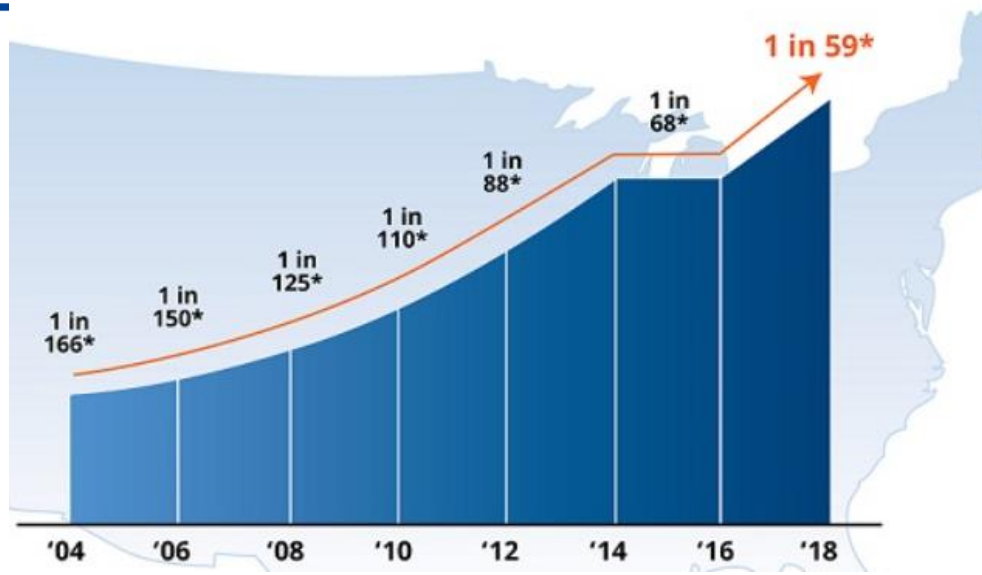
Jonel TREBICKA

GEMMA

2019-2023

€14,2M



- Autism
- Involves 600 at-risk infants
- Understand multifactorial risks
- Interactions between gut microbiome, intestinal barrier and immune response
- Integrative analytical platform using Artificial Intelligence and multi-omics
- Preventive nutritional formulation

autismspeaks.org
CDC estimate 2018
Alessio FASANO

http://cordis.europa.eu/home_en.html

Health topic 'SC1-BHC-01-2019'

"Understanding causative mechanisms in co- and multimorbidities"

- Validate mechanisms
- Exploit existing and generate new data
- Integrate lifestyle, behaviour, etc.
- € 4-6 M, total budget € 70 M
- Deadlines 2.10.18 & 16.4.19

Health topic 'SC1-BHC-25-2019'

" Demonstration pilot for implementation of personalised medicine in healthcare "

- Linking different actors & use multitude of data
- Show benefit, implementability, economic viability of Personalised Medicine in real life
- Going beyond cancer and rare diseases
- Pilot tailored to the needs of citizens
- IA for € 18-20 M, total € 60 M
- Deadlines 2 October 2018 & 16 April 2019

Future

- Linking different actors, multi-disciplinarity, partnerships, involving end-users & citizens
- Use multitude of data, integration & combination of real-world-data
- Standards for data comparability
- Real-life implementation of approaches
- Digital tools for faster clinical decisions
- International collaboration
- Focus on impact

CLUSTER 1: Health

Everyone has the right to timely access to affordable healthcare of good quality (EU Pillar of Social Rights, UN SDGs).

3 Health challenges:

- **Threats to citizens and public health:** rise of non-communicable diseases; spread of antimicrobial drug resistance; emergence of infectious epidemics; health risks in a rapidly changing social, urban and natural environment

- **Sustainability of social and health care systems:** increasing costs for European health care systems; lack of effective health promotion and disease prevention; persistence of health inequalities, affecting disproportionally the vulnerable

- **Competitiveness of EU's health and care industry:** personalised medicine approaches and digitalisation in health and care; increasing pressure from new and emerging global players in health innovation

These challenges are **complex, interlinked and global.**

CLUSTER 1: Health

6 Intervention areas:

1. Health throughout the life course
2. Environmental and Social Health Determinants
3. Non-Communicable and Rare Diseases
4. Infectious Diseases
5. Tools, Technologies and Digital Solutions for Health and Care
6. Health Care Systems

CLUSTER 1: Health

What is new?

- **Digitalisation and personalisation** of health and care cut across all intervention areas
- **Health economics** and **health systems** are key for uptake of results and achieving impact
- **Patient-centered solutions and technologies** for health and care call for integrated approaches from medicines to medical devices (supported in Horizon 2020 under the pillar 'Leadership in Enabling and Industrial Technologies')