Towards personalised food and nutrition

Prof. Dr. Koen Kas @kaskoen

September 20, 2017
The science behind a meal

Biology
Technology
Data
Behaviour x Design

Which one is sweetest?
Mood-enhancing food menu to create calmer in-flight experience

Monarch Airlines

Health = your biology + environment + lifestyle

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Public health recommendations based on averages of population data

Individuals differ in their response because of inherent variations in & complexity of individual genetic makeup & lifestyle & environment

Tools emerge to translate these variations into personalized recommendations

Based on great review van Ommen et al., Nutrition Reviews, Volume 75, 1 August 2017, 579–599
https://doi.org/10.1093/nutrit/nux029

Disease incidence ~ Change in dietetic habits when people migrate
4 cups a day and other mortality studies (N=20,000)

N = 135,000 study challenges conventional wisdom about carbs & fats

**Associations of fats and carbohydrate intake with cardiovascular disease and mortality in 18 countries from five continents (PURE): a prospective cohort study**

Dr Mahshid Dehghan, PhD, Andrew Mento, PhD, Xiaohe Zhang, MSc, Sumathi Swaminathan, PhD, Prof Wei Li, PhD, Prof Viswanathan Mohan, MD, Romaina Iqbal, PhD, Prof Rajesh Kumar, MD, Edelweiss Wentzel-Viljoen, PhD, Prof Annika Rosengren, MD, Leela Ilty Amma, MD, Prof Alvaro Avezum, MD, Jephthah Chifamba, DPhil, Rafael Diaz, MD, Rasha Khatib, PhD, Prof Scott Lear, PhD, Prof Patricio Lopez-Jaramillo, MD, Xiaoyun Liu, PhD, Prof Rajeev Gupta, MD, Nouchin
Can your diet help fight disease?

“Our food should be our medicine and our medicine should be our food.”

~ Hippocrates
In L.A., Kids At Risk Of Diabetes Are Getting Prescriptions For Free Fruit

Prevention—in the form of healthy, affordable produce—is what the doctor ordered.

Food as medicine
Caelum Health wants to use software to improve people's health without prescribing them drugs. It's starting with irritable bowel syndrome, which affects 20 percent of Americans and leads to $55 billion worth of prescriptions. Caelum provides behavioral health treatments that it says are 3x more effective than prescription drugs, all on a mobile app platform.

Food as medicine

Welcome to FoodTherapyMD™!
If you have a specific health question about your diet or a potential topic that you would like us to address in our blog, please let us know!
“Doctors pour drugs of which they know little, to cure diseases of which they know less, into patients of whom they know nothing.”

Molière, French author (1622-1673)

3 guardian angels

8755hrs

(Gen)omics & biomarkers
Sensors (wearables,..)
Internet of Things

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Your personal genome - DNA code 3.000.000.000

The era of Personal genome analysers

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Oxford Nanopore

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DNA RESULT: AVOID LACTOSE

Explore nutrition insights and more. With Helix, unlock a lifetime of new discoveries with your DNA.

Shop now ➤
Personalised nutrition based on DNA polymorphisms

(Neuro) biology of personalised food
Resto menu based on your DNA

The sweet tooth gene
Obese people lack cells with satiety hormones

Grasping walnuts

Walnuts activate portion of the brain involved in cognitive control, making it easier for you to stop overeating
Eating at 'wrong time' affects body weight, circadian rhythms

Cara
Your personal food and symptom diary

YOUR PERSONAL DIARY
Cara helps you to keep track of your nutrition, symptoms, stress, mood, medication and your individual factors.

SMART ANALYSIS
Analyze the connection between your symptoms and triggers.

GET PERSONAL INSIGHTS
Get actionable insights to be your healthy best.

https://www.cara-app.com/
Genes VERSUS diet -> Genes AND diet
The epigenetic code

Calorie restriction -> lengthened lifespan by slowing down epigenetic drift
Diet & gut microbiome influence epigenetic modulation

No guts no glory: Harvesting the microbiome of athletes


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Gut bacteria trigger gene complex protecting against autoimmune disease (T1 diabetes,...)
Quantified Self generation 1.0

1. Step detection
2. Heart Pulse
3. Heart rate variability
4. Blood pressure
5. Blood oxygenation
6. Body temperature
7. Sleep

Actionable insights
Track calories simply photographing your food

INTRODUCING SNAP IT BY LOSE IT!
Now, tracking your food is as easy as snapping a picture.
Tracking diet with chew-monitoring necklace or speech

Wearable food nutrition feedback system
Unhealthy cravings curbed by smartphone treatment – project ICare

Artificial intelligence to turn images of food into recipes

Pic2Recipe!
Upload an image

Bestand kiezen
Geen bestand gekozen

or select one of these
The Vitameter provides the best way for you to proactively manage your health. Track your vitamin levels at home and buy customized supplements based on what you ACTUALLY need.

Take out survey

Ingredient scanners marching on
**Portable food scanners**

SCIO

Bosch X-Spect

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**Allergen detector could fit in your pocket**

Harvard Medical School

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Synthetic biology powered food

Aranex Biotech

SAFER peanuts

We are developing hypoallergenic peanuts that lack the major allergens responsible for allergic reactions.

From: Systems biology of personalized nutrition
1st artificial pancreas approved, T1D

Medtronic, Sugar.IQ, powered by IBM Watson

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IBM Watson + Pathway Genomics

Panorama

Hybrid artificial intelligence fusing scientific big data and deep learning for personalized health.

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If nutrition labels looked like this

The average restaurant meal today is more than four times larger than in the 1950s

SOURCE: CDC

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Mirrored tableware tricks brain to change eating habits
Insurance policy rewards employees’ healthy shopping choices with cash

EastRight Rewards is encouraging healthy eating among employees by offering cash to those that buy fruit and veg at the supermarket.

Filed under:
- Food & Beverage
- Health & Wellbeing

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It pays to live healthy

Introducing Wellcoin, the world’s first health currency. Earn Wellcoins for all your healthy choices, big and small.

Spend your Wellcoins on fabulous rewards

There are hundreds of rewards in our marketplace.

- Gym Classes: 0 Wellcoins
- Seed, Healthy Food: 1,000 Wellcoins
- Workout Gear: 9,000 Wellcoins

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Jobs of the future: Communication with (food) coaches

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HealthSlate

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HEALTHYMATION

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Soon 1st Personalised food prevention App

Medicare to reimburse for Diabetes Prevention Program, including Omada's digital version

By Jonell Comstock | March 23, 2016

HHS Secretary Sylvia Burwell announced today that Medicare will cover the Diabetes Prevention Program, including digital versions like omada health. This marks the first time a preventative model from a CMS Innovation Center has been expanded into the Medicare program.

“This program has been shown to reduce health care costs and help prevent diabetes, and is one that Medicare, employers and private insurers can use to help 6 million Americans live healthier,” Burwell said in a statement. “The Affordable Care Act gave Medicare the tools to support this groundbreaking effort and to expand this program more broadly. Today’s announcement is a milestone for prevention and America’s health.”

HHS reported that, based on pilot studies, participants in the program lost an average of 5 percent of their body weight, 50 percent attended at least four weekly sessions, and, compared to Medicare beneficiaries outside the program, the DPP would save about $2,500 per enrollee.

Sickcare -> Healthcare
Precise medicine to Personalised Prevention

Omics Biomarkers

Internet of Things

Sensors

Actions / Behaviours

BIG Data

Devices / Robots

Machine Learning

Artificial Intelligence

Baymax, Big Hero 6
The Ikea Recipe Series

How can we help you?

Eye-opening, inspiring Keynotes

Self-learning Newsletter
Unknown unknowns

Connectors unlocking data silo’s

healthskouts

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