Personalized nutrition, a new setting for nutrition and health related business

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Personalised nutrition offers a new way to deal with this complex and difficult issue.

The system underlying dietary behaviour is extremely complex.

We have never known more about what food is good for health... ...but having the freedom to make the right choices seems to create problems.
Two key issues that people are increasingly facing

What foods and what eating patterns are right for ME to have stable and good health in order to allow me to do what I would like to do?

How do I go about changing my behaviour to adopt these recommendations?
Working definition of personalised nutrition

The recommendation of a dietary behaviour that is appropriate for an individual to maintain optimal health. It takes into account the individual’s dietary and lifestyle patterns and preferences, phenotypic (biomarker) status and genetic background and delivers advice about food choice, eating patterns and lifestyle relevant to nutrition and health.

Nutrigenomics

(University of California, Davis)

The science of how foods affect our genes, how individual genetic differences can affect the way we respond to nutrients and how this gene-nutrition interaction affects diet-related diseases.
The essence of personalised nutrition

Metabolic factors

- Biological status
  - Physical (weight,...)
  - Genetics (SNPs)
  - Physiological (biomarkers)

Behavioral factors

- Nutrition behaviour
  - food choices
  - eating patterns
- Lifestyle
  - physical
  - psychological
  - emotional
  - societal
The essence of personalised nutrition

Effectiveness

- Personal goals and preferences
  - Health
  - Food
  - Lifestyle
  - Performance
  - Beauty
  - PN process

Assess risk/benefit profile

Metabolic factors

Behavioral factors
The essence of personalised nutrition

Coaching
Effectiveness

- Personal goals and preferences
  - Health
  - Food
  - Lifestyle
  - Performance
  - Beauty
  - PN process

Metabolic factors

Behavioral factors

Assess risk/benefit profile

Measurement – Analysis - Assessment

Personal goals and preferences
Personalised nutrition is aimed at lasting dietary behaviour change

- Appropriateness of nutritional carrier selection
- Degree of experience of health and well-being
- Degree of acceptance of feedback parameters
- Preparedness to accept nutritional counselling
- Effectiveness of support and coaching
- Acceptance of genetic diagnostic information
- Effectiveness of nutritional advice
The personalised nutrition system

- Appropriateness of nutritional carrier selection
- Effectiveness of nutritional advice
- Degree of experience of health and well-being
- Degree of acceptance of feedback parameters
- Preparedness to accept nutritional counselling
- Effectiveness of support and coaching
The personalised nutrition system is deeply rooted in the societal tissue.

Value creation concepts for personalised nutrition will be facing important societal issues.
3 types of personalisation

**Personalised nutrition**
- Interface, tools, feedback preferences, psycho-social factors

**Individual recommendation for dietary behaviour**
- Dietary intake
- Food preferences
- Lifestyle preferences

**Basic personal nutritional recommendations**
- Phenotyping (physical parameters and biomarkers)
- Genotyping (SNP profile)

**Optimal nutrient requirements**
- Biomarkers $\leftrightarrow$ Nutrient $\leftrightarrow$ Genotype interactions
Population = group of different metabolisms

- Individual metabolic differences may not be large enough to justify different advices
  - identify people with similar metabo-types and tailor advice to each group

Not everyone has a significantly different metabolic profile

Metabo-types = People with very similar metabolism

- Personalisation = analyse each person to determine to which metabolic group he/she belongs
Consumer’s expectation of “personalisation”

Essential attributes

- **Personal contact**
- **Qualified expert advice**
- **Exercise & lifestyle**
- **Regular support & guidance**

Attributes to differentiate

- **Group support ⇔ one-to-one guidance**
  - groups may motivate to adhere to advice
- **Dietary intake data ⇔ phenotypic data ⇔ genotypic data**
  - dietary intake data often seen too general
  - phenotypic data is most acceptable, familiar
  - genotypic data is often too far-fetched
- **Scientific evidence ⇔ alternative evidence**
  - there is a niche favoring experience-based evidence
- **Individual payment ⇔ sponsored program**
  - government or employer sponsored programs are viable option for some
- **Personal food preferences ⇔ radical change in dietary patterns**
  - dietary advice based on personal food preferences is easier to comply to, but for some it is too much in conflict with health needs
The real challenge of personalised nutrition is not to build sound nutritional advice, but to make it applicable in a real life situation.
Key take away message (1)

“Personalised nutrition will fundamentally change the way consumers make food choices, thus resolving the consumer's dilemma in making appropriate food choices that fit with lifestyle preferences and health goals”

(individual perspective)
A constellation of activities

Information collection
- biological status
- quantified self
- sampling
- monitoring tools
- analytics
- questionnaires

Risk/benefit
- lifestyle/food, habits & preferences
- advice generation
- coherent
- science based interpretation
- algorithms
- databases

Delivery feedback
- mobile tools
- personal contact
- interface
- personal
- contact

Behaviour supporting tools
- intelligent kitchen
- shopping assistants
- personalised food delivery
A constellation of activities

Who will handle all of these activities?

A new networked system is likely to emerge

...it will affect all food and health related systems, from the entire food chain to the pharmaceutical and medical world, from doctors and dieticians to employers, teachers, caterers, social workers

...profoundly impacting how our society perceives the food and health relationship
New business models – new integrating actors

Individual clients (consumers, patients, employees,...)

- Medical profession
- Dieticians/nutritionists
- Wellness/Fitness centres
- Employers
- Schools
- Day-care
- Retailers
- Public health care
- Hospitals
- Insurance

PN service integrators

- Medical appliance industry
- Household appliance industry
- App interface providers
- Knowledge rule developers
- Database service providers
- Diagnostics industry
- Analytical laboratories

Hospitals

Medical profession

Dieticians/nutritionists

Wellness/Fitness centres

Employers

Schools

Day-care

Retailers

Public health care

Medical profession

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Individual clients (consumers, patients, employees,...)
A wealth of possible PN business model concepts: 6 key characteristics to differentiate

Type of data gathered
- self reported
- + BMI
- phenotyping
- genotyping

Type of interface used
- internet
- email
- telephone
- face to face

Tracking effectiveness
- none
- limited
- rigorous

Frequency of feedback
- one-off
- self-requested
- organised
- monitoring

Nature of feedback
- health status,
- food & diet plan
- activity profile
- lifestyle

Type of organiser
- business
- corporate
- government
- NGO
Technology is adding significant drive

**Nutrigenomics**

is deepening insights in the link between metabolism and health

more **reliable** and **appropriate** nutritional and dietary advice

**Diagnostic and monitoring tools**

reduce the barrier to ‘quantify yourself’, both on metabolic status and behaviour

**awareness** about the **actual** personal **health** status

**Mobile interfaces**

make information ubiquitous and instantly available

facilitate **instant informed** decision making in **food choices** (shopping, menu-choice, activity)
A vision of the future
Technology helps to integrate many aspects

RESTAURANT

3D-printer

DATA CENTER
HEALTH CARE SERVICE PROVIDER
HEALTH MANAGEMENT PROGRAMM

BODY WEIGHT
BLOOD PRESSURE
BLOOD METABOLITES
EXERCISE MONITORING

GENETIC TESTING
ON-LINE MONITORING DEVICES

CONSUMER

SUPERMARKET

HOME DELIVERY

FOOD INTAKE QUANTIFICATION

Jo Goossens - shiftN

Key take away message (2)

“Personalised nutrition will shift the value creation focus of food/health related businesses from products to services focusing on supporting consumers with information and advice to optimise health and dietary behaviour”

(industry perspective)
Future scenarios > business model concepts

- Conception of health
- Logic of health
- Management issue
- Quality of life
- Care systems
- Economic
- Personal conviction

- My Health
- My Home
- Smart Sister
- Community
- Wiki Health
- Google
Common features of future value creation concepts

Gradually emerging in a changing environment (transition dynamics)

Networked structure
  Initiators and integrators driving the development
  Distributed profit centres

Community driven and society encompassing approaches

Public private partnerships will be most relevant to accommodate societal impact
Value creation concepts for personalised nutrition are inherently linked to a change in the societal context.

**Personalised nutrition value creation concepts**

Societal changes to resolve the nutrition and health issue are very likely to trigger personalised nutrition concepts.

Personalised nutrition concepts are very likely to result in societal changes.

Changing perceptions in society on the value of food and its role in health.
In the longer term (10-20 years)

Broad acceptance of personalised nutrition is likely to bring significant changes in the societal context

The following is likely to happen:

- Blurring borders between nutrition/diet and health care
- Community based approaches
- Education in food and health will be revived
- Personal health data as an individual value asset
- Self quantification (monitoring and feedback) will be a habit
- Health counselling ubiquitous
- Dietary behaviour advice will reduce need for special foods (except for people with metabolic disorders)
- There will be a uniform data and interpretation platform for diet/nutrition/health
Food4Me scenario brochure, whitebook & video

Scenario brochure:
http://www.food4me.org/component/content/article/2-content/191-brochurescenariospersonalisednutrition

Whitebook:

Video:
https://www.youtube.com/watch?v=yUn9QgXWb-w
Key take away message (3)

“Personalised nutrition will have a substantial societal impact by changing the perceived role and the value of food in contributing to optimal health, thus alleviating the health care burden”

(societal perspective)
An example - a new integrating service platform

Individual clients (consumers, patients, employees,...)

- Hospitals
- Public health care
- Insurance
- Medical profession
- Dieticians/nutritionists
- Wellness/Fitness centres
- Employers
- Schools
- Day-care
- Retailers
- Medical appliance industry
- Household appliance industry
- Analytical laboratories
- Diagnostics industry
- Database service providers
- Knowledge rule developers
- App interface providers
- Quisper

SUPPLIERS

Database and knowledge rule providers

Interest to join
Integrated platform for sharing and creating value from scientific and consumer information

CLIENTS

Interest to use
Integrated and coherent source (API) of all relevant interpreted scientific data and knowledge for personalised nutrition

EU project databases (free of cost)

Scientific Research

- Roll out plan

- Quisper Association (AISBL) – not for profit structure
- Started 1 Jan 2016
- Quisper Quality Label
- Membership fee to use the platform
  - Companies EUR 2,500 (SME) – 10,000
- Consultation fee for each query:
  - Data queries: based on volume (cost/datapoint)
  - Knowledge rule queries: based on frequency (cost/consultation)
    - different types of knowledge rules: daily/weekly – monthly – yearly
  - Other services by members can be offered via the platform:
    - app development support, knowledge rule development support, app performance measurement
Quisper services available at start

**EUROFIR FOOD COMPOSITION DATA**
(28 countries)

**EUROFIR DIETARY REFERENCE VALUES**
(D-A-CH, UK, IT, Nordic countries)

**Gender, birthdate**
Weight, length
**Food intake**
Physical activity
Other measurements (bloodpr., cholesterol)

**IPH**
Dietary & physical activity ADVICE

**Biomarkers**

**SWISS ANALYSIS**
Micronutrient RECOMMENDATION

**Gender, age**
BMI, Waist Circumf.
Nutrient intake & portions/gram intake
Physical activity
Biomarkers (13)
*Genes (6)*

**SAFECAPE**
Dietary & physical activity ADVICE

**FOOD4ME ALG.**
Dietary & physical activity ADVICE
New services foreseen

- EUROFIR FOOD COMPOSITION DATA (28 countries)
- EUROFIR DIETARY REFERENCE VALUES (D-A-CH, UK, It, Nordic countries)
- EUROFIR & IPH RECIPES FOOD PICTURES PORTIONS
- IFR & FOODWIZZ GENERIC & BRANDED FOODS (UK)

- IPH Dietary & physical activity ADVICE
- SWISS ANALYSIS Micronutrient RECOMMENDATION
- SAFECAPE Dietary & physical activity ADVICE
- FOOD4ME ALG. Dietary & physical activity ADVICE

- SWISS ANALYSIS - KEITH ADVICE based on biomarkers and genes (45)
- IPH - MUNICH UNIVERSITY daily dietary RECOMMENDATIONS linked with ADVICE Food4Me & MENU PLANNER
- FOOD4ME ALG. - KEITH expand ADVICE with additional genes
3 types of personalisation

- Biomarkers
- Nutrient interactions
- Genotype

Optimal nutrient requirements

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Basic personal nutritional recommendations

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Personalised nutrition

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- Lifestyle preferences

Tools for personalised nutrition advice

Biomarkers <-> nutrient <-> genotype interactions
Quisper - 3 key advantages

- **Single unified portal for accessing** data and knowledge rules to interpret personal health/diet/lifestyle information to generate a personalised nutrition advice.

- **Neutral validation of the scientific appropriateness** of the data and knowledge rules offered through Quisper (scientific advisory board and evaluation procedures).

- **Harmonisation of the data and knowledge rules** originating from different sources when accessed through Quisper (strict quality requirements from suppliers).
Thank you

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