Innovatie in gezonde voeding: “Elk voordeel heb z’n nadeel”
“Innovation in Healthy Nutrition: Every Advantage Has a Disadvantage”
Fred Brouns

2008… Call from University Board

Wish to develop new Study Programs in Bio-business and Innovation?
Are you interested?

A global producer and marketer of food, agricultural, financial and industrial products and services.
Go/noGo?

Why would I do that?

What is the advantage

"Elk voordeel heb z’n nadeel"
"Every advantage has a disadvantage"

Johan Cruijff

http://spanje.blog.nl/files/2011/04/Johan-Cruijff.png
A steak prior to the match gives you extra power!

Added value?

In 1983 left Wander Dietetics to start my PhD studies at RUL

- Critic: sport drinks supply “empty calories”, thus lead to reduced vitamin intakes in athletes
- Solution: add vitamins to sports drink in relation to energy density of the daily diet
- Dutch Food Law: Adding vitamins to a sports drink poses a public health risk and is forbidden
- In Germany drinks with added vitamins were considered safe and legal......

- Case support document "Vitamins and Sport" in laymen language for the lawyers

- Cassis de Dijon decision: goods lawfully produced in one Member State of the European Union (EU) can also be sold in any other EU state

“Judges do not understand biomedical experts”
Prof van Koppen- President European Association of Psychology and Law

- for taking appropriate decisions in many cases, judges are more and more dependent on seeking advice from external experts.
- Judges are lawyers that do not know about the biomedical aspects of the suspect, the DNA traces, etc.
- After the expert has given his advice, a paradoxical situation occurs: the judge has to trust the information and decide whether or not he is going to use that for his evidence review and final ruling.
- Such a judgement, however, is only possible if the judge has knowledge about the working field of the expert……….BUT, he does not have that!
- good scientific opinions may be ignored because they are not well understood (better no decision than a wrong one...)
- Wrong decisions may be taken based on not knowing the backgrounds of the facts….. The lady went to prison but was not guilty........!
- This paradoxal situation seems not unsolvable!
- analogy: sales managers ↔ nutrition scientists. How to make that happen?

2008... back to University?

- >25 years in food and beverage R&D
- enriched >200 expert meetings and a long list of communications and publications
- I have a deep passion to connect people and bridge gaps in knowledge

YES

Bio-business and Innovation
MSc. Health Food Innovation Management

.. complex matter in a “simple context”

Engaged Teachers ↔ Engaged students

- Teaching is not about filling empty spots in knowledge.
- Onderwijs gaat niet om het vullen van gaten in kennis.

- It is more about starting a fire inside to feed the eagerness to learn more
- Het gaat vooral om het ontsteken van een innerlijk vuurtje dat de gretigheid om meer te leren voedt
Let’s put that in perspective

Simpel is moeilijk
"Simple is difficult"

During a life time

- You eat and drink > 50,000 hours
- You consume > 55,000,000 Kcal = 13.750 KG sugar
- You drink > 65,000 liters of fluid
- You produce a fecal weight equivalent to the weight of several big elephants

Yet, what do we know about our food, nutrition and consumption behavior?
• Vitamins
• Minerals
• Fibers

• Pre-biotics
• Pro-biotics
• Sterols
• glucosamine

• Fruit
• Vegetables
• Milk

2010 Freedom to communicate and sell

“Moving Science”
“Moving Law”
“Moving Consumer Interests”
Coca Cola was originally marketed as a tonic containing cocaine and being a cure for headaches and other illnesses.

Ovaltine/Ovomaltine: a health drink
Malt, Barley, Egg, Milk and Cocoa

10/17/11

1900: DROSTE cocoa shows a nurse on the box of cacao powder

• Suggesting the health/healing power of the chocolate milk.

“Health” has always been selling. Yet, not everything is healthy.
• Can we improve foods to create added value
• Can we prove the benefits
What is innovation?

- Innovate (Latin “innovare”), to renew or change, containing in → “into” + novus → “new”

- The central meaning of innovation relates to renewal or improvement, with novelty being a consequence of this improvement.

Renewal or Improvement

“The voyage of discovery is not seeking new landscapes but having new eyes”

Marcel Proust
Arrows formula 1 racing team
Spent 80,000 pounds to reduce the weight of the front wing by 150 grams without compromising strength.

... the bodyweight of the driver? Can we....

What is innovation?

- Innovation is the successful implementation of creative ideas within an organization.
- "Innovation is a management process that requires specific tools, rules, and discipline."

Amabile & Conti, et al. 1996
What is innovation?

- Innovation is the **successful** implementation of creative ideas within an organization.

- "Innovation is a management process that requires specific tools, rules, and discipline."

**Added Value**

Innovation process developments

- 1st gen: heavy funding of R&D
- 2nd gen: R&D + marketing
- 3rd gen: + consumer insights
- 4th gen: 'deeper' business processes.
- 5th gen: Align with new technologies and start open innovation to obtain "Fresh Blood" from outside

Less time ➔ less costs ➔ value

Creating business value through innovation
Arthur D. Little et al. 2011

Too often there is a lack of clarity on:

- what *value creation* innovation is intended to generate:
  - Top line growth → revenues
  - Shareholder value → company value
  - Bottom line optimization → profit

- organizational and behavioral barriers to collaboration and cross disciplinary working

Complex interrelationships

Understanding the key elements of innovation and their interrelationships is a must to appreciate for our students.

www.adl.com/reports.html?view=77
“De waarheid is nooit precies zoals je denkt dat hij zou zijn.”

“The truth is never exactly as you thought it would be”

The truth and the confused consumer

Foods With Benefits, or So They Say

The New York Times

May 14, 2011

• Are all these products really healthy, or are some of them just hyped? The answer to that question matters to millions of Americans who are wagering their money and their waistlines on hot new products in the grocery aisles called “functional foods.”

• Food companies market functional foods with health-promoting or wellness-maintaining properties. Such claims are perfectly legal, provided that they are backed up by some credible science.

Consumers took Danone to court in USA

- Dannon has marketed Activia and DanActive yogurt products as “clinically” and “scientifically” proven to regulate digestion and boost immune systems.

- Wiener, who suffers from stomach problems, told ABC News, “I saw the ad on TV, and I went to the market specifically to buy it…” “And there was absolutely no change whatsoever in my digestive system.”

- “The judge agreed that the marketers were making claims they simply hadn’t proven”. ➔ $45 million settlement

Confused consumers

- Understanding the sources of consumer confusion is essential for the establishment of effective communication strategies that tell the simple truth.
- Misleading claims may cost more than the product development itself

Confusing scientific news
Do .. Scientists overturn accepted theory of disease? 26/02/2004

- thinking that oxygen free radicals are responsible for the development of numerous diseases may be a red herring, says a team of UK scientists.
- Millions were "misspent by the pharmaceutical industry in chasing the red herring of the involvement of oxygen free radicals in the causation of many diseases".
- “Many patients might be using expensive antioxidant drugs based upon completely invalid theories as to their therapeutic potential,”

Food antioxidants?

Segal, Nature (vol 427, no 6977, p853)

Folic acid controversy

- FA was "the first functional food ingredient that effectively was shown to reduce a disease risk (spina bifida)"
- But, FA may induce positive or negative effects depending on FA status, tissue type and timing

Smith D. et al Am J Clin Nutr 2008; 87, 517-533
Folic acid controversy

FA deficiency

Risk of neoplastic transformation

Progression of cancer

Normal ➔ Neoplasia ➔ Cancer

Risk of neoplastic transformation

Progression of cancer

FA Supplementation

Satiation power

Protein > Carbohydrate > Fat

Are you overweight? Eat more protein!

High-protein, reduced-carbohydrate weight-loss diets promote metabolite profiles likely to be detrimental to colonic health\(^1\)-\(^4\)

Wendy R Russell, Silvia W Gratz, Sylvia R Duncan, Grietje Balme, Jennifer Ince, Lorraine Scobie, Garry Duncan, Alexandre M Johnson, Gerald E Lobley, R John Wallace, Garry G Dunne, and Harry J Fine


Do you know the unintended consequences, the counter side of increase intakes & supplementation?
• What other biological processes can be influenced?
• Are you prepared for the unexpected?
Consumers buy “on belief”
Marketing managers “buy and sell belief”

“Ik laat me betalen voor mijn Naam en Faam, het liefst door onnozelen”

“I am being paid for my Name and Fame, favorably by silly people”

Large company- big name, big sales, big beliefs...

- In B2B anything seems possible...
- ”heavy air” can be sold
  - beneficial to the confused consumer
  - for a good profit
  - all within the law....

Example Ribose Sugar
Ribose: a pentose sugar in adeninenucleotides

Energy rich phosphates = "super fuel" required for sprinting

Muscle fuel changes after one 30 sec treadmill sprint

Mol/kg dry muscle

GLYC  LAC  PCR  ATP

Pre-Sprint  Post-Sprint

n = 6
3 males
3 females

Adenine nucleotide metabolism in muscle

- Maximal sprint → Decrease in super fuel
- Post exercise → Reduced super fuel
- Recovery → “Refilling” is slow
  → May last > 3 days

Search for measures to improve recovery and repeated sprints

Synthesis of adenine nucleotides

Diet → Glucose
  → G-6-P
  → 6-P-G
  → R-5-P
  → R-5-P
  → PRPP
  → IMP
  → AMP
  → ATP
  → Super fuel

Glycogen → G-6-PDH

Ribose
## Recovery in TAN-super fuel before and after lack of oxygen

<table>
<thead>
<tr>
<th>Condition</th>
<th>Pre-test</th>
<th>24 hrs</th>
<th>% Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo (n=7)</td>
<td>5.06±0.18</td>
<td>2.58±0.26</td>
<td>51</td>
</tr>
<tr>
<td>Ribose (n=9)</td>
<td>4.67±0.30</td>
<td>4.46±0.33*</td>
<td>96 (*P&lt;0.001)</td>
</tr>
</tbody>
</table>

12 mongrel dogs, 20 min global myocardial ischemia, 80 mmol/L ribose perfusion.

*P<0.001

## Testing in human cardiac patients

- Ribose improved mean ST time. Placebo no effect p<0.06
- Not randomized, no cross over, statistics
- Plasma ribose was not measured
- TAN metabolites were not measured
- Oral intake of 135 g. needed to obtain a level of 80 mmol/L

## The truth and the confused manager


Yet, ribose business is blooming
China Set to Lead L-Carnitine business

• L-carnitine is claimed to enhance lipid burning, sports performance and weight loss.
• The U.S. market, driven by issues of obesity and related diseases, is the largest market for L-carnitine products.
• Doubts are increasingly being raised by scientists and regulatory authorities regarding the false and hyped health benefits of L-carnitine and its derivatives.
• In certain cases, L-carnitine health claims were found misleading based on false advertisements and public misinformation.
• Yet, it is a multi-million business.

EFSA- Industrial health benefit claims evaluation

• ≈ 44,000 article 13 health benefit dossiers were submitted
• 40,000 rejected at first hand…!
• Compilation for review ≈ 4,000
  Only a limited number have been approved

What went wrong?
• Academic choice of biomarkers and clinical endpoints
• Industrial interpretation of data?

Search for low-glycemic foods
Low glycemic carbohydrates: assessment flow

Basic question
Does the new carbohydrate show a low blood glucose response?

NO ➔ stop

YES

Fully digestible?

NO ➔ stop

YES

Health Benefits?

Isomaltulose

Isomaltulose occurs naturally in minor quantities in sugar cane and honey.
Glycemic Index (mean ± SEM) based on 3 studies, 32 persons
GI = 51.9 ± 10.2

Insulinemic Index (mean ± SEM) based on 2 studies, 23 persons
II = 50.0 ± 3.4

Absorption in humans
8 ileostomy patients
nearly complete absorption
Slower absorption rate should result in a sign lower oxidation rate!

Isomaltulose is tooth friendly

- Sugar → Acid → pH decrease
- Isomaltulose: no change
**Intellectual property: patent coverage**

CER03-00005
- Isomaltulose containing comestibles for sustained carbohydrate energy release and reduced glycemic / insulinemic responses. WO 05/013720

CER03-0008
- Comestibles containing Isomaltulose and Trehalose for sustained carbohydrate energy release and reduced glycemic/insulinemic responses. WO 04/084655

**Isomaltulose as a healthy sugar substitute.**

- Slowly digested and absorbed
- Low blood glucose and insulin response
- Tooth friendly
- Patents in place
- Golden Award for Health Ingredient Innovation Frankfurt, 2007

SUCCESS ?
Understanding the business in its regulatory context and competitive price elements is a key issue for the creation of a profitable business.

• Food law- labelling: it is a “sugar”
• More expensive than sugar

NO GO!

“Voetbal is een spel van fouten”
“Wie de minste fouten maakt wint”

“Soccer is a game of mistakes”
“The team making the least mistakes wins”
From Knowledge through Skills to Profit
Van kennis naar kunde en kassa

- Build knowledge
- Learn skills
- Do profitable business

An Integrated Academic-Industrial Learning Program to:
- acquire essential knowledge,
- to understand “how to play the game”
- master the skills to “play”
- learn how to make a profit.

- Consumer insights
- Food industry
- Innovation engine
- Biomedical Sciences
- Governments
- Regulations
- Law
- MSc.
Why Industry involvement?
A student cannot learn the "complexity of food innovation process" in a non-food business environment.

Students need to get an appreciation of this field on tension

Why Industry involvement?
In a sales driven environment commercial priorities mostly outweigh technical & research priorities.

Science is always "on the costs side" and often "hindering sales"

sales managers do not understand science....
Success factors

1) A science climate that also has entrepreneurial focus and understanding

2) Elimination of organizational and behavioral barriers to collaboration and cross disciplinary working

3) Defining common interests and acting on them jointly, moving from “I did it my way” ➔ we did it our “consensus way”

Managing innovation

- The best in class are those companies focused on the quality of their innovation management, in a way that reflects a clear understanding of:
  - Consumers
  - Market place
  - Technologies

The kind of value to create

Roussel et al., Third generation R&D. HBS Press (1991)
Common interests

Joint activities
Shared expertise
Shared facilities

Markets
Food Law, safety
Food Technology
Consumers
Habits
Molecular sciences

Consumers
Health
Food Law
Innovation
Management
Fac. Law
Fac. Psychology and Neuroscience
Fac. Economics and Business Administration
Fac. Health, Medicine and Life Sciences
Health Food Innovation Management
Fac. Law

SUCCESS

Industry

Food Law

10/17/11
Acquiring knowledge and success

- Take 100% personal responsibility for what you decide. (Jack Canfield, success principles)

- Believe nothing!
  No matter where you read it or who said it, even if I said it, unless it agrees with your own reason and your own common sense (Buddha)

Most failure in business is due to NOT understanding it

HIE Madrid Nov 2010
Route planners...
- Hein Ouwersloot ➔ Sjef Swinkels ➔ Hans Keizer ➔ Peter Kilian ➔ ….
- Dave Costill, Lars Hermansen, Phil Gollnick, Eric Newsholme, Jack Wilmore, Clyde Williams, Herman Adlercreutz, ….
- Wim Saris, Foppe the Hoor
- Annemie Schols, Jo Ritzen
- Nancy Rehner, Eva kovacs, Asker Jeukendrup, Michiel van Nieuwenhoven, Caroline Faessler, Maha Tahiri, Aline Adam
- Olympic athletes and their medical teams
- Faculty Law, SBE, PNS, FHML, NIZO, TNO, HAS
Inaugureële rede

- Mother: field study to check anecdotal evidence
- Father: my first presentation in public

Kim, Ingmar, Gaya, Rubina,
- Waar ben je niet geweest?
- “Fred-luister club” .. altijd met 3 dingen tegelijk bezig…
- Ingmar 7 jaar: “ik heb gesproken”
No mechanism known. Yet observed. Thus true!

- Het menselijk hart begint al na 22-23 dagen te kloppen, als de foetus nog maar 2-3 mm groot is
- The human fetal heart begins beating at about 22-23 days after conception when the fetus between 2 and 3 mm in size!

- Wat initieërt de allereerste slag?
- What initiates the very first beat?

Martina

- Wetenschappelijke waarnemingen zijn altijd “het verleden”
- Scientific observations always are “the past”
- Vormt “wetenschap” voor het innovatie proces niet “een verstandelijke beperking”? 
- Is “science” an intellectual limitation for the process of innovation?
Martina

- Zou “houden van” ooit significant kunnen worden?
- Would “love” ever become significant?

"Als ik zou willen dat je dit begreep, zou ik het wel beter uitleggen”.

Johan Cruijff

"If I wanted you to understand this I would have explained it better”

Mother Teresa

“Intense love does not measure, it just gives”.