

## Welcome

### Food-Pharma Industry Workshop

We have great pleasure in welcoming you to the Food-Pharma Industry Workshop organised by the European Technology Platform (ETP) Food for Life in the framework of the EU Specific Support Action Food4Life and the Irish National Food Platform linked to this ETP.

It is evident that the food and health sector has a very significant interface with the pharmaceutical sector. The Workshop brings together leading figures from both sectors to discuss areas of common interest and to identify mechanisms for ongoing knowledge transfer and co-operation.

The Alimentary Pharmabiotic Centre (APC) which is a partnership between University College Cork and Teagasc, Moorepark, operates at the interface of the food and pharma sectors with activities ranging from the research bench to the clinical bedside. The APC is delighted to host this Workshop and gratefully acknowledges the financial support of the ETP Food for Life and the Government Department of Agriculture, Fisheries and Food (DAFF) which hosts the Irish National Food Platform.

We wish all delegates a rewarding and enjoyable experience at the Workshop and during their visit to Cork and its environs.

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Professor Fergus Shanahan, Director, APC

Dr Jan Maat, Chairman of the Operational Committee, ETP Food for Life

Professor Willem de Vos

Professor Roger Fenwick

Professor Charlie Daly

} Organising Committee

## **PROGRAMME**

### **Thursday, January 31st 2008**

4.00pm Arrivals & Registration

**Chairperson:** Fergus Shanahan, Alimentary Pharmabiotic Centre,  
University College Cork, IE

5.00pm **ETP Food for Life: Vision and Implementation**  
Jan Maat, Unilever Research, NL

5.45pm **Innovative Medicine: From ETP to Joint Technology Initiative**  
Jorg Janssen, TI Pharma, NL

6.30pm **Food and Health Research in EU Framework Programmes**  
Timothy Hall, DG Research, BE

7.00pm **Drinks & Buffet**

### **Friday, February 1st 2008**

8.30am Registration

**Chairperson:** Willem M. de Vos, Wageningen and Helsinki University, NL & FI

9.00am **The APC – where Food Meets Pharma - Experiences of a  
Public Private Partnership**  
Fergus Shanahan, Alimentary Pharmabiotic Centre,  
University College Cork, IE

9.30am **Food and Pharma – A Food Business-to- Business Perspective**  
Peter Olesen, Chr Hansen, DK

10.00am **Food and Pharma – Opportunities for Food Innovations**  
Tiina Mattila-Sandholm, Valio, FI

10.30am **Coffee Break**

**Chairperson:** Willem M. de Vos, Wageningen and Helsinki University, NL & FI

11.00am **Tomatoes, Platelets and Heart Disease**  
Niamh O'Kennedy, Provexis Ltd, UK

11.20am	<b>Pharmabiotics – A Story from Bench to Bedside</b> Barry Kiely, Alimentary Health, IE
11.40am	<b>Can Omega-3 Fatty Acids Become Medicine?</b> Mehar S Manku, Amarin Corporation, UK
12.00pm	<b>Soluble Fibers and Intestinal Disease</b> Jonathan Rhodes, Liverpool University, UK
12.20pm	<b>Discussion</b>
12.40pm	<b>Lunch Break</b>
<b>Chairperson:</b>	Peter Lillford, University of York, UK
1.45pm	<b>Food and Pharma – Opportunities from a Science Perspective</b> Renger Witkamp, TNO/Wageningen University, NL
2.15pm	<b>Pharmacogenomics and Nutrigenomics – Can The Two Meet?</b> Mike Gibney, University College Dublin, IE
2.45pm	<b>Open Innovation – Food &amp; Pharma Opportunities</b> Steve Meller, Procter & Gamble, US
3.15pm	<b>Can Food and Pharma Work Together – An Industry-Academia Perspective</b> David Alpers, Glaxo Smith Kline, UK
3.45pm	<b>Coffee Break</b>
<b>Chairperson:</b>	Tiina Mattila-Sandholm, Valio, FI
4.15pm	<b>Common Research Areas and Priorities - Round Table Discussions</b>
5.00pm	<b>Agreement on The Way Forward</b>
5.15pm	<b>Drinks and Departures</b>

## CHAIRPERSONS

### **Fergus Shanahan,**

Alimentary Pharmabiotic Centre, University College Cork, Ireland



#### **Biographical Sketch**

Fergus Shanahan is Professor and Chair of the Department of Medicine at University College Cork (UCC) and Director of the Biosciences Institute, UCC. He is a Dublin graduate (UCD 1977). He was awarded the gold medal in medicine from the Mater Hospital, Dublin. After internship and residency in internal medicine in Dublin, he trained in Clinical Immunology at McMaster University, Canada (1981-1983) and in Gastroenterology at the University of California, Los Angeles (UCLA; 1983-1985). He has been awarded Fellowships from the Royal College of Physicians in Ireland, Canada and the United Kingdom and the Fellowship of the American College of Physicians. Before returning to Ireland in 1993 he was Associate Professor of Medicine with tenure at UCLA. He has published over 300 scientific articles and several books. He is the current President of the Irish Society of Gastroenterology. His ability to bridge medicine, science and food science within UCC and in Teagasc (the Irish Agriculture and Food Development Authority), enabled him to lead a team of clinicians and scientists to successfully compete for a major research award from Science Foundation Ireland (SFI) and to create a multi-disciplinary research centre – the Alimentary Pharmabiotic Centre (APC). The APC investigates, amongst other things, host-microbiota interactions in the gut and the interface between food and medicine in health and disease. Under the directorship of Prof. Shanahan, the APC now has over 100 staff and scientists and has expanded its funding and research base through a research alliance with GlaxoSmithKline with support funding from two government agencies, IDA Ireland and SFI.

### **Willem M. de Vos,**

Wageningen and Helsinki University, The Netherlands & Finland



#### **Biographical Sketch**

Willem M. de Vos (1954) received a cum laude PhD degree at the State University of Groningen that was partly done at the Max Planck Institute in Berlin, stayed for a post-doc at the NIRD (now IFR) in the UK, and became research manager at NIZO, the research institute of the Netherlands dairy industry. Here he established a research group on lactic acid bacteria and (at the age of 32) became the first Professor of Bacterial Genetics and later Chair of Microbiology at Wageningen University, where he also served as Director of the Department of Biomolecular Sciences. While continuing his chair, in 2000 he became Programme Director Microbial Functionality and Safety at the Wageningen Centre for Food Sciences, now known as the Top Institute Food and Nutrition, a public-private centre of excellence in the Netherlands (TTI). In 2007 he was selected as Finland Distinguished Professor and became also professor of Molecular Microbiology at Helsinki University. He has supervised more than 60 PhD students, (co)authored more than 350 peer-reviewed papers, and was involved in the filing of more than 25 patents or patent applications. He received several international awards, including the Rhone Poulenc Dairy Science Award, and is among the ISI highly cited authors in Microbiology (h factor > 60).

**Peter Lillford**, University of York, United Kingdom

**Biographical Sketch**

Peter Lillford was trained as a chemist at King's College London, and after postdoctoral positions at Cornell and the San Francisco Medical Centre, joined Unilever Research where he spent most of his career.



He led Basic Research in Food Physical Chemistry and Materials Science and as Chief Scientist (Foods), was also responsible for research in Microbiology and Sensory Science. He retired in 2001 and is currently a Visiting Professor in the Biology Department of the University of York and the School of Engineering in Birmingham. He is Chairman of Governors of the Institute of Food Research (UK) and is Chairman of the UK LINK Scheme in Advanced Food Manufacturing. He currently holds a Flagship Fellowship in CSIRO (Australia) and consults for several multinational food companies. He was Chairman of the UK Technology Foresight Programme for Food and Drinks and is also a former President of IFS (UK).

**Tiina Mattila-Sandholm**, Valio, Finland

**Biographical Sketch**

Tiina Mattila-Sandholm, DVM, accomplished her PhD in 1985 on 'Diagnostic tools to detect anti-inflammatory compounds in bovine milk'. The thesis was supported by a diagnostic company Labsystems Oy which raised her interest to implement scientific results towards profitable innovations. Thereafter she spent her postdoc years 1987-1988 in Australia, University of Queensland, Department of Veterinary Public Health. She has established her career at VTT Finland, heading the Microbiology Department and for the last ten years she has held the Professorship in Industrial Microbiology at VTT Biotechnology as well as heading the VTT Life Sciences business sector. From 1994 onwards she invested active efforts in the European Community, coordinating both national and international multidisciplinary research programmes based on food and health and leading the Nordic and European probiotic-prebiotic networks. She has coordinated many large EU projects, including the European multinational cluster "Food GI-tract functionality and human health" of 8 EU projects, 64 institutes in 16 countries. This cluster, besides the efforts in the 64 institutes, provided a structure of both consumer and industrial platforms (consisting of 50 industrial companies). Currently she coordinates the Specific Support Action GutImpact, which includes organizing and coordinating research activities for large companies and SME's. She has produced in teamwork altogether more than 150 international refereed publications, among which 5 have been cited more than 100 times, and edited the book Functional Dairy Products (2003). She received various awards, including the Young Scientist Award Wellcome Foundation UK and the Innopotti Industry Innovation Award, and gave numerous invited and key note lectures. She has held the EU DG Research Chair of the Advisory Group of 6th Framework Thematic priority 5, Food Quality and Safety from 2002-2006 and since 2006 she is a Horizontal Group member of the European Technology Platform (ETP) Food for Life and on the ILSI Board of Directors. She also held the Chair of the Biosciences and Environment of the Academy of Finland from 2004-2007. Since 2007 she serves as Board Member of the Academy of Finland. From August 2004-2007 she has been Senior Vice President and R&D Director of Valio R&D, one of the most innovative Dairy companies in the world, and from 2007 she is Executive Vice President, member of Valio Board of Executives.



## SPEAKER

### ETP Food for Life: Vision and Implementation

**Jan Maat**, Unilever Research, The Netherlands



#### Biographical Sketch

Jan Maat (1952) studied chemistry at the University of Leiden, the Netherlands, where he also received his PhD-degree (cum laude) on the DNA sequence analysis of the tumour-inducing region of Adenovirus type 5. After a one year post-doctoral position at the University of California at San Francisco (U.S.A.) in the group of Prof. Herbert Boyer he joined the Unilever Research & Development Laboratory at Vlaardingen, the Netherlands. Following several years of research in the area of Biotechnology as a trained molecular biologist, he was promoted to the position of section manager Bio- & Immunochemistry. In this function the main emphasis was on enzyme engineering, immunochemistry and applied enzymology. In 1991 he moved into the more applied research area by taking leadership of the Bakery Products section; later on he also became responsible for the Bakery R&D program. From 1999 till 2000 he was Head of the Innovation Centre Bakery at Aartselaar Belgium. After the sale of the Bakery Division he became responsible for external (foods) research at Unilever R&D Vlaardingen. As well as participating in a number of Advisory Boards of several Universities he currently is the chairman of the Operational Committee of the European Technology Platform Food for Life. From 1988 till 1997 Jan Maat also had a special chair as Professor of Biotechnology at the Free University of Amsterdam.

#### Summary

The **European Technology Platform (ETP) Food for Life** was created under the auspices of the Confederation of the Food and Drink Industries of the EU (CIAA) in 2005 to strengthen the European-wide innovation process, improve knowledge transfer and stimulate European competitiveness across the food chain. The vision of the ETP, published in July 2005, aims at an effective integration of strategically-focussed, trans-national, concerted research in the nutritional-, food- and consumer sciences and food chain management so as to deliver *innovative, novel and improved food products for, and to, national, regional and global markets in line with consumer needs and expectations.*

The **European Technology Platform Food for Life** has developed a Strategic Research Agenda (SRA) following an extensive programme of national, regional and web consultations with its principal stakeholders (consumers and society, industry, academia and the research community). This SRA represents *the priorities for research, communication, training and knowledge transfer in the food sector for the coming years as a basis for improving the competitiveness of the largest manufacturing and distributing industry in Europe, as well as ensuring that European citizens are supplied with a healthy, safe, varied, affordable, ethically-produced and environmentally-sensitive food supply.* If the SRA is to have maximal impact, ***the research effort must be innovation-driven rather than simply research-led*** and this poses many challenges to the European research system.

Effective knowledge generation and knowledge exploitation are essential in driving the innovation agenda. This SRA addresses both of these elements in order that the ETP Vision can be fully realised. Research priorities have been identified that cover all scientific and technological areas that are relevant to the production, manufacture and distribution of food with specific attention being paid to identifying the social (consumer) science studies that are necessary if the consumer's desires and trust in the food supply are to be met. The detailed research challenges have been defined in six key areas.. These are:

- 1. Ensuring that the healthy choice is the easy choice for consumers,**
- 2. Delivering a healthier diet,**
- 3. Developing quality food products,**
- 4. Assuring safe foods that consumers can trust,**
- 5. Achieving sustainable food production, and**
- 6. Managing the food chain.**

Nonetheless to ensure that the ETP's programme is effectively implemented at the European level it has been necessary to further prioritise these challenges according to:

- the importance of the societal challenge,
- the economic impact, and
- the need for a major, long-term investment in multi-disciplinary, multi-national knowledge generation and dissemination.

When these criteria are applied, three key thrusts emerge; these involve research training and technology transfer that will lead to improved competitiveness of the agro-food industry by developing new processes, products and tools that:

- A. Improve health, well-being and longevity,**
- B. Build consumer trust in the food chain, and**
- C. Derive from sustainable and ethical production.**

Focus on these thrusts will lead to a quantum leap in new innovation opportunities if encompassed through a European food research strategy. They must be implemented effectively, and with sufficient resources made available to deliver outputs over the next decade and beyond. These thrusts will be addressed in detail in a subsequent ETP Food for Life Implementation Plan

**Key messages:**

1. Agro-food sector largest manufacturing sector in the EU, yet under threat from competition from upcoming markets (BRIC) and USA especially in areas of predicted growth.
2. Vision and Strategic Research Agenda are consumer focussed, well supported by all stakeholders in the food chain (farmers-industry-retail-consumer) as well as academia and targeted on areas of greatest economic and social importance for the future.
3. National Platforms have been created to mobilise national funding and align activities
4. Challenges in the Food & Health area are focussing on prevention on a population level rather than cure on an individual level, which is one of the distinguishing factors with the Pharma sector.
5. Many research tools and approaches are similar to the ones used in the Pharma area and this synergy should be pursued in discovering and validating biomarkers, use of standards etc.



## SPEAKER

### Innovative Medicine: From ETP to Joint Technology Initiative

**Jorg Janssen**, TI Pharma, The Netherlands



#### Biographical Sketch

Jorg Janssen is responsible for Strategy & Business Development at the Dutch Top Institute Pharma. Prior to TI Pharma Jorg worked as a project manager at Roland Berger Strategy Consultants, through which he was involved in the initiating phase of TI Pharma and several other Public Private Partnerships. Jorg holds a PhD in applied physics in which he studied the electronic properties of carbon nanotubes. He studied applied physics at Delft University of Technology and was a researcher at the University of California at Berkeley. Jorg is (co-)author of 14 articles.

#### Summary

There is a need for more and new forms of collaborations between Academia, SME's and big Pharma to counter the trend of decreasing output in terms of new drugs. One form of collaboration are Public-Private Partnerships (PPP) of which the Innovative Medicines Initiative (IMI) and the Dutch Top Institute Pharma (TI Pharma) are good examples.

The IMI is a unique partnership between the European Community and the European Federation of Pharmaceutical Industries and Associations (EFPIA). The Council of the European Union formally approved the Regulation setting up the Innovative Medicines Initiative on December 20, 2007. This formal approval opens the way for the IMI Joint Undertaking to operate. In this presentation its goals, setup and strategic research agenda will be presented.

In brief, experiences from TI Pharma, a PPP in the Netherlands, will also be presented as a hands on example on how to realize such new forms of collaborations.



## **SPEAKER**

### **Food and Health Research in EU Framework Programmes**

**Timothy Hall**, DG Research, Belgium



#### **Biographical Sketch**

T.J. Hall joined the Commission services in 1983 and was made Head of Unit for S&T Cooperation with Developing Countries in 1994. He has also headed units in the Quality of Life Directorate under FP5 and in the Health Directorate under FP6. His current position (since October 2006) is Head of Unit for Agriculture, Forestry, Fisheries and Aquaculture with primary responsibilities for overseeing the management of projects in these areas supported under FP6, and implementing the Activity "Sustainable production and management of biological resources from land, forest and aquatic environments" in the FP7 Theme "Food, Agriculture and Fisheries, and Biotechnology". Since 1 September 2007, he also holds the position of Acting Director for Biotechnologies, Agriculture and Food.

#### **Summary**

The European Commission has been funding research on food and health for many years. An update will be given on the relevant projects being funded in the Thematic Programme "Food quality and safety" of the 6th Framework Programme (2002-2006). Recent developments will be described concerning the Theme "Food, agriculture and biotechnology" within the 7th Framework Programme (2007-2013), such as the results of the first call and work programmes of current and future calls. Related opportunities in other Themes will also be indicated.

### **SPEAKER**

#### **The APC – where Food Meets Pharma - Experiences of a Public Private Partnership**

**Fergus Shanahan,**

Alimentary Pharmabiotic Centre, University College Cork, Ireland



#### **Biographical Sketch**

Fergus Shanahan is Professor and Chair of the Department of Medicine at University College Cork (UCC) and Director of the Biosciences Institute, UCC. He is a Dublin graduate (UCD 1977). He was awarded the gold medal in medicine from the Mater Hospital, Dublin. After internship and residency in internal medicine in Dublin, he trained in Clinical Immunology at McMaster University, Canada (1981-1983) and in Gastroenterology at the University of California, Los Angeles (UCLA; 1983-1985). He has been awarded Fellowships from the Royal College of Physicians in Ireland, Canada and the United Kingdom and the Fellowship of the American College of Physicians. Before returning to Ireland in 1993 he was Associate Professor of Medicine with tenure at UCLA. He has published over 300 scientific articles and several books. He is the current President of the Irish Society of Gastroenterology. His ability to bridge medicine, science and food science within UCC and in Teagasc (the Irish Agriculture and Food Development Authority), enabled him to lead a team of clinicians and scientists to successfully compete for a major research award from Science Foundation Ireland (SFI) and to create a multi-disciplinary research centre – the Alimentary Pharmabiotic Centre (APC). The APC investigates, amongst other things, host-microbiota interactions in the gut and the interface between food and medicine in health and disease. Under the directorship of Prof. Shanahan, the APC now has over 100 staff and scientists and has expanded its funding and research base through a research alliance with GlaxoSmithKline with support funding from two government agencies, IDA Ireland and SFI.

#### **Summary**

The Alimentary Pharmabiotic Centre (APC) is an example of a research centre operating at the interface of the food and pharma sectors with activities ranging from the research bench to the clinical bedside. Although traditionally food and pharma have been operationally distinct in their approach to fundamental research, this may represent a lost opportunity. Potential synergies need to be explored and lessons learned by the pharma sector, particularly in relation to clinical trials and regulatory affairs, will become increasingly relevant. With increasing interest in functional foods, there are also emerging areas of common interest to the food and pharmaceutical industrial sectors. In general, the food industry will primarily focus on disease prevention and target biomarkers of disease risk whereas the pharmaceutical sector will focus on disease management and target biomarkers of early disease and clinical course.

## SPEAKER

### Food and Pharma – A Food Business-to- Business Perspective

**Peter Olesen**, Chr. Hansen, Denmark



#### Biographical Sketch

As Executive Vice President of the Corporate Research division of Chr. Hansen A/S, Peter Olesen has been responsible for the development of new skills, competencies and innovation projects to support the growth of the food cultures and dairy enzyme business areas in Chr. Hansen A/S, as well as concepts for new business development. The company has devoted a strategic focus to the development of novel health ingredients within the probiotic and dairy based functional foods and food supplements areas.

Peter Olesen, who has a background as PhD in plant biology from University of Copenhagen, has been with Chr. Hansen for 8 years. Before joining the Chr. Hansen group he had several R&D top management positions within international companies, operating out of Denmark, France and the US: Copenhagen Pectin/Hercules Inc., Director Business Technology, (1996-2000); Sandoz Seeds, Ltd., VP Technology (1994-96); Danisco A/S. VP R&D (1984-94).

Peter Olesen has also been associated with University of Copenhagen as Affiliated Professor in plant cell biology for 2 5-year periods and is serving as member and chairman of a number of national Danish as well as Nordic research committees and research councils.

#### Summary

The development of new and approved products with documented preventive or risk reduction effects towards the epidemic spread of chronic and life-style related metabolic diseases now constitutes the major trend (and challenge) for the global food and health industries. Innovations within these industries will very much depend upon developments in (and interactions between) on one hand the regulatory approval schemes for health claims and, on the other hand, new business models enabling companies to reach end consumers in efficient and competitive ways. And, regardless of whether the successful market players will be from food, food supplements, beauty, clinical/special nutrition or pharma industries (or any cross-over combination) they will all be in need of well-documented and safe ingredients to provide the desired health functionalities. For this development to take place, several key issues need to be further addressed from science, industry, and legislation – such as:

1. The role of bioactive food compounds in the formation and maintenance of a healthy balance of the gut microflora and the immune system with a focus on inflammatory and oxidative processes in the human body
2. That typical health effects of functional food products will be a sum of multiple, multifactorial, and relative small effects exerted over a considerable time span
3. The need for a paradigm shift in legislation and approval processes for obtaining health claims, which today is dominated by a linear thinking inherited from the pharma environment.

## SPEAKER

### Food and Pharma – Opportunities for Food Innovations

**Tiina Mattila-Sandholm**, Valio, Finland



#### Biographical Sketch

Tiina Mattila-Sandholm, DVM, accomplished her PhD in 1985 on 'Diagnostic tools to detect anti-inflammatory compounds in bovine milk'. The thesis was supported by a diagnostic company Labsystems Oy which raised her interest to implement scientific results towards profitable innovations. Thereafter she spent her postdoc years 1987-1988 in Australia, University of Queensland, Department of Veterinary Public Health. She has established her career at VTT Finland, heading the Microbiology Department and for the last ten years she has held the Professorship in Industrial Microbiology at VTT Biotechnology as well as heading the VTT Life Sciences business sector. From 1994 onwards she invested active efforts in the European Community, coordinating both national and international multidisciplinary research programmes based on food and health and leading the Nordic and European probiotic-prebiotic networks. She has coordinated many large EU projects, including the European multinational cluster "Food GI-tract functionality and human health" of 8 EU projects, 64 institutes in 16 countries. This cluster, besides the efforts in the 64 institutes, provided a structure of both consumer and industrial platforms (consisting of 50 industrial companies). Currently she coordinates the Specific Support Action GutImpact, which includes organizing and coordinating research activities for large companies and SME's. She has produced in teamwork altogether more than 150 international refereed publications, among which 5 have been cited more than 100 times, and edited the book Functional Dairy Products (2003). She received various awards, including the Young Scientist Award Wellcome Foundation UK and the Innopotti Industry Innovation Award, and gave numerous invited and key note lectures. She has held the EU DG Research Chair of the Advisory Group of 6th Framework Thematic priority 5, Food Quality and Safety from 2002-2006 and since 2006 she is a Horizontal Group member of the European Technology Platform (ETP) Food for Life and on the ILSI Board of Directors. She also held the Chair of the Biosciences and Environment of the Academy of Finland from 2004-2007. Since 2007 she serves as Board Member of the Academy of Finland. From August 2004-2007 she has been Senior Vice President and R&D Director of Valio R&D, one of the most innovative Dairy companies in the world, and from 2007 she is Executive Vice President, member of Valio Board of Executives.

#### Summary

The food and pharma sectors have more differences than similarities. However, there is a growing interest of the consumer in an affordable and healthy diet that is compatible with their lifestyle, gender, age, and genetic background. Hence, the food industries have developed a range of functional foods that are among the most innovative products of the sector. While the marketing of functional foods and pharma products differ, there are similarities in design, development and validation.

VALIO Ltd. has a long history of health innovations and was among the first companies to launch the probiotic concept with Lactobacillus GG®. Health innovations often rely on a combination of science-based nutritional interventions and technological breakthroughs that appeal to the consumer as will be illustrated by several recent examples that have been successfully introduced into the Finnish and international market. These include the reduction of blood pressure by milk-derived peptides that show ACE inhibitor activity. The challenge to produce sufficient amounts of these peptides while preventing bitter and other off-flavours in dairy products has been successfully met by the recent introduction of Evolus® drinks that effectively balance the blood pressure. Moreover, as Finland has a high incidence of lactose-intolerant consumers, a series of novel processes have been developed that reduce the amount of lactose to a zero level in fresh milk products. These form the first generation products that comply with a personalised diet. Recently, they have been further developed into low calorie but high protein dairy foods that generate satiety in the ProFeel® concept. The presentation will highlight the above examples and address parallels with the pharma sector.

## **SPEAKER**

### **Tomatoes, Platelets and Heart Disease**

**Niamh O'Kennedy**, Provexis Ltd, United Kingdom

#### **Biographical Sketch**

Dr Niamh O'Kennedy is a natural products chemist with wide experience in isolation and characterisation of plant-derived compounds. She is specifically interested in the interaction of these compounds with biological / biochemical systems; the mechanisms by which phytochemicals regulate physiological processes, and the possibility of harnessing these properties to provide measurable health benefits. Her university education was received from the Universities of Manchester, Glasgow and Aberdeen. One of the founding members of Provexis Ltd in 2001, she now holds the position of Director of Research and Development in the AIM-listed company Provexis plc. Projects in development at Provexis include natural antiplatelet compounds, polysaccharide extracts from plants which modify bacterial interactions with their human host, and plant extracts with anti-inflammatory and anticancer activities.

#### **Summary**

Normal platelet function is essential for haemostasis. However certain conditions, e.g. atherosclerosis, contribute to chronic platelet activation and can lead to a prothrombotic state. Management of platelet hyperactivity is an established therapeutic route in the secondary prevention of cardiovascular disease, and an emerging target of primary prevention strategies, particularly in at-risk groups. In the primary prevention setting where aggressive drug treatments are not warranted, change of diet and lifestyle is a preferred treatment option. Platelets lack functional DNA and have a very limited inherent synthetic capacity, depending on the blood plasma for components of their skeleton such as lipids and amino acids, as well as glucose, antioxidants, etc. Platelet function is an ideal target for dietary interventions aimed at primary prevention of cardiovascular disease, as it is directly modifiable by a change in diet over a short (7 – 10 days) timecourse. The lycopene-free tomato extract Fruitflow® is an example of a dietary antiplatelet which can be easily incorporated into a daily dietary regime, and which results in systemic suppression of platelet activity after consumption. Antiplatelet components from tomato extracts modulate platelet function in vitro by mechanisms including inhibition of platelet surface protein expression and  $\alpha$ -granule secretion. These different mechanisms of action lead to effects on different aggregation pathways ex vivo. Results from six placebo-controlled studies in > 250 healthy subjects have shown that in the acute setting, a significant antiplatelet effect (8 – 23% inhibition, compared to control) is observed three hours after extract consumption, with effects persisting for up to 18 hours. Both ADP and collagen-mediated platelet aggregation are affected, and release of thromboxane B2 and soluble p-selectin by platelets is reduced. Chronic consumption of Fruitflow on a daily basis leads to more wide-ranging benefits, such as reduction in plasma triglycerides (9% reduction compared to controls) and lower numbers of circulating platelet-leukocyte aggregates. Results from Fruitflow trials illustrate the possible applications of dietary interventions in suppression of platelet function, and suggest that the antiplatelet activity of certain tomato components may be partly responsible for the cardiovascular benefits recorded for populations consuming diets rich in tomatoes and tomato products.

## SPEAKER

### Pharmabiotics – A Story from Bench to Bedside

**Barry Kiely**, Alimentary Health, Ireland



#### Biographical Sketch

After completing a Ph.D in Microbiology at University College Cork in 1986, Barry worked at Pfizer, Ringaskiddy as a research scientist in their fermentation department. In 1987, he joined International Biochemicals Group (IBG) – a wholly owned Royal Dutch Shell subsidiary company – where he managed their research programmes. In 1990, Shell divested IBG and Barry was part of a management buyout bid to purchase the company. The MBO was unsuccessful. However, Barry gained significant commercial experience in the process – specifically how not to go about an MBO! Following a period in Germany in a business development role with a small biotechnology company, Barry returned to UCC in 1995 as General Manager of BioResearch Ireland's National Food Biotechnology Centre in Cork. While at UCC Barry was responsible for Campus Company development. He joined one of these companies, Alimentary Health Ltd. as CEO in 1999.

Alimentary Health Limited (AH) is a development stage specialty biotechnology company located in Cork. The company is focused on the discovery, development and commercialisation of therapeutic bacteria (probiotics), their components and metabolites (pharmabiotics) as treatments for infectious and inflammatory disorders. The company was established to commercialise probiotic technologies licensed from the university. AH is the foundation industry partner of the Alimentary Pharmabiotic Centre (APC). Since forming in 1999, AH has established research partnerships with a number of the world's leading healthcare companies, including Procter & Gamble (P&G) and Mead Johnson Nutritionals. The company has established two additional partnerships in 2007. Over the past 7 years the company and its partners have invested in excess of US\$20 million in preclinical and clinical research to develop a range of efficacious probiotic technologies for the management of gastrointestinal conditions. The company successfully launched a new product with P&G in 2007. This product, Align® has been developed for the management of IBS and is now available in pharmacy shelves across the US.

#### Summary

The desire for products with healthcare and health promoting properties increases year on year. Today products exist which range from consumer products to prescription medicines and it is now more than ever the responsibility of product regulators and suppliers to ensure that product claims are scientifically supportable. The development of Align®, a novel probiotic product for managing digestive health, has followed a rigorous scientific and clinical evaluation prior to market launch. This presentation will describe this development process.

## **SPEAKER**

### **Can Omega-3 Fatty Acids Become Medicine?**

**Mehar S Manku**, Amarin Corporation, United Kingdom

#### **Biographical Sketch**

Dr Mehar Manku joined Amarin in October 2004 on the acquisition of Laxdale Limited. Dr Manku graduated from Makerere University, Uganda. He continued his studies at the University of Newcastle upon Tyne, obtaining his PhD, in 1975 (Supervisor Late DF Horrobin). He was invited to become the first Director of Scotia Research Institute, in Kentville, Nova Scotia. This research facility employed 75 people, and focused on the research of fatty acids in health and disease. He was also Head of Research and Development at Scotia's facility in Carlisle, UK. He joined Laxdale Ltd (now Amarin Neuroscience Ltd) in May 2001. He is author and co-author of nearly 250 scientific and technical papers and named inventor on 18 patents in the field of essential fatty acids (EFAs) and Photodynamic therapy PDT. Recently he was appointed Honorary Professor at University of Hull, UK. He is Editor-in-Chief and one of the founding Executive Editors of "Prostaglandin, Leukotrienes and Essential Fatty Acids", a well-respected, peer review journal in the field of EFA research. He has worked in the field of EFAs for the past 30 years.

#### **Summary**

Can Omega-3 Fatty Acids Become Medicine? In short the answer is YES. The presentation will highlight reasons why.

There are two series of essential fatty acids, n-3 (omega-3) and n-6 (omega-6). Both dietary sources of linoleic acid (LA), the parent compound of the n-6 series, and alpha-linolenic acid (ALA), the parent compound of the n-3 series, are converted to their ultimate metabolites by an alternating series of desaturations and elongations. Two such metabolites of Omega 3 series are Eicosapentaenoic (EPA) and Docosahexaenoic Acid (DHA). The success is also linked to breakthrough in technologies to manufacture pharmaceutical pure omega 3 fatty acids such as EPA, which has gone through several placebo controlled clinical trials such as Huntington's disease and treatment resistant depression. Omega 3 fatty acids are already approved as medicines in Japan, EU and USA, to treat hypertriglyceridemia.



## SPEAKER

### Soluble Fibers and Intestinal Disease

**Jonathan Rhodes**, Liverpool University, United Kingdom



#### Biographical Sketch

Jonathan Rhodes is Professor of Medicine (since 1995) and Consultant Gastroenterologist at the Royal Liverpool University Hospital. He trained at the Royal Free Hospital and Queen Elizabeth Hospital, Birmingham. He was elected Fellow of Academy of Medical Sciences in 1999 and Associate Editor of Alimentary Pharmacology and Therapeutics. He is a member of the International Organisation for Inflammatory Bowel Disease and Medical Advisor for the National Association for Colitis and Crohn's Disease. Professor Rhodes has been an Editorial Board Member of the British Journal of Nutrition and Gut. In the past he has been a Council member of the Royal College of Physicians and is currently Council Member for the British Society of Gastroenterology. He held the post of Chairman of Education and Programme Committees for the British Society of Gastroenterology. He was awarded the Francis Avery Jones Research Medallist, the Brits Soc Gastro in 1989 and the Bengt Ihre Research Medal Swedish Medical Association in 2005. Jonathan Rhodes research interests include epithelial glyobiology, lectin-carbohydrate interactions and novel therapies for IBD.

#### Summary

This talk will focus on the possible role of soluble plant fibres in blocking mucosal recruitment of bacteria. It is becoming apparent that the mucosa-associated microbiota may be more relevant to disease than those bacteria that are free in the lumen. In the healthy colon there is a continuous mucus layer which helps to ensure relative sterility of the mucosa but in diseases such as Crohn's disease and colon cancer this sub-mucus niche becomes colonised by bacteria, particularly by *E. coli* with an adherent and invasive phenotype (AIEC). There is little direct evidence that these bacteria can invade the healthy surface mucosa but they can be found within Crohn's tissue and are thought to invade via the specialised M cells that exist in the dome epithelium that overlays Peyer's patches in the distal small intestine and lymphoid follicles in the colon. The adherence of these *E. coli* to intestinal epithelial cells and their translocation through M cells in culture can both be blocked in the presence of plant fibres, particularly soluble plantain (green banana) fibre. Countries that have a high intake of plantains as their staple vegetable tend to have very low incidences for inflammatory bowel disease and colon cancer. This is in keeping with soluble plant fibres having the potential to maintain intestinal health by preventing mucosal recruitment of potentially harmful bacteria, perhaps particularly micro-aerophilic bacteria such as *E. coli* that may preferentially inhabit the submucus niche. A controlled trial is about to start in Liverpool to assess the effect of supplementation with soluble plantain fibre in the maintenance of remission in Crohn's disease.

#### References:

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2. Subramanian S, Campbell BJ, Rhodes JM. Bacteria in the pathogenesis of inflammatory bowel disease. **Curr Opin Infect Dis.** 2006;19:475-84.
3. Rhodes JM. The role of *Escherichia coli* in inflammatory bowel disease. **Gut** 2007;56:610-2.

## SPEAKER

### Food and Pharma – Opportunities from a Science Perspective

**Renger Witkamp**, TNO/Wageningen University, The Netherlands



#### Biographical Sketch

Renger Witkamp (1959) studied Biology and Pharmacy at the Utrecht University (the Netherlands). He received his PhD in Pharmacology in 1992 and worked as associate professor at the Utrecht University until 1996. Then he moved to TNO, the Netherlands' Organization for Applied Research. At TNO he worked in several positions, mainly in pharmacology and analytical chemistry. As director of TNO Pharma (2003-2006) he was also responsible for business development relations with the pharmaceutical industry. In 2006 he was appointed to professor in Nutrition and Pharmacology at the Wageningen University, which is a new chair group. In addition he still works for TNO for two days per week. A basic course in pharmacology and nutrition is now compulsory for students in nutrition and health and optional for other life sciences disciplines in Wageningen. Advanced courses are in preparation. The research is focusing on natural bio-actives that act via the endo-cannabinoid system in relation to appetite regulation, obesity and the metabolic syndrome.

#### Summary

Nutrition and Pharmacology seem to be two scientific disciplines divided by a common language. In many ways this is a matter of tradition and culture. Historically, pharmacology as a science has strong roots in experimental physiology. Somewhere in the mid-19th century, investigators started to use biologically active compounds from natural or synthetic origin to change organ and body functions. Remarkably, pharmacology as a clinical science developed much later, although medicines have already been prepared and used since the beginning of civilisation. The emphasis in nutrition was originally on the prevention of deficiencies, focussing on what were found to be essential components of the diet. Nevertheless, there are also many historical examples of the use of nutrition to cure diseases. Nowadays, from a scientific point of view, the overlap between both disciplines is very clear.

- "Pharma" can learn from "Food" when it comes to understanding the subtle regulation of metabolic diseases and the complexity of pathological disturbances. Pharmacologists are realizing that the "one disease – one target – one drug" concept is not always leading to successful cures, in particular not with chronic and degenerative diseases. This has led to new developments including systems-based approaches, the principles of "multi-target" pharmacology and "dirty" drugs.
- *Vice versa*, nutrition is realising that the principles of pharmacokinetics and pharmacodynamics provide tools for understanding the effects of both essential and non-essential components in our diet. The increased scientific and commercial interest in functional foods and food supplements has intensified research and development in this area. Many food companies are actively engaged in finding new bioactive compounds that can be used in food products. Some discovery programs in the food industry resemble approaches used in the pharmaceutical world, starting with molecular targets that are not infrequently derived from "drug targets".
- There are several areas where the R&D programmes in "food" and "pharma" meet and would benefit from working together. This will be illustrated with examples from the endo-cannabinoid system, a highly versatile physiological system involved in energy intake and storage.

## SPEAKER

### Pharmacogenomics and Nutrigenomics – Can The Two Meet?

**Mike Gibney**, University College Dublin, Ireland



#### Biographical Sketch

Michael Gibney, M Agr Sc, MA, Ph D, was appointed Professor of Food and Health at University College Dublin in 2006 and is Director of the UCD Institute of Food and Health. He is a former President of the Nutrition Society based in London. He served on the EU Scientific Committee for Food from 1985 to 1997 and then chaired the BSE working group as a Member of the Scientific Steering Committee of the EU from 1997 to 2000. He is a member of the board of the Food Safety Authority of Ireland. His research interests lie in metabolic and molecular nutrition, in public health nutrition and in probabilistic risk analysis. He is currently the coordinator of a major EU funded research project (€12.5m) on nutrition, genetics and the metabolic syndrome ([www.lipgene.tcd.ie](http://www.lipgene.tcd.ie)) and is also actively involved in the European Nutrigenomics Organisation ([www.nugo.org](http://www.nugo.org)). He has been joint principal investigator of the National Adult, Children and Teenagers' Dietary Surveys funded by the Department of Agriculture ([www.iuna.net](http://www.iuna.net)). Professor Gibney was awarded the British Nutrition Foundation Prize in 2000. Professor Gibney has served on the Faculties of the University of Sydney (1973-1976), the University of Southampton (1976-1984) and Trinity College Dublin (1984-2006).

#### Summary

There are fundamental differences in pharma and food. The former acts on single gate-keeper enzymes and elicits a unique metabolic cascade. Nutrients have widespread effects operated through (a) changes in gene expression and ultimately regulatory proteins, (b) changes in nuclear receptors and (c) membrane function. Most data in both nutrigenomics and pharmacogenomics comes from observational studies of single nucleotide polymorphisms and unless corroborated with data from intervention studies, are of little benefit in personalised nutrition or medicine. Food and pharma can meet if a highly specific effect of a nutrient is established coinciding with the impact of a drug but that tends to be the exception rather than the rule.

## SPEAKER

### Open Innovation – Food & Pharma Opportunities

**Steve Meller**, Procter & Gamble, United States



#### Biographical Sketch

Dr Steve Meller is originally from Adelaide, South Australia. He received B.Sc., B.Sc. (Hons.), and PhD (in Physiology) from the University of Adelaide. After travelling the world for a year, he spent 6 years at the University of Iowa, in Iowa City on the research faculty in Pharmacology studying the basic mechanisms underlying chronic pain before moving to the Procter and Gamble Company (an \$80 billion global company) in 1994. Since moving there 13 years ago, he has held various roles in R&D in Health Care where he was ultimately responsible for the non-Pharma Health Care technology research and the global non-Pharma Clinical organizations. For the last 3 years, he has been in a corporate role where he is head of a global open innovation program focused on bringing bio-based innovation, from the globe, into P&G's R&D product pipeline across all of the diverse business P&G operates in. In that role he has developed a variety of novel approaches to source, evaluate and commercially develop bio-based innovations intended to accelerate P&G's innovation pipeline. In addition, he has been very active in, and leads a number of teams focused on sustainability.

#### Summary

The three key messages are:

- o Open Innovation is being used by organizations to increase their productivity
- o Diversity of networks and relationships are key to discontinuous open innovation success
- o Food and Pharma innovation opportunities extend well beyond food and Pharma

This presentation will cover the approaches that P&G has used that have enabled it to be widely acknowledged as one of the global leaders in Open Innovation. This diversity of thought and approaches are key to bringing open innovation to the forefront of business success and include elements of leadership, strategies and relationships. I will describe the journey that P&G has been on, its successes and the elements that have been key to success for us. I'll then share examples of why and how diverse networks and relationships and one of the main keys to discontinuous open innovation success and will conclude with thoughts on how these same approaches and principles could apply across the Food and Pharma industries to significantly enhance the impact of these industries.

## SPEAKER

### Can Food and Pharma Work Together – An Industry-Academia Perspective

**David Alpers**, GlaxoSmithKline, United Kingdom



#### Biographical Sketch

David Alpers received his bachelor and medical degrees from Harvard University, was a medical house officer at the Massachusetts General Hospital, and a research fellow at NIH under Gordon Tomkins. After a fellowship in gastroenterology at the Massachusetts General Hospital and serving as a junior faculty member at Harvard Medical School, he served as chief of the GI Division at Washington University School of Medicine from 1969-1997. His laboratory research was focused on the regulation of protein synthesis in the GI tract, and on the intestinal absorption of triglycerides and vitamin B12. This involved study of the biology of proteins unique to the GI mucosa, including especially intestinal alkaline phosphatase, gastric intrinsic factor, and the intrinsic factor-cobalamin receptor (cubilin). He has published over 210 peer reviewed scientific papers related to this work.

He has had many editorial responsibilities, including associate editor of the J Clin Invest, editor of the Am J Physiol Gastrointest Liver Physiol (1991-97), editorial board of the J Biol Chem (1998-2003), and editor of Small Intestine and Nutrition sections of Current Opinion in Gastroenterology (1997-present). He is Associate Editor of the Textbook of Gastroenterology, T. Yamada (editor-in-chief), and coauthor (with W Stenson and DM Bier) of the Manual of Nutritional Therapeutics. He served as director of the Undergraduate Teaching Project of the American Gastroenterological Association from 1985-2001, and was President of the AGA in 1990-91. He received the Julius Friedenwald medal of the AGA for lifetime contributions to the field of gastroenterology. Since 1999 he has been a Senior Medical Consultant to GlaxoSmithKline plc.

#### Summary

Large pharmaceutical companies do not have a history of entering the market for food/food supplements as therapeutics, in part because very few supplements have shown efficacy and in part because the likelihood of success for unprecedented mechanisms is very low, ~8%. Companies are interested to pursue new therapeutic areas if they fulfill an unmet medical need and are tractable. Prerequisites that would be important in entering an area such as food/nutrition might include:

- identification of an unmet medical need jointly agreed with the food industry
- formulation of a product as a prescription item or with enough name recognition to start as otc
- interactions with academia to facilitate focused and speedy execution of collaborative development planning.