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8TH DANONE INTERNATIONAL PRIZE FOR NUTRITION



2011



**8TH DANONE
INTERNATIONAL
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NUTRITION**



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PIONEERING RESEARCH ON THE HUMAN GUT MICROBIOME: A NEW APPROACH FOR UNDERSTANDING OBESITY AND UNDERNUTRITION REWARDED

Our gut is home to **100 000 billion microbes** that benefit us in many ways. Pioneering work in a new area of research, metagenomics, by Professor Jeffrey I. Gordon and his students is providing new views of the complex interrelationships between our varied diets, the structure and functions of our gut microbial communities, the nutritional value of the foods we eat, and our nutritional status. This new approach has implications for understanding obesity and undernutrition. It will provide another paradigm to enhance the health of children and adults representing varied cultural traditions. **His discoveries have earned him the prestigious Danone International Prize for Nutrition worth 120,000 Euros** ●

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PIONEERING RESEARCH ON THE GUT MICROBIOME: A NEW APPROACH FOR UNDERSTANDING OBESITY AND UNDERNUTRITION REWARDED



Singapore, July 13th 2011 – American research scientist Jeffrey I. Gordon, Director of the Center for Genome Sciences and Systems Biology at Washington University School of Medicine in St. Louis, has just received the Danone International Prize for Nutrition for his outstanding discoveries about the mutually beneficial relationships that exist between the human body and the tens of trillions of bacteria living in our intestines, known today as the gut microbiota. *“I am thrilled and at the same time very humbled. I have been incredibly fortunate to have had an inspiring group of students work in the lab over the years”*, says Gordon, the one who has motivated hundreds of young researchers to contribute to the knowledge of the gut microbiome and its modulation by food. Today, his great work provides a vast array of applications in the field of nutrition and beyond.

Prof. Gordon and his lab are exploring a mysterious world, teaming with myriad life forms most previously unknown and unnamed. Collectively this universe of micro-organisms is referred to as the **gut microbiota** and its collection of millions of microbial genes, as the **gut microbiome**. The goal of researchers is to gain new knowledge about how, beginning at birth, mutually beneficial relationships are forged between our gut microbes and ourselves and to use this knowledge to promote healthy growth in children, and to identify microbiome-based strategies for diagnosing, treating and ultimately preventing diseases related to poor nutritional status at various stages of life.

We are a Synopsis of Microbial and Human Parts

“Human beings are supraorganisms, a multi-species compendium of human and microbial cells and genes,” notes Prof. Jeffrey I. Gordon. **Our gut microbiome endows us first with a number of genes that vastly exceed the number of genes in our human cells.** Secondly the repertoire of our gut microbial genes endows us with physiological functions that our gut cells had not to evolve: For example the ability to metabo-

lize some carbohydrates our gut cannot digest. Jeffrey I. Gordon has revolutionized the way we look at the human gut microbiome and its role in human health. He and the scientists of his lab have conducted **pioneering interdisciplinary studies** that ‘marry’ **new methods in genomics** with **innovative animal models** and studies on **humans**, including twins.

These approaches have allowed them to:

- **Decipher the genomic and metabolic features** that monitor how the main groups of the human gut microbiota share nutrients in the gut. For this, he revisited the use of germ-free mice, recolonizing them with specific human gut microbes whose genome have been sequenced, and used sequential colonization, adding new microbes to the mouse models.
- **Provide new research tools** for identifying how the microbiome may be used therapeutically.
- Show how, during the course of mammalian evolution, **diet has been the principal factor that has shaped gut microbiome structure and function.**
- Develop ways to decipher and **predict how the**

gut microbiota will respond to manipulating dietary components.

- **Demonstrate that the microbiome can impact energy balance**, and how it may contribute to obesity.
- Show that **gut microbial communities from different individuals can be preserved** and then each reliably transplanted to and replicated within germ-free animals; these humanized mice can then be used to define how much of the human donor's physiological features can be attributed to their gut microbial 'organ'.
- **Characterize how gut communities are acquired**, emphasizing, thanks to studies of twins, the importance of early environmental exposures.
- Delineate features of **the gut microbiome that are shared between individuals and those that vary from one individual to another**.
- Devise new approaches for **defining the genetic factors that determine the abilities and functions of human gut microbes**.

Applications for Human Health

Applications are very large and the implications for global human health are great, especially at a time when the world's population is increasing, as diets are changing as a result of Westernization, and where there is a pressing need to generate more and healthier foods. *"If we define malnutrition as the inadequate or excessive consumption of dietary ingredients leading to the development of disease, then we need also to consider the role of the microbiome, not only in terms of the alarming epidemic of obesity that is sweeping the world, but also in terms of the development of various forms of malnutrition. The microbiome should provide new ways for enhancing our ability*

to provide more informed recommendations about our nutritional needs at various stages of life and in different cultural settings, new ways of defining our nutritional status and the nutritional value of the foods we consume, as well as new microbiome-based approaches for the diagnosis, treatment and ultimately prevention of nutritional disorders in various human populations."

A € 120,000 Prize

In addition to the distinction associated with the prize, currently recognized as the most prestigious in the field of nutrition, the Danone International Prize for Nutrition carries a cash reward of € 120,000. Prof. Gordon explains: *"I will use part of the money to promote the career development of students, supporting their travel to developing countries where we are conducting studies of the impact of varying cultural traditions and diets on the gut microbiome. Similarly, part of the money will support the travel of colleagues from developing countries to our Center for Genome Sciences and Systems Biology as part of a scientific exchange designed to disseminate the experimental and computational tools of metagenomics. Finally, it will help support the work of anthropologists working with us who are studying the 'anthropology of microbes'"*.

Now that several years have gone by, **previous prize winners** such as Prof. David Barker (University of Southampton, UK, prize winner 2005), Prof. Jeffrey Friedman (Rockefeller University, New York, USA, prize winner 2007) and Prof. Johan Auwerx (Federal Polytechnic School of Lausanne, Switzerland), **can attest to the research advances resulting from the Danone International Prize for Nutrition**. *"I used the € 120,000 donation to establish a new research group in the University of Southampton whose aim is to determine the barriers to good food choices among young wo-*

men," explained Prof. Barker, 2005 prize winner. The 2007 prize winner, Prof. Jeffrey Friedman, is equally enthusiastic: *"The Danone International Prize for Nutrition [€ 120,000] allowed us to begin several novel lines of research that would not have been possible without these funds."* Prof. Johan Auwerx considers that the Danone International Prize for Nutrition he received in 2009 *"has been very useful to fulfil [his] research in order to identify the role of new nutrients and the way in which they influence transcription (the expression of genetic information), activating metabolic sensors."* Furthermore, *"this prize offered an international visibility and contributed to a worldwide recognition of [his] laboratory"*.

"The Equivalent of a Nobel Prize for Nutrition"

Initiated by Danone in 1997, with the support of the Medical Research Foundation, **the Danone International Prize for Nutrition is part of one of the initiatives undertaken by the Danone Institute International in support of nutritional research.** It should be noted that the **Danone Institutes**, set up by Danone as of 1991, **are designed to promote public health by developing and sharing knowledge concerning nutrition, diet and health.**

The Danone International Prize for Nutrition has been awarded every two years since 1997 to a research scientist or research team conducting outstanding studies in human nutrition. The candidate selection procedure, based on that used for the Nobel Prize, is rigorous, objective and transparent. The Danone International Prize for Nutrition committee initially brings together an 'nomination college' joining together several hundred representatives of leading institutions that promote nutritional research worldwide.

Each member of the committee is asked to propose the election of one or two research scientists (or research teams). An independent international jury including eight renowned scientists then chooses the prize winner on a majority basis. According to Prof. Manuel Serrano Rios, Chairman of Danone Institute Spain and Member of the Academy of Medicine, *"In my view, the Danone International Prize for Nutrition is nothing less than the equivalent of a Nobel Prize for nutrition"*. This opinion is shared by Danone CEO Franck Riboud: *"Today, we are very proud to see that the Danone International Prize for Nutrition is helping to promote research conducted by the foremost research teams in the fields of health and nutrition, and that it is viewed by scientists as one of the most prestigious awards. **This prize and the Danone Institute International offering this reward are both naturally in line with Danone's initiative to provide health through food to as many people as possible.**"* ●

INTERVIEW

with Prof. Jeffrey I. Gordon,
Winner of the 8th Danone
International Prize for Nutrition



American researcher Jeffrey I. Gordon, Director of the Center for Genome Sciences and Systems Biology at Washington University School of Medicine in St. Louis, has just received the Danone International Prize for Nutrition for his research on the human gut microbiome, diet and nutritional status. His work underlines how variations in gut microbial community composition correlate with obesity as well as with undernutrition.

© DR Prof. Jeffrey I. Gordon
(Center for Genome Sciences
and Systems Biology,
Washington University School
of Medicine, St. Louis),
2011 winner of the Danone
International Prize for Nutrition

You have just been awarded the Danone International Prize for Nutrition. What was your reaction to the announcement of this prize?

I am thrilled and at the same time humbled. I have been incredibly fortunate to have had an inspiring group of students working in the lab over the years. So, the honor of the Danone International Prize for Nutrition is really theirs, and a testimony to their vision, courage, and accomplishments.

This prize, awarded by your peers, is a recognition of years of research on the human gut microbiota, its metagenome, diet and nutritional status. Could you summarize your research work?

Our research deals with mutually beneficial host-microbial relationships in the human gut. It has provided a new view of human beings as a supraorganism, mixing our human

cells and our gut microbial communities. Our gut microbes are providing physiological capacities that our gut cells had not to evolve with. This contributes to the physiological variations we manifest following birth, and help our gut to be adapted to the different cultural settings including diets.

Our studies of identical and fraternal twins and their mothers have emphasized that our microbiomes should be considered as part of the transfer of genetic information that occurs within family members across generations. These studies have also revealed the existence of a core gut microbiome composed of microbial genes encoding key metabolic functions that are shared among humans not only within families, but across families. Our analyses of humans, non-human primates, and many other mammalian species have emphasized that diet has been a major factor shaping gut microbial ecology during the course

of mammalian evolution. Our work in gnotobiotic mouse models is revealing the mechanisms by which diet and specific dietary ingredients shape gut microbial community structure and function. We have studied how the microbiota not only allows energy to be extracted from otherwise indigestible components of our diets such as complex plant carbohydrates, but how it also helps insure, through manipulation of host genes, that the extracted energy is deposited in host cells. Finally, we have and are continuing to use gnotobiotic mouse models, including those that contain transplanted human gut microbial communities, to show how variations in gut microbial community composition and gene content/function correlate with obesity as well as with severe forms of undernutrition.

What are the main applications of your studies?

Together, our findings emphasize that

the caloric and nutrient value of food should not be considered as absolute entities, but rather as relative terms influenced by the consumer's gut microbiota and microbiome.

Moreover, our ongoing genomic and metagenomic analyses are allowing us to compare and contrast the gut microbiota/microbiomes of malnourished (and obese) individuals of varying ages, prior to, during and after various dietary interventions. Many outcomes of these analyses can be envisioned. First of all, a deeper understanding of the nutritional needs of humans living in various parts of the world could be coupled with: (i) microbiome-based biomarkers to identify those at risk for malnutrition, especially at early stages of their lives, as well as those at risk for obesity; (ii) recommendations for dietary interventions based on the nutritional needs and nutrient processing capacities of these populations, and (iii) a deeper understanding of why some prevention strategies and therapeutic interventions fail in some individuals but succeed in others. Based on these considerations, our 21st century pharmacopoeia will likely include members of our microbiota (some of which can be incorporated into food), the chemical messengers they normally produce, and/or a new generation of man-made compounds that affect the activity of human genes discovered to be

the normal targets for manipulation by the microbiota.

You say “The time is right and the need is great to better understand the interrelationships between diet, nutritional status, the immune system and microbial ecology in humans at different stages of life, living in distinct cultural and socioeconomic settings.” Why now?

The answer lies in a confluence of forces. We need to devise new ways to feed healthy foods to a human population whose size is predicted to expand to 9 or even 10 billion in the next 40-80 years. The solution must take into account the fact that land and water resources are being increasingly constrained and that food distribution systems have to be improved. Tragically, approximately half of the 10 million children who die each year die because of problems related to malnutrition. We need to better understand the relationships between the composition of breast milk and its evolution during lactation, the assembly of the infant gut microbiome and the maturation of its metabolic functions, and the development of our immune systems so that we can gain deeper understanding of the determinants of healthy growth. Up to one billion people suffer from varying degrees of undernutrition. One testable

One testable hypothesis is that the gut microbiota may contribute to undernutrition, as well as obesity, through its effects on nutrient metabolism and immune function.

hypothesis is that the gut microbiota may contribute to undernutrition, as well as obesity, through its effects on nutrient metabolism and immune function. We need to consider the impact of Westernization on the structure and dynamic operations of our gut microbiomes and ask whether there is another dimension to human genetic evolution - one that is occurring very rapidly in many of our societies as a result of the changing ways that we are living. If so, how are changes in our gut microbiomes brought about by Westernization and our Western diets affecting our physiology, and contributing to our risks for various diseases? The answers require, at least in part, development of new translational medicine pipelines ⁽¹⁾ for rigorously defining the nutritional value of foods we consume at different stages of our lives, and the role of the microbiome in defining 'nutritional value'. These pipelines are required to assess health claims made about food ingredients.

Laureates are awarded € 120,000 in recognition of research studies already published as well as to support future research. Have you decided how this will be used?

I will use part of the money to support the career development of students: To support their travel to developing countries where

we are conducting studies of the impact of varying cultural traditions and diets on the gut microbiome so that they can obtain a more global view of the factors that influence human nutrition and of the pressing challenges that rapid population growth will have on our ability to adequately feed people. Similarly, it will also be used to support the travel of colleagues from developing countries to our Center for Genome Sciences and Systems Biology as part of a scientific exchange designed to disseminate the experimental and computational tools of metagenomics as they relate to the studies of gut microbial ecology and human nutritional status. Finally, it will help support the work of anthropologists working with us who are studying the 'anthropology of microbes' ●

(1) :The "translational medicine pipeline" concept is based on two notions: The rapid transition from research to practice, meaning tests on animals and humans, with ongoing alternations between the two, thus deepening or validating hypotheses; and transversal expertise, based on joint, multidisciplinary work (biological sciences, computer sciences, humanities, etc.) for more efficiency and to achieve measurement and monitoring of the impact on public health.

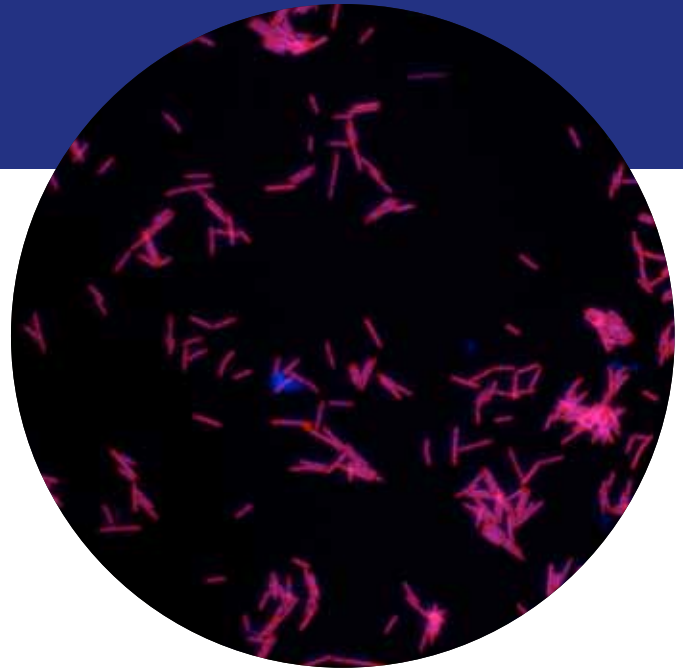
THE DANONE INTERNATIONAL PRIZE FOR NUTRITION, AWARDED BY THE DANONE INSTITUTES, SUPPORTING RESEARCH SINCE 1997



Every two years, the Danone International Prize for Nutrition awards research scientists for their work. In addition to the international stature of the reward, which is currently recognised as one of the most prestigious in the nutrition field, the award carries a donation of € 120,000 allowing teams to continue their research. Below are testimonials of three previous prize winners: Prof. David Barker (*University of Southampton, UK, prize winner 2005*), Prof. Jeffrey Friedman (*Rockefeller University, New York, USA, prize winner 2007*), and Prof. Johan Auwerx (*Federal Polytechnic School of Lausanne, Switzerland*).

Every two years since 1997, the Danone Institute International, a non-profit organisation, has awarded the Danone International Prize for Nutrition to research scientists or research teams carrying out noteworthy studies in the field of human nutrition. This prize is awarded for innovative concepts and studies expanding the barriers of nutrition science, whether through fundamental or applied research. The candidate selection procedure, based on that used for the Nobel Prize, is rigorous, objective and transparent.

The Danone International Prize for Nutrition committee initially brings together a 'nomination college' comprising several hundred representatives of leading institutions to promote nutritional research worldwide. Each member of the committee is asked to propose the election of one or two research scientists (or research teams). An independent international jury comprising seven to nine renowned scientists then chooses the prize winner, who will receive € 120,000 ●



© Photo Danone Research
Bacteria isolated
from intestinal microbiota.

“The Danone International Prize for Nutrition, with its € 120,000 cash award, also provides an important stimulus for the prize winners elected every two years since 1997.”

Dr Virginia Stallings,
President of the Danone Institute International and of the Dannon Institute USA.

INTERVIEW

Prof. Johan Auwerx



**Prof. Johan Auwerx
Winner of the 2009
Danone International
Prize for Nutrition**

*Federal Polytechnic
School of Lausanne,
Switzerland*

Prof. Johan Auwerx, you were awarded the 2009 Danone International Prize for Nutrition for your research work. Could you tell us a few words about your main discoveries?

I have been working for a number of years on the mechanisms by which cells react to the nutrients present in the cellular environment. My studies show that the effects of these nutrients may in certain cases be more important than those of hormones. This discovery completely changes our understanding of nutrition since it highlights the degree to which our body in general, and more particularly our cells, are able to adapt to their environment according to what we eat. The nutrients we absorb each day through our diet thus constitute a number of signalling factors able to trigger hormone-like reactions within our bodies.

For example, when resveratrol – a polyphenol found in grapes and wine and involved in the well-known French Paradox – is eaten, the body

starts to burn its reserves, and thus adipose tissue. However, the concentrations in natural products are extremely low, and in any case too low to produce any visible results on obesity. We therefore began work on developing a synthetic molecule and a capsule containing high concentrations of this substance.

Nevertheless, applications of these discoveries do not only apply to the development of drugs. We are moving from a cure perspective through drugs to one of prevention through nutrition. This is good news given that when obesity has developed, it is generally too late to act upon. We are working, therefore, more and more often in collaboration with the food industry in hopes of creating a positive impact on public health.

As a research scientist, what did you gain from the Danone International Prize for Nutrition?

The Danone International Prize for Nutrition was

awarded to us in 2009 and has been very useful for the continuation of our research aiming at identifying the role of new nutrients and the way they influence transcription [the expression of genetic information] by activating metabolic sensors.

We especially worked on Vitamin B derivatives, which activate sirtuins¹ and induce energy expenditure. This Prize has offered us an international visibility and has contributed to the worldwide recognition of our laboratory.

1. Sirtuins are transcription co-factors that act as "molecular traps" for nutrients and intracellular metabolites. These proteins in fact play a dual role: They detect changes in concentrations of certain nutrients or metabolites in the environment and they react to this information by modifying transcription of the genes involved in metabolic control, thereby ensuring a suitable response.

INTERVIEW

Prof. Jeffrey Friedman



Prof. Jeffrey Friedman
Winner of the 2007
Danone International
Prize for Nutrition

Howard Hughes
Medical Institute
and Rockefeller
University,
New-York, USA

Prof. Jeffrey Friedman, you were awarded the 2007 Danone International Prize for Nutrition for your research work. Could you tell us a few words about your main discoveries?

My laboratory identified a new adipocyte hormone that we decided to name leptin. This discovery has led to the elucidation of a robust physiological system that maintains fat stores at a relatively constant level. Leptin is a peptide hormone secreted by adipose tissue in proportion to its mass. This hormone circulates in the blood and acts on the hypothalamus to regulate food intake and energy expenditure. When fat mass decreases, plasma leptin levels fall stimulating appetite and suppressing energy expenditure until fat mass is restored. When fat mass increases, leptin levels increase, suppressing appetite until weight is lost. It is through this mechanism that total energy stores are stably maintained within a relatively narrow range.

Genetic defects in the leptin gene are associated with massive obesity in mice and some humans. Treatment with recombinant leptin markedly reduces food intake and body weight in these patients. The low leptin levels in patients with leptin mutations are also associated with multiple abnormalities including infertility, diabetes and

immune abnormalities all of which are corrected by leptin treatment.

As a research scientist, what did you gain from the Danone International Prize for Nutrition?

The Danone Prize [€ 120,000] allowed us to begin several novel lines of research that would not have been possible without these funds. In one study, we were able to add a radioactive metal to leptin which allowed us to follow leptin's distribution in the body, in rodents, and non-human primates. This study allowed us to define the mechanism by which leptin is metabolized *in vivo* and also revealed a surprising and important avidity of leptin for cells of the human system.

In other ongoing studies, Danone funds are being used to develop a novel methodology that, if successful, will allow us to non-invasively modulate the activity of specific neurons in awake animals potentially allowing us to assess the effects of activating specific neural populations on feeding behaviour.

On a personal note, I would like to say that the Danone International Prize for Nutrition has emerged as the most prestigious prize in the field of nutrition and I feel greatly privileged to have had my name added to the list of distinguished previous recipients.

INTERVIEW

Prof. David Barker



Prof. David Barker
Winner of the 2005
Danone International
Prize for Nutrition

University
of Southampton, UK

Prof. David Barker, you were awarded the 2005 Danone International Prize for Nutrition for your research work. Could you tell us a few words about your main discoveries?

Twenty years ago I showed for the first time that people with a low birth weight were at greater risk of developing coronary heart disease, hypertension, stroke and diabetes. This is now widely accepted. It has led to a new understanding that chronic adult diseases are "programmed" by malnutrition

in the womb. Malnutrition during development is known to cause life-long changes in the body's structure and physiology. In the Western world many babies are malnourished because their mothers have unbalanced and monotonous diets, or because their mothers are either overweight or excessively thin. In the Third World, many babies are malnourished because their mothers were chronically undernourished when they were young.

As a research scientist, what did you gain from

the Danone International Prize for Nutrition

I used the € 120,000 donation to establish a new research group in the University of Southampton whose aim is to determine the barriers to healthy food choices among young women. The award of this prize was followed by invitations to lecture around the world and this has helped disseminate the results of my research throughout the nutrition community.

THE DANONE INTERNATIONAL PRIZE FOR NUTRITION AND THE DANONE INSTITUTES: ONE OF DANONE'S COMMITMENTS TO HEALTH



In the beginning, there was Danone, already inherently permeated by the values of nutrition and health. In 1991, Danone decided to promote public health by developing and spreading knowledge about nutrition, diet and health, and set up its first Institute. Twenty years later, there are now 17 Danone Institutes worldwide, operating under the aegis of the Danone Institute International. The latter has been awarding the Danone International Prize for Nutrition every two years since 1997 to a research scientist or research team conducting noteworthy studies in human nutrition. Today, this prize is one of the Institute's key activities but also highlights Danone's long-standing commitment to nutrition and health.



© Photo Danone Research
FISH microscope



The Danone International Prize for Nutrition has been awarded every two years since 1997 by the Danone Institute International. Today, this prize is one of the Institute's key activities and is completely in line with the Institute's original mission to promote health through the development and spreading of knowledge about nutrition, diet and health.

The Danone Institute International: Advancing Knowledge on Nutrition

The first Danone Institute was created in France in 1991 thanks to Danone's desire to promote health beyond its own products. This was an ambitious project, with the group seeking to create an independent and transparent non-profit organisation for the promotion of public health by the development and spreading of knowledge about nutrition, diet and health. To achieve this, Danone brings together eminent members from the scientific community (for the scientific council), together with nutritional

experts and Danone representatives (board), under the presidency of an independent scientist. Thus, this organisation is at complete liberty as to the use of the funds provided by the group. Twenty years later, there are now **17 Danone Institutes** worldwide that are funded by local Danone subsidiaries. The Danone Institute International is responsible for steering the network, stimulating rich and continual exchange between the different countries. To date, **over 900 research projects** have been supported (representing a global **budget of 20 million Euros**), **dozens of educational programs** have been launched, and close to **one hundred symposia** organised.

Actions undertaken by the Institute include support for cutting-edge research, as carried out by the group itself, which has always been heavily invested in research and development. In this respect, the Danone International Prize for Nutrition represents a key activity.

Nutrition and Health: Long-Standing Danone Values

Since its creation, Danone has always been directly linked with nutrition and health and has demonstrated complete commitment to these activities at every stage of its history. Already in 1789, the Marquis de Lessert discovered the health benefits of Evian water. In 1881, Joseph Léon Jacquemaire, a pharmacist in Villefranche-sur-Saône (France), and his associate, Maurice Miguet, founded a laboratory to carry out food research, particularly concerning baby foods, and this resulted in the foundation of Blédina, the infant nutrition department, in France. In 1919, Isaac Carasso supplied pharmacies in Barcelona with the first Danone yoghurts for children with digestive problems. These yoghurts

were manufactured using bacteria provided by the Institut Pasteur of Paris.

More than a century later, Danone continues to develop products linked with health: Fresh dairy products (Activia, Danacol, etc.), waters and baby nutrition products (growth milk enriched with iron, cereals, fruit desserts, etc.), as well as clinical nutrition products sold through pharmacies and hospitals for sick, undernourished or elderly people.

Research is a major pillar of Danone's innovation strategy. The R&D skills are brought together in Danone Research, a worldwide organization employing more than 1200 employees. Danone Research enables the company to identify nu-

INTERVIEW

Franck Riboud



“Health has always been of primordial concern in Danone products”

CEO of Danone

What is the place of the Danone International Prize for Nutrition in Danone's policy?

Health has been historically linked to Danone products. Research has consistently been a major pillar of the Group in meeting its objective to provide consumers with products combining optimal flavour, nutritional benefits and safety guarantee. Beyond our investments to promote research for our own products, it is also essential to support

academic research in the field of nutrition, as this activity opens up new avenues for improving health in various populations. For this reason, we actively support the Danone Institutes, one of whose goals is to promote research, and consider the Danone International Prize for Nutrition, awarded for particularly innovative studies, to be a key initiative.

Other prizes exist for innovative research in the field of nutrition. What sets the Danone International Prize

for Nutrition apart?

The selection procedure, under the responsibility of renowned scientists, is based on the model used for the Nobel Prize, thereby ensuring complete independence, objectivity and transparency. Today, we are proud that, through the sizeable cash award, the Danone International Prize for Nutrition contributes to the development of novel research among the most innovative teams in the field of nutrition, and that it helps highlight the central importance of nutrition, and thus of diet, to health.

nutritional deficits in countries in which the Group has operations, adapt the nutritional quality of its products accordingly, and offer products tailored to local cultural specificities (taste, circumstances of consumption, portions, etc.), demonstrate the health benefits of its products, etc.

Furthermore, in order to develop scientific knowledge within a specific domain, **Danone Research creates partnerships with many internationally renowned institutions** in areas including probiotics, infant nutrition and medical nutrition (e.g. Institut Pasteur, University of Washington, etc).

Nutrition and Health: At the Heart of Danone's Corporate Governance

Nutrition and health are formally part of Danone's corporate governance as attested by its **Food, Nutrition and Health Charter** based on **five fundamental commitments**:

1. Propose nutrition solutions continuously tailored to nutritional needs and recommendations, tastes and incomes of the local people.
2. Develop products with relevant, scientifically proven health benefits and based on an appropriate nutritional profile.
3. Inform consumers clearly and factually and advertise responsibly (for example Danone's pledge on advertising aimed at children).
4. Promote healthy lifestyles and diets.
5. Address major health – and nutrition – related societal challenges.

The Danone Institutes and their projects actively and independently contribute to these commitments through their multiple research support and health care and education professional information programs ●

Since its creation, Danone has always been directly linked with nutrition and health and has demonstrated complete commitment to these activities.

THE FOUNDATION FOR MEDICAL RESEARCH SUPPORTS FRENCH MEDICAL RESEARCH AND THE DANONE INTERNATIONAL PRIZE FOR NUTRITION



Founded in 1997 as a Danone initiative, the Danone International Prize for Nutrition is supported by the Foundation for Medical Research (FRM), whose mission is to develop cutting-edge research, contributing to the health of all. Entirely independent, state-approved and certified by the Committee of the Charter for Trust Funds, the Foundation operates through the generosity of its donors.



Founded in 1947 by doctors and researchers, including Professor Jean Bernard, the Foundation for Medical Research is engaged in all areas of medical research: Cancer, neurological diseases, infectious diseases, cardiovascular diseases, genetic diseases and rare diseases... Its objective: To enable the most promising studies to have quick success and to contribute to the development of pioneering and innovative French medical research, leading to medical advancements for all.

Two Missions that Link the Researchers and the Donors

The primary mission of the Foundation is to develop public medical research by funding—following calls for projects, evaluation and selection—projects that are submitted by researchers, thanks to its donations. Thus, the foundation constitutes a real interface between a population eager to commit to research, but ignorant of the needs and emergencies of the latter, and the concrete needs of researchers.

The second mission of the Foundation—scientific information—is to be a relay of information between researchers and the public in order to enable the latter to better understand the issues and research findings. It plays this role particularly through its journal "Research & Health".

A Unique Position at the Heart of Research

The Foundation for Medical Research is the only non-profit organisation to intervene in all research disciplines. It also provides significant support to research projects engaging young researchers, striving for the sustainability of medical research in France and the quality of our health tomorrow. As the most significant private contributor to French public research, all research areas combined, the Foundation contributes annually to the development of more than 750 research projects.

Three Major Programs to Meet the Needs of Researchers

The Hope for Research program supports research in all disciplines. It constitutes the heart of the mission of the Foundation. In 2010, 74% of funding granted by the Foundation, 377 grants, was through this program.

The Urgency for Research program is dedicated to the development of under-supported disciplines identified as priorities by the Foundation in terms of research and public health.

The Pioneers of Research program aims to encourage multidisciplinary approaches for a better understanding of the major issues in the evolution of life and to foster the emergence of therapeutic innovations.

Procedures to Ensure the Proper use of Donations

The funds raised by the Foundation for Medical Research are awarded by the scientific committees composed of senior researchers:

- Its Scientific Advisory Board composed of 32 researchers, representing all medical and scientific disciplines evaluates and selects research projects to benefit from the Hope for Research program.
- *Ad hoc* scientific committees, composed of experts from relevant research fields, are composed to evaluate and select research projects to benefit from the Urgency for Research and Pioneers of Research programs.

Evaluations and selections made by these committees are based on the scientific quality of the projects, the potential that they carry for medical progress and the excellence of the concerned researchers. Eager to promote high quality research, the foundation only funds each year from 30 to 35% of submitted projects.

The desire for Full Transparency on the Use of Funds

The Foundation for Medical Research follows the procedures and controls that ensure the quality of its management and enable its donors to be fully informed of the use of their gifts :

- Control of an auditor.
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Its objective: To enable the most promising studies to have quick success and to contribute to the development of pioneering and innovative French medical research, leading to medical advancements for all.

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