

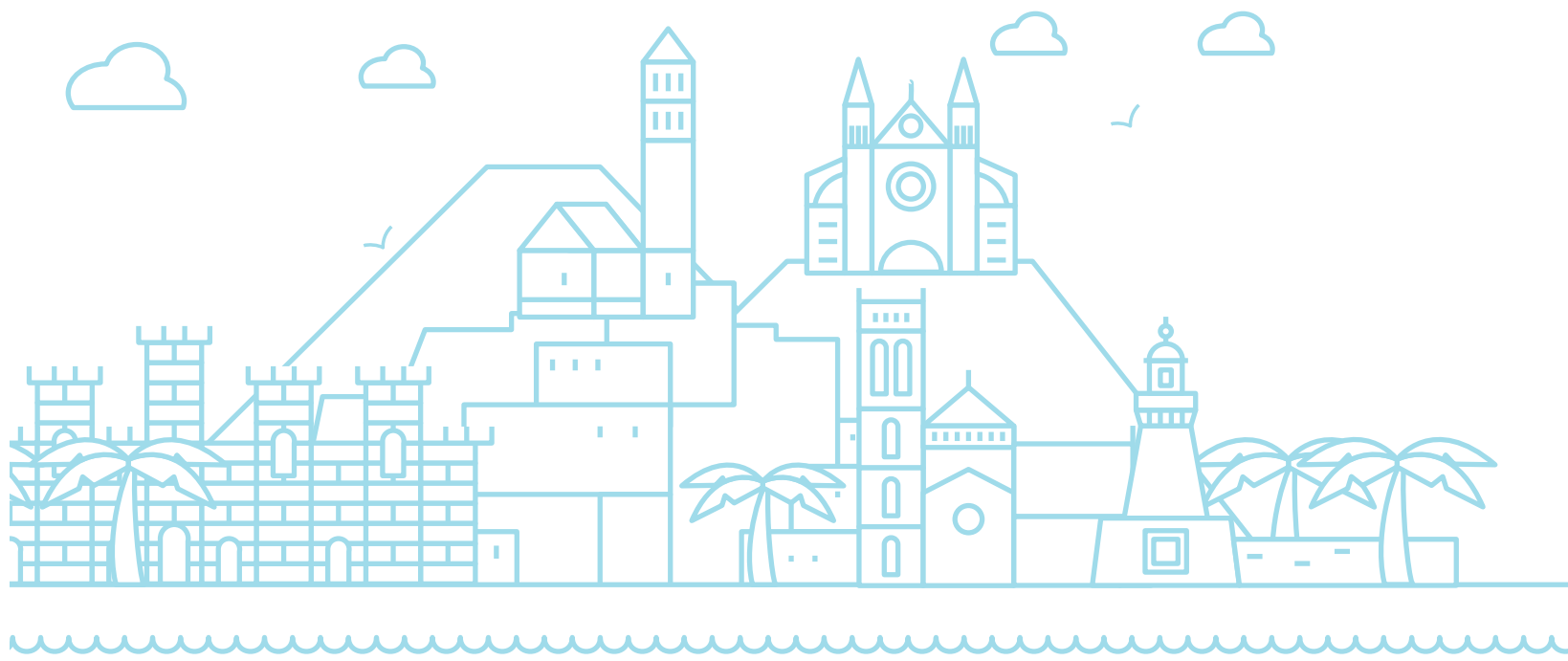


Moving Forward in CHILD NUTRITION

VI INTERNATIONAL SCIENTIFIC SYMPOSIUM

June 20th, 2019





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WELCOME AND OPENING SESSION

Dr. José M.^a Ventura

President of Laboratorios Ordesa, Barcelona, Spain



I am honored to welcome you to the 6th edition of the Scientific Symposium organized by Ordesa Laboratories that this year will be hosted in the alluring city of Palma de Mallorca. Since the celebration of the last edition, Cátedra Ordesa has continued researching different aspects of child nutrition with the aim of bringing closer scientific knowledge and society, as well as improving our formulas and offer the Pediatric professional community products of the best quality.

Therefore, I hope that this meeting will allow us not only to expand our knowledge on this subject, but also to reinforce our professional bond with the field of Pediatrics.

Some of you come from different parts of Spain, but others have travelled from distant countries. To all

of you, I want to say thank you, as your presence here is essential for Ordesa Chair to share knowledge and experiences and, at the same time, a bilateral exchange, since it is greatly enriched with your contributions, which help us to define future research topics and foster the Meeting success.

As in previous editions, we will be relying on excellent professionals who will share interesting lectures on current trends in this field.

I hope that this Meeting will be of maximum benefit to all of you and that we may meet again in the future in new editions in new editions organized by Ordesa Chair on Child Nutrition.

Please receive my warmest welcome and deepest gratitude for your attendance.





SCIENTIFIC PROGRAMME





EARLY PROGRAMMING: FROM THEORY TO CLINICAL PRACTICE

Nuevo Palacio de Congresos

20th June, Palma de Mallorca

Scientific Programme

9.00-9.30 H

OPENING

Dr. Jose M^a Ventura, *President of Laboratorios Ordesa, Barcelona, Spain*

Dr. María Rodríguez-Palmero, *Cátedra Ordesa, Spain*

Prof. Cristina Campoy, *Director of Cátedra ORDESA, University of Granada, Spain*

9.30-10.30 H

KEYNOTE LECTURE

Metabolomic profiling in early life: are there implications for clinical practice?

Prof. Berthold Koletzko, *Dr. von Hauner Children's Hospital, Ludwig-Maximilians University of Munich, Germany*

Questions & answers (15 min)

Chairs: Dra. Montserrat Rivero, Dr. Josep Tur

10.30-11.00 H

COFFEE BREAK

11.00-13.00 H

SYMPOSIUM 1: EARLY PROGRAMMING DURING THE FIRST TWO YEARS OF LIFE: A WINDOW OF OPPORTUNITY

Early growth, nutrition, and neurodevelopment: an intricate problem

Prof. Virgilio Carnielli, *Polytechnical University of Marche, Italy*

Early programming of allergic diseases

Prof. Sibylle Koletzko, *Dr. von Hauner Children's Hospital, Ludwig-Maximilians University of Munich, Germany*

Oxidative and nitrosative stress in the neonatal period: consequences in infancy and childhood

Prof. Máximo Vento, *Health Research Institute La Fe, Valencia, Spain*

Questions&answers (15 min)

Chairs: Prof.Gerardo Rodríguez, Prof. Lino Álvarez

13.00-14.00 H

LUNCH

14.00- 16.00 H

SYMPOSIUM 2: ROLE OF EARLY NUTRITION ON THE DEVELOPMENT OF MALNUTRITION

Early programming of fat adipose tissue control: role of leptin

Prof. Andreu Palou, *Department of Biochemistry and Molecular Biology, University IllesBalears, Spain*





Strategies to Reduce the Prevalence of Stunting in Indonesia: Perspectives

Prof. Damayanti Syarif SpA(K) – *Pediatric Nutrition & Metabolic, Department of Paediatrics, Faculty of Medicine, Dr Cipto Mangunkusumo National Referral Hospital, Jakarta, Indonesia*

Early dietary intake and obesity development

Prof. Luis Moreno, *University of Zaragoza, Spain*

Malnutrition: from undernutrition to overnutrition

Prof. Rosaura Leis, *Pediatrics Departament. University Clinic Hospital, Santiago de Compostela, Spain*

Questions & answers (15 min)

Chairs: Dr. M^a Jesús Cabero/ Dr. Antonio Muñoz

16.00-16.45 H

CLOSING LECTURE

Gut Feelings: Impact of Early-Life Diet-Microbiome interactions on Brain Development and Behaviour

Prof. John F. Cryan, *Dept. of Anatomy & Neuroscience, University College Cork, Ireland*

Chairs: Dr. Cristina Campoy

Questions & answers (15 min)

16.45 - 17.00 H

CLOSING

Dr. Jose M^a Ventura, *President of Laboratorios Ordesa, Barcelona, Spain*

Dra. María Rodríguez-Palmero, *Cátedra Ordesa, Spain*

Prof. Cristina Campoy, *Director of Catedra ORDESA, University of Granada, Spain*

17.00 - 17.30 H

COFFEE BREAK

Ordesa Symposium

17.30 - 19.00 H

NEW ADVANCES IN INFANT FEEDING

Use of rice protein based infant formulas for the treatment of milk protein allergy in the infant

Prof. Antonio Nieto, *University Hospital La Fe, Valencia, Spain*

Long-term effects of an infant formula enriched with MFGM, synbiotics and other bioactive compounds on children's growth and neurodevelopment

Prof. Cristina Campoy, *Pediatrics Department, University of Granada, Spain*

Osteopontin in human milk and infant formulas

Lotte Neergaard Jacobsen, *Arla Foods Ingredients, Denmark*

Questions & answers (15 min)

Chairs: Dr. Joan Permanyer / Dr. Jesús Jiménez

19:15 - 19:30 H

CLOSING

Dr. Joan Permanyer, *CEO Laboratorios ORSESA*

Dr. Jesús Jiménez, *Scientific Director, Laboratorios Ordesa, Spain*



SPEAKERS AND MODERATORS



Jesús Lino Álvarez Granda, MD, PhD

Head of the Department of Pediatrics, University Hospital
Marques de Valdecilla, Santander, Spain

Jesús Lino Álvarez Granda is Head of the Pediatrics Department at the University Hospital Marqués de Valdecilla in Cantabria, Spain, and he is a professor at the University of Cantabria. Álvarez Granda holds a PhD in Medicine and Surgery by the same university, and a Master in Health Services Management. His research activity is carried out within the Group of

Metabolism, Genetics, and Nutrition in the Research Institute Marqués de Valdecilla, and the Unit of Nutrition and Cardiovascular Risk at the University of Cantabria, where he has developed more than 20 projects with public funds. Álvarez Granda has directed several PhD theses and published more than 55 scientific articles in both international and national scientific journals.

**Maria Jesus Cabero, MD, PhD****Associated Professor at the University of Cantabria, Spain**

María Jesús Cabero Pérez is Associated Professor at the University of Cantabria, Pediatrician at the Hospital Marqués de Valdecilla and Head of the Emergencies and Consultations of the Pediatrics Service of the same hospital. Cabero Pérez holds a degree in Medicine and Surgery obtained the PhD degree from the University of Cantabria. As a researcher, Cabero is Member of the Nutrition and Cardiovascular Risk Unit of the Medical and Surgery

Sciences Department at the University of Cantabria, and the Pediatrics and Chronobiology Unit of the Institute of Research and Education Marqués de Valdecilla (IFIMAV). She is the Principal Researcher at the node of Cantabria of the Maternal and Child Health and Development Research Network (Red Samyd), and Researcher at the Health Observatory of Cantabria. She has directed 3 PhD theses and has published 50 scientific and professional papers.

**Cristina Campoy, MD, PhD****Director of ORDESA Infant Nutrition Chair
Full Professor at the Department of Pediatrics, University of Granada, Spain**

- Full University Professor (permanent staff). Department of Paediatrics. School of Medicine. University of Granada.
- Director of the EURISTIKOS Excellence Centre for Paediatric Research - Health Sciences Technological Park (PTS)
- Director of the Cátedra-ORDESA-Universidad de Granada
- Person in charge of the Research Group-PAI-CTS-187 on: "Nutrition and Metabolism in Pediatrics".
- Membership positions: ESPGHAN Committee on Nutrition; Early Nutrition Academy Steering Group (ENA); ESPGHAN representative at the EU Platform for Action on Diet, Physical Activity and Health. European Commission; Committee on Nutrition of the Spanish Paediatric Association (AEP); Nutrition Expert Group of the SEGHN; Royal Academy of Medicine of Granada, Spain; Royal Academy of Pharmacy of

Catalonia, Spain; Spanish Academy of Nutrition and Food Sciences

- Co-ordinator of the FP7 NUTRIMENTHE EU Project and the PREOBE Excellence Project and UGR principal investigator of: PREciSE, DynaHEALTH, EarlyNutrition, MyNewGut, NutriOMICS, EARNEST and NUHEAL EU Projects, GD-Brain, EVASYON projects and member of the Spanish Research Network on Epidemiology & Public Health (CIBERESP-ISCIII).
- Coordinator of the Official Interuniversity Master on "Genetic, Nutritional and Environmental Factors for Growth and Development" (NUTRENVIGEN-G+D Factors).
- More than 320 papers & chapters in National-International Journals and books, more than 580 abstracts and many Conferences in National and International Meetings.



**Virgilio Carnielli, MD, PhD**

Professor of Neonatal Pediatrics at Polytechnical University Marche, Italy

Virgilio P Carnielli is Chief of the Division of Neonatology and Professor of Neonatal Pediatrics at the Polytechnic University of Marche in Ancona, Italy. He has been Fellow in Neonatology and Clinical Nutrition at the Hospital for Sick Children and Women's College Hospital in Toronto, Canada (1984-1987), Neonatologist at the Sophia Children Hospital in Rotterdam, the Netherlands (1996-1999) and Senior Lecturer at the Institute of Child Health and Great Ormond Street Hospital in the University College London in UK (2000-2001).

He is author of more than 200 publications in peer-reviewed journals (PubMed publications: 174; Publications in Scopus: 194, H-Index:34;

Publications Web of Science: 203, H-Index:29; Impact Factor: 836; 14 book chapters and about 40 publications in Italian).

He has been invited speaker at about 130 international conferences and at about 120 Italian meetings. Is reviewer for several international journals and member of Academic Societies, and was Editor for Pediatric Research from 2005 to 2010. He is former President of the European Society for Neonatology and Council Member of the European Society for Pediatric Research, 2001-2010.

His scientific interests are pulmonary surfactant and lipid metabolism in the newborn infant.

**John F. Cryan, PhD**

Professor & Chair of Anatomy & Neuroscience Department, University College Cork, Ireland

John F. Cryan is Professor & Chair, Dept. of Anatomy & Neuroscience, University College Cork, Ireland and is also a Principal Investigator at APC Microbiome Ireland Prof. Cryan's current research is focused on understanding the interaction between brain, gut & microbiome and how it applies to stress, psychiatric and immune-related disorders at key time-windows across the lifespan.

Prof. Cryan has published over 450 articles and is co-author of the bestselling "The Psychobiotic Revolution: Mood, Food, and the New Science of the Gut-Brain Connection" from National Geographic Press. He has received numerous awards including UCC Researcher of the Year in 2012; UCC Research

Communicator of the Year 2017, the University of Utrecht Award for Excellence in Pharmaceutical Research in 2013 and being named on the Thomson Reuters/Clarivate Highly Cited Researcher list in 2014, 2017 & 2018. He was elected a Member of the Royal Irish Academy in 2017.

He also received a Research Mentor Award from the American Gastroenterology Association and the Tom Connor Distinguished Scientist Award from Neuroscience Ireland in 2017 and was awarded an honorary degree from the University of Antwerp, Belgium this Spring. He was a TEDMED speaker in 2014 and is currently President of the European Behavioural Pharmacology Society.



Damayanti Syarif SpA(K), MD, PhD

Chair of Div. Pediatric Nutrition & Metabolic, Department of Paediatrics,
Faculty of Medicine, Dr Cipto Mangunkusumo National Referral Hospital,
Jakarta, Indonesia

- **Education**

GP FKUI: 1978-1983

Pediatrician FKUI: 1987-1992

Training in Clinical Metabolic Diseases,
Wilhelmina Kinderziekenhuis Utrecht The
Netherlands 1996-2000

Training in Medical Genetics, Utrecht Clinical
Genetic Center, The Netherlands 1996-2000

PhD in Utrecht University 2000

Consultant in Pediatric Nutrition and Metabolic
Diseases 2001

- **Occupation:** General Physician and Head of
Puskesmas Batakte, Kec Kupang Barat and Pulau
Semau, NTT 1984-1987

General Pediatrician at RSUD Brebes 1993-1994

Pediatrician, Consultant in Pediatric Nutrition

and Metabolic Diseases, Clinical Genetics RSCM

Chair of Div Pediatric Nutrition and Metabolic

Diseases Dept of Pediatrics FKUI/RSCM

Clinical Lecturer in Faculty of Medicine

Universitas Indonesia

Chair of Human Genetic Research Center IMERI

2011- now

- **Organization:** Secretary of Working Group
Pediatric Nutrition and Metabolic Diseases IDAI
2001-2007,

Chair of Working Group Pediatric Nutrition and
Metabolic Diseases IDAI 2008-2014

Board Member of HISOBI 2003-2010 ,

Member of SSIEM 1998-now,

Board Member of ACIMD 2010-now

Life Time Member of APSHG 2015-now



Jesús Jiménez, PhD

Scientific Director
Laboratorios Ordesa, Spain

Jesús Jiménez López is Scientific Director at
Laboratorios Ordesa, responsible for the company
areas of basic research, product development, medical
management, regulatory affairs, quality design, and
business development.

Jiménez López is PhD. in Chemical Sciences.
Biochemistry and Cell Biology, he has a Master in
Biotechnology by the Autonomous University of
Madrid, Spain, and four years of postdoctoral scholar
training at the Massachusetts Institute of Technology

(MIT), and Boston Tufts University, USA. Before
joining Laboratorios Ordesa, Jiménez López held
directive positions in other leading companies of
the food industry, such as ACEITES DEL SUR-
COOSUR S.A., INGREDIENTIS BIOTECH
S.L.U, PULEVA BIOTECH, and PULEVA
FOOD.

As researcher and author, he has numerous
publications in international scientific journals,
and 10 International patents.



Berthold Koletzko, MD, PhD

**Professor of Pediatrics, Dr. von Hauner Children's Hospital,
Ludwig-Maximilians University of Munich, Germany**

Bert is Professor of Paediatrics at LMU - Ludwig-Maximilians-Universität Munich, Germany and heads the Div. Metabolic & Nutritional Medicine, Dr. von Hauner Children's Hospital, Univ. of Munich Medical Centre. He is author of >990 journal articles (Web of Science: Citations 22 026, H-index 75), 222 book chapters, and 39 books/monographies. Bert is President, Federation Int Soc of Paediatr Gastroenterol, Hepatol & Nutrition (fispghan.org), Past-President, Eur Soc Paediatr Gastroenterol, Hepatol & Nutrition, President-Elect, Int Soc Res Human Milk & Lactation, Treasurer Elect, United Eur Gastroenterol, Chair, Tertiary Care Council,

Eur Paediatr Academy, Board Member, Biomedical Alliance in Europe, and Strategic Nutrition Advisor, International Paediatr Assoc. His research grant funding exceeded 20 mio.€ during the last decade provided mostly by the EU Framework Programmes 5, 6, 7 & H2020, European Research Council, German Research Council, German Federal Ministry Education

& Research, governments of Bavaria and Norway, US National Institutes of Health and other public funding bodies. He has been acting as Co-ordinator of the EU funded projects CHOP, PIANAO, EARNEST, and EarlyNutrition and the EU Erasmus+ Projects Early Nutrition eAcademy South East Asia and Capacity Building to Improve Early Nutrition and Health in South Africa. He is member of the grant review board medicine, German Research Council and chairs their Clinical Trial grant review board. Bert is Editor in Chief of Ann Nutrition & Metabolism and of World Rev Nutrition & Dietetics, and Associate Editor of Curr Opin Clin Nutr Metabol Care and Monatsschrift Kinderheilkunde. He has been acting as Scientific Advisor to the German Federal Government, the Innovation Initiative of the Chancellor of the Federal Republic of Germany, the European Commission, the European Parliament, the World Health Organisation, and other national and international governmental bodies and organisations.



Sibylle Koletzko, MD, PhD

**Head of Div. of Paediatric Gastroenterology and Hepatology,
Dr. von Hauner Children's Hospital, Ludwig Maximilians
University of Munich, Germany**

Professor Dr. Sibylle Koletzko studied medicine and trained in Paediatrics in Germany. From 1986 until 1988, she was a clinical research fellow in the Div. of Paediatric Gastroenterology at the Hospital of Sick Children, Toronto, Canada.

Professor Koletzko is the Head of Div. of Paediatric Gastroenterology and Hepatology, Dr. v. Haunersches Kinderspital, Ludwig Maximilian University Munich, Germany. Her research involves projects in inflammatory bowel disease, coeliac disease, Helicobacter pylori infection, and food allergy. She is one of the principal investigators of the German Infant Nutrition Intervention (GINI Plus) study and the ProCeDE trial (evaluation of the new guidelines of coeliac disease), the German investigator EU-funded projects in coeliac disease (PrevendCD) and IBD (PIBD-SetQuality), and member of the coeliac group for the NIH funded TEDDY study.

Sibylle Koletzko served as secretary of GI-committee from 2005-2012 and council member of European Society of Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) (2009-2012), and president of the German Society of Paediatric Gastroenterology and Nutrition (GPGE) (2007-2009). She chaired the ESPGHAN Helicobacter Working group from 2007-2017, and is member of the ESPGHAN Porto group for IBD and the Coeliac working group. She presented ESPGHAN in the Scientific Committee of the United European Gastroenterology (UEG) from 2013-2017. She has contributed to several national and international guidelines, including Crohn's disease, ulcerative colitis, coeliac disease, Helicobacter pylori infection, infectious gastroenteritis, cow's milk and food allergy. She is member of the Editorial board of the Journal of Paediatric Gastroenterology and Nutrition and is principal author or co-author of >400 scientific publications, book chapters and reviews.



Rosaura Leis, MD, PhD

Professor at the Pediatrics Department, University Clinic Hospital, Santiago de Compostela, Spain

Full Professor of Pediatrics at the University Santiago de Compostela (USC) in Galicia, Spain. Principal Researcher of the Excellence Research Group 1341, Unit of Research in Human Nutrition, Growth, and Development at the USC. Principal Researcher of the Pediatrics Research Group of the Health Research Institute Santiago - Carlos III Health Institute. CiberObn. Coordinator of the Gastroenterology, Hepatology, and Pediatric Nutrition at the Clinical Hospital Santiago-Xerencia de Xestión Integrada de Santiago. Member of the Nutrition Committee of the Spanish Pediatric Association. Coordinator of the Nutrition Working Group of the Spanish Society for Pediatric Gastroenterology, Hepatology, and Nutrition. Director of the Scientific Committee of the Atlantic Diet Foundation at the USC. Leis has directed so far 84 Degree Projects, 11 Theses, 18 Supervised Research Projects, 93 Master Final Projects, and 20 Dissertations.

Leis is author of more than 200 papers. Some of the most relevant works are The Euro-Growth Study (1990-96), developing the first growth graphics for Europe. At the GALINUT study, she has been part of the research team that has allowed during 30 years to evaluate the evolution of the nutrition, growth, and development of children and teenagers in Galicia, Spain, and the

prevalence of obesity, obesity-related comorbidities, and other risk factors. Together with Prof. Tojo, coordinated the Working Group of Pediatric Obesity within AECOSAN-MSC. Adviser of the Regional Government plan PASEA for the promotion of healthy activities, exercise, and nutrition at the Xunta de Galicia. Expert Committee THAO-Child Health focused on the prevention of child obesity in Spain, "Galicia Saludable", and the regional plan for the prevention of obesity (XERMOLA).

Leis has been PI in several funded projects and clinical trials. Currently, she is participating in 2 clinical trials, a FIS project, and a POPTEC project. The research group establishes technological transfer with both public institutions (Spanish Government, regional counselings, city councils, scientific societies) and private (food and nutrition industries). Likewise, Leis has organized national and international workshops and congresses upon this specialization. She is a Fellow of the national Scientific Association, the SAMID network (RD 08/0072) network, the RETICS subprogram (period 2012- December2015), and Physiopathology of Obesity and Nutrition Networking Biomedical Research Centre (CiberObn) since January 2016. She received several research awards.



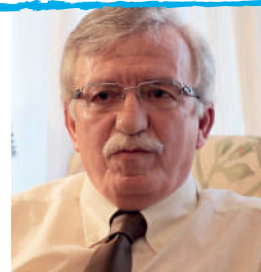
Luis Moreno, MD, PhD

Professor of Public Health, University of Zaragoza, Spain

Luis A. Moreno is Professor of Public Health at the University of Zaragoza (Spain). He did his training as Medical Doctor and his PhD thesis at the University of Zaragoza.

He studied Human Nutrition and Public and Community Health at the University of Nancy (France). He has participated in several research projects supported by the Spanish Ministry of

Health, and the European commission (HELENA, IDEFICS, EURRECCA, ENERGY, ToyBox, iFamily and Feel4Diabetes). He has published more than 600 papers in peer reviewed journals. He is the coordinator of the GENUD (Growth, Exercise, Nutrition and Development) research group, at the University of Zaragoza. He is a former member of the ESPGHAN Committee of Nutrition and former President of the Spanish Nutrition Society.



Antonio Muñoz, MD, PhD

**Head of the Pediatrics Department,
University of Granada, Spain**

- Prof. Muñoz Hoyos studied Medicine at the University of Granada, where he graduated and read his Doctoral Thesis in 1985. He completed the specialization of Pediatrics through the MIR system, being the first MIR professional that joined the team at San Cecilio University Hospital in Granada.
- Professor of Pediatrics, and Director of the Pediatric Department at the Faculty of Medicine (University of Granada).
- Director of the Unit of Pediatrics Clinic Management (San Cecilio University Hospital, Granada).
- Ex-Vice Dean of the Faculty Board and Medical Education of the Faculty of Medicine in Granada.
- Ex-President of the Society of Pediatrics in Western Andalusia.
- Muñoz Hoyos has participated in 25 Funded Research Projects.
- Director of 88 Doctoral Thesis.
- Editor/Author of 14 books on Pediatrics and specialization areas.
- Author of more than 200 papers published in Spanish and international scientific journals.
- Director of the Research Group of the Andalusian Plan for Research, Development and Innovation (CTS-190) on Infant Development.



Lotte Neergaard Jacobsen, MSc

**Pediatric Research Scientist, Arla Foods Ingredients
Viby, Denmark**

Lotte Neergaard Jacobsen is a Pediatric Research Scientist at Arla Foods Ingredients P/S (AFI). After graduating from Aarhus University in 2003 (MSc, Molecular Biology, Laboratory for Protein Chemistry headed by Professor Esben Skipper Sørensen), she started her career in a small biotech company, producing human B12-binding proteins in transgenic *Arabidopsis thaliana* plants. Since 2010 when joining AFI, Lotte Neergaard Jacobsen has been responsible for developing a range

of scientifically documented ingredients for use in infant formula, including identification of new proteins, development of new ingredients and clinical documentation of their safety and efficacy. Her areas of interest and expertise are infant immune development and cow's milk allergy.

AFI is a global leader in milk protein ingredients for products in a range of categories, but with a strategic focus on ingredients for infant nutrition.



Antonio Nieto, MD, PhD

**Head of the Unit of Pediatric Neumology and Allergology,
University Hospital La Fe, Valencia, Spain**

- Bachelor of Medicine, University of Valencia, Spain.
- Doctor of Medicine by the University of Cádiz.
- European Accreditation in Pediatric Allergies.
- Head of the Pediatric Allergy and Pulmonology Unit at La Fe Children Hospital in Valencia.
- Member of the International Pediatric Asthma and Allergy Consortium (iPAC)
- Board Member of Foundation Clemens Von Pirquet, EEACI Pediatric Section.
- Former First Vice President of the Spanish Pediatric Association.
- Member of the FP7 Evaluation Committee of the European Commission for Immunology and Allergy projects. Comisión Europea para proyectos de Inmunología y Alergia.
- Former Member of the National Pediatric Commission.



Andreu Palou, PhD

**Professor at the Department of Biochemistry and Molecular Biology,
University Illes Balears, Spain**

Professor of Biochemistry and Molecular Biology at the University of the Balearic Islands (UIB, 1987-). Director of LBNB (Laboratory of Molecular Biology, Nutrition and Biotechnology) of the (UIB) (1995-), CIBERobn (2006-) and IDISBA (2015-). The main research is in the field of Molecular Nutrition and Food Science.

The main discovery has been the new function of Leptin in breast milk, whose absence predisposes to obesity in adulthood. Around 350 articles (H-index: 49). Conferences in Spain and abroad (15-20/y). International and National Awards such as “Hipocrates” (Asturias, 2008); Nutrition and Health (Univ. Navarra, 2011).

Lifetime trajectory (Spanish society SEEDO, 2011) and the National Award “Dupont” on Science (2013). At the UIB he has been Dean of the Faculty of Sciences and Vice-Rector for academic staff, planning and research. Chair of 3 EU large collaborative projects/contracts, including BIOCLAIMS (2010-2015). 2nd Vice-Chair of the Scientific Committee on Food (2000-02).

Vice-chair of the Scientific Panel of Nutrition of EFSA (European Food Safety Authority) (2002-2009). Chair of the Scientific Committee of the Spanish Agency of Food Safety and Nutrition (2003-2011).

**Joan Permanyer Fabregas, PhD****CEO of Laboratorios Ordesa, Spain**

Joan Permanyer Fábregas, Doctor of Pharmacy by the University of Barcelona, IESE Program for Management Development, Diploma in Health, Food, and Nutrition, and Full Professor of Nutrition and Bromatology at the Pharmacy Faculty of the University of Barcelona.

During his business career Pernayer Fábregas has worked seven years in the pharmaceutical industry Laboratorios Dr. Andreu, S.A. and then for food company Nutrexpa, S.A., where he worked in the quality and R&D Management, and the General Management of Cola Cao Business Unit.

From 2014 he is the CEO and Managing Director of Laboratorios Ordesa, S.L., company devoted to infant nutrition, and expert in development of food supplements for adult life stages.

Permanyer Fábregas is a Permanent Member of the Reial Acadèmia de Farmàcia de Catalunya and member of different scientific societies. Besides, he is author of more than 30 scientific publications in journals of high impact index and author of numerous communications and papers in different conferences at both national and international level.

**Montserrat Rivero Urgell, PhD****President of Joint Committee of Ordesa Chair of Infant Nutrition
Chief and scientific advisor of Barcelona Children's
Hospital Foundation (FHNB)'**

Montserrat Rivero Urgell holds a PhD in Pharmacy by the University of Barcelona (Spain), and a specialization in Industrial and Galenic Pharmacy and Nutrition and Applied Nutrition by the University of Nancy (France). She is Fellow of the Royal Academy of Pharmacy of Catalonia, President of the Catalan Association of Food Sciences (ACCA), and President of the Joint Commission of the Ordesa Chair on Child Nutrition.

Her professional career has been focused on the pharmaceuticals and food industries as head in scientific and research areas, in combination of 12 years as Professor at the University of Barcelona.

Currently, Rivero Urgell is **Counsellor of the Health Division at Solid Integración**, where she participates in strategic projects. She is Chief and Scientific

Advisor of the **Fundación Hospital de Nens de Barcelona** since 2016, promoting hospital scientific research, and since 2011 she has been **Advisor at Microlitix**, with an expertise in the subjects of Food Safety and Integrated Microbiological Control.

Rivero Urgell has directed or participated in more than 50 European, Ibero-American, or Spanish research projects in the fields of child nutrition, neurocognitive, immunological developments, and obesity. She has collaborated in European projects such as NUHEAL, EARNEST, or DYNAHEALTH. In this respect, she has created 10 patents as inventor.

Rivero Urgell has participated as author in 37 books and more than 150 papers published in scientific and professional journals.





Gerardo Rodríguez Martínez, MD, PhD

Professor of the Pediatrics Department,
University of Zaragoza, Spain

- **Full Professor of Pediatrics.** University of Zaragoza
- **Neonatologist and Pediatric Doctor.** Lozano Blesa University Clinical Hospital.
- **Secretary Academic Professor and Coordinator of Movility and Interantional Relations.** Faculty of Medicine. Universidad de Zaragoza.
- **Master in Food and Diet Therapy for Children and Adolescents.** University of Zaragoza
- **Member of the Nutrition and Metabolism Group.** Spanish Society of Neonatology
- **Coordinator of the Committee for the Promotion of Health.** Spanish Association of Pediatrics
- **Coordinator of the research network SAMID** (Maternal and Child Health and Development) of

ISCIII (RD12 / 0026), in Zaragoza, Aragón Health Research Institute.

To date he has participated in various research projects and in the development of numerous scientific articles meanly related to neonatology, nutrition and physical activity in pediatrics, which have materialized in a total of 235 publications: 90 chapters of national and international books, 85 articles in prestigious international journals (JCR) and 60 articles in national journals. He has exposed numerous communications and conferences in national and international meetings. He has directed 16 Doctoral Theses. He is also the author of 8 books.



Maria Rodríguez-Palmero, PhD

Cátedra Ordesa, Spain

Maria Rodriguez-Palmero is Director of Preclinical Research at Laboratorios Ordesa, a company specialized in products for the health of infants, children, women and the elderly. She is responsible for the research centre at the Scientific Park of the University of Barcelona, where research projects are carried out, also in collaboration with external public or private research groups, which have contributed to the launching of several key products in the company.

Previously, she has had other positions in the technical and scientific area. Maria holds a PhD in

Pharmacy from the University of Barcelona and later trained in infant nutrition at the Pediatric Hospital of the Ludwig Maximilians University in Munich, Germany, thanks to a grant from the Alexander von Humboldt Foundation.

She is author of more than 30 scientific and professional publications and has collaborated in several projects supported by the European Union such as NUHEAL, MEPPHAC, EARNEST and DYNAHEALTH projects. She is also member of the Spanish Nutrition Society and member of the Board of the Catalan Academy of Food Sciences.



**Josep Antoni Tur Marí, PhD****Professor of Physiology, University Illes Balears, Spain**

Professor of Physiology at Universitat de les Illes Balears. Director of the IUB Research Group Community Nutrition and Oxidative Stress (NUCOX) part of the project on Obesity and Nutrition Physiopathology CIBEROBN led by the Carlos III Health Institute and Illes Balears Health Research Institute (IDISBA).

Academic Founder of the Spanish Academy of Nutrition and Food Science, and Corresponding Academician of the Reial Acadèmia de Farmàcia de Catalunya. Member of the Scientific Committee of

the Spanish Agency for Consumer Affairs, Food Safety and Nutrition (AESAN) 2014-2018. Vocal of Nutrition of the COF of Illes Balears. Member of the Spanish Scientific Nutrition Committee of the Spanish General Council of Pharmacists Associations. Author of more than 65 books and chapters, 320 scientific articles, and 8 application patents.

Tur Marí has directed 20 doctoral theses, and he is a Member of the Editorial Board of *Nutrients*; *Antioxidants*; *Nutrition, Metabolism & Cardiovascular Diseases*.

**Máximo Vento, MD, PhD****Scientific Director of Health Research Institute La Fe, Valencia, Spain**

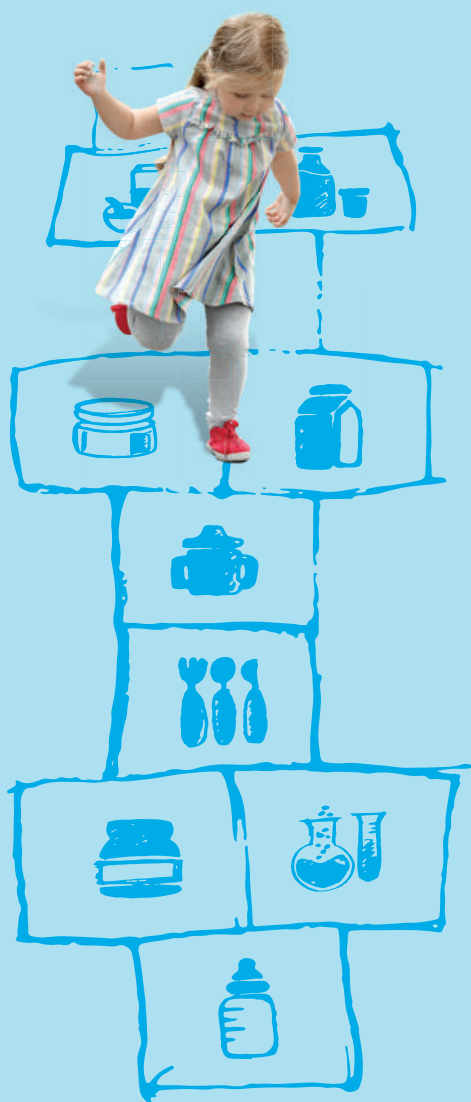
Máximo Vento, MD PhD, is currently Professor of Pediatrics, Chief of the Division of Neonatology, and Scientific Director of the Health Research Institute La Fe (Valencia, Spain). He is also Chairman of the European Board of Neonatology (EBN), Member of the Executive Committee (ESPR), President of the Spanish Neonatal Society (SENeo) 2015-2019, and Chairman of the Spanish Network for Maternal and Infant Health and Development (Red SAMID) at the Instituto de Investigación en Salud Carlos III (Spanish Ministry of Science, Innovation and Universities).

His lines of research are: Physiology of the Fetal to Neonatal transition; Perinatal Asphyxia; Resuscitation in the Delivery Room; Oxygen: physiology, hypoxia/hyperoxia derived toxicity, oxidative and nitrosative stress and biomarkers; Epigenetics and oxygen; Redox Regulation;

microbiome/infection/genome wide expression. He has expertise on the following methodologies: Clinical trials; Experimental mice and piglet models; Targeted and untargeted metabolomics; HPLC or GC coupled to Mass Spectrometry; LC-QTOF approach. Capillary electrophoresis. Epigenomics. Transcriptomics. GWAS.

Scientific contributions in national and international journals: Hirsch index 45; >200 abstracts presented at International meetings; >240 papers published in international peer reviewed journals and national journals at: <https://www.ncbi.nlm.nih.gov/pubmed/?term=Vento+M+or+Vento+Torres+M>; 36 book chapters in international handbooks of Pediatrics and Neonatology; >150 conferences at International Scientific Meetings and Congresses; Direction of 21 PhD thesis in Perinatology.

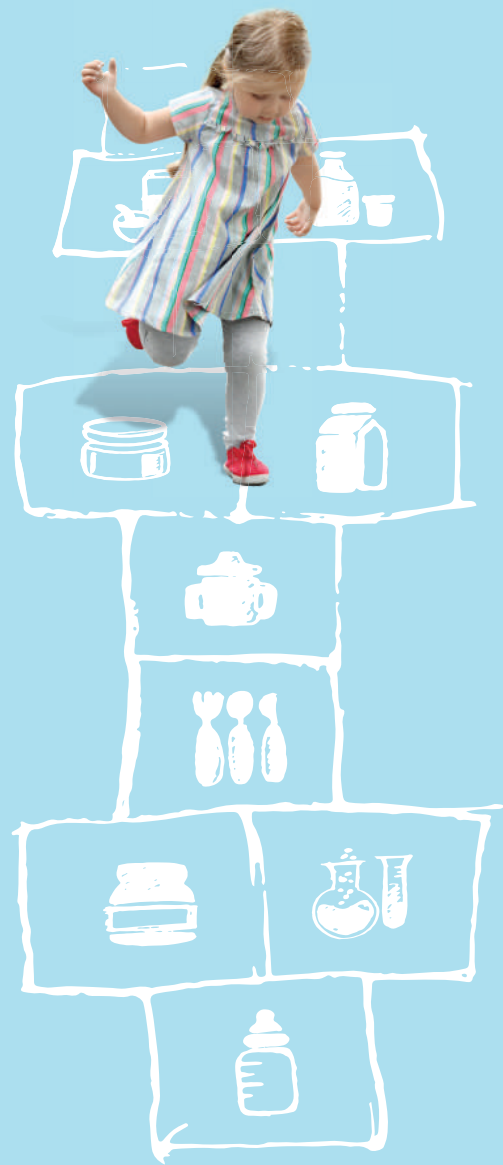




ABSTRACTS







OPENING







ORDESA INFANT NUTRITION CHAIR

Dra. María Rodríguez-Palmero, *Ordesa Chair*
Prof. Cristina Campoy, *Director of the Ordesa Chair*

The **ORDESA INFANT NUTRITION CHAIR** is an entity promoted by Laboratorios Ordesa in collaboration with the **University of Granada**, where it is currently based, the **University of Zaragoza** and the **University of Cantabria**. Its main purpose is to establish a permanent link between the company and the academic and scientific fields, to lead the knowledge in Infant Nutrition and its translation to society.

The Ordesa Chair is, therefore, a **PIONEER** institution in Spain, not only because it is the first in the field of pediatric nutrition, but also because of its vocation to establish relationships with several prestigious Spanish universities.

Among the activities carried out by the Ordesa Chair since its creation in 2013, are those aimed at generating **ADVANCED RESEARCH**, which allow the generation of new knowledge in the field of Nutrition and Child and Adolescent Health, as well as promoting the **DISSEMINATION** of the advances that are produced and develop a **TRAINING POLICY** towards the professionals involved in the area.

Among all the activities carried out so far by the Ordesa Chair of Child Nutrition, the following stand out:

- The organization of **6 Scientific Conferences**, which have brought together internationally renowned experts and professionals from around the world, in which the latest advances in Child Nutrition have been presented, and in which relevant topics have been addressed, such as early programming of health, the prevention and treatment of food allergies, the importance of the microbiota and its relationship with infant development and the improvement of the composition of infant foods.
- Support for campaigns to improve dietary habits for the prevention of childhood obesity, such as those carried out by the Andalusian Council of Official Associations of Pharmacists and the Official College of Pharmacists of Barcelona
- A landmark of the Ordesa Chair was the publication in 2015 of the **White Paper on Child Nutrition** in Spain and then in 2018 the Practical Guide with recommendations of the White Paper, made with the collaboration of more than 100 food specialists and with the participation of the Spanish Pediatric Association, the General Council of Pharmaceutical Official Associations, the Spanish Nutrition Foundation and the Spanish Agency for Food Safety and Nutrition.
- Finally, it is worth highlighting the performance of several **collaborative Research Projects** among the entities of the Chair, several of them started in the last year, funded partly by the CIEN program of the Spanish Ministry of Economy and Industry: Evaluation of the effect of the Dietary fiber in the digestive function and the composition of the microbiota in children and infants, in collaboration with the University of Zaragoza and Cantabria (SMARTFOODS project, IDI-20141206) and Effect of new milk formulations and based on infant cereals, in collaboration with the University of Granada (TOLERA project, IDI-20170870).





KEYNOTE LECTURE

CHAIRS

Dra. Montserrat Rivero
Prof. Josep Tur







METABOLOMIC PROFILING IN EARLY LIFE: ARE THERE IMPLICATIONS FOR CLINICAL PRACTICE?

Berthold Koletzko, MD, PhD
*Professor of Pediatrics, Dr. von Hauner Children's Hospital,
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metabolomics describes the determination of a broad range of small molecules within a biological sample. Targets are potentially all small molecules up to about 1500 Dalton, which act as substrates, intermediates or end products of enzymes of an organism. Typical sample materials in humans are blood, urine, saliva and breastmilk, but also tissue biopsies can be characterized. Blood plasma represents a broad metabolite spectrum, from small hydrophilic metabolites to large complex lipids. Untargeted approaches using high-resolution mass spectrometry or nuclear magnetic resonance spectroscopy and targeted analysis usually based on high-pressure liquid chromatography coupled to triple quadrupole mass spectrometry are used.

The metabolome is influenced by various factors such as diet, physical activity, stress and diseases, drug intake, and microbiome, which induce short- and long-term effects. With respect to programming effects of infant diet, we showed that different infant formulas markedly modify child metabolome. For example, a specific profile of elevated amino acids and acylcarnitines representing their catabolites were found in plasma of infants fed formula with high intake levels of milk protein. Supplemented long-chain polyunsaturated fatty acids to infant formula were found in infant plasma phospholipid species and thus are incorporated into cellular membrane. Among various possible influencing factors such as diet, gestational weight gain, or age, the pre-pregnancy BMI was the strongest parameter for the variation of maternal plasma metabolites. Across different a specific sphingomyelin molecular species was closely associated with body mass index (BMI) and body weight, while an amino acid predicted insulin resistance (HOMA). Metabolomic profiling with sensitive, quantitatively precise methodology provides a very powerful tool to investigate the impact of genetic, environmental, nutritional, pathogenic and disease factors and can pave the way towards precision medicine approaches.

ACKNOWLEDGMENTS

As member of the German National Breastfeeding Committee, chair of the Nutrition Committee, German Paediatric Society, member of the national Becoming Breastfeeding Friendly Project and President Elect, the IntSoc Research in Human Milk & Lactation, BK tends to be biased towards breastfeeding. LMU - Ludwig-Maximilians-Universität Munich and its employee BK benefit from support for scientific and educational activities from the European Commission, FP7 Programme Early Nutrition-289346 and H2020 Programmes DYNAHEALTH- 633595 und Lifecycle-733206, the European Research Council Advanced Grant META-GROWTH ERC-2012-AdG—no.322605, the Erasmus Plus Programmes Early Nutrition eAcademy Southeast Asia-573651-EPP-1-2016-1-DE-EPPKA2-CBHE-JP and Capacity Building to Improve Early Nutrition and Health in South Africa-598488-EPP-1-2018-1-DE-EPPKA2-CBHE-JP, the EU Interreg Programme Focus in CD-CE111 and the European Joint Programming Initiative Project NutriPROGRAM, the German Ministry of Education and Research, Berlin (Grant Nr. 01GI0825 and 01EA1904), the German Research Council (Ko912/12-1 and INST 409/224-1 FUGG), the University of Munich Innovation Initiative, the US National Institutes of Health, the Government of Norway, and different healthcare and nutrition companies, predominantly as part of publically funded research projects supported by the European Commission or German government. The author declares no conflict of interest with the meaning of circumstances that involve the risk that the professional judgment or acts of primary interest may be unduly influenced by a secondary interest.





SYMPOSIUM 1: EARLY PROGRAMMING DURING THE FIRST TWO YEARS OF LIFE: A WINDOW OF OPPORTUNITY

CHAIRS

Prof. Gerardo Rodríguez
Prof. Lino Álvarez







EARLY GROWTH, NUTRITION, AND NEURODEVELOPMENT: AN INTRICATE PROBLEM

Virgilio Carnielli, MD, PhD
Professor of Neonatal Pediatrics at Polytechnical University of Marche, Italy



The vast majority of Pediatricians-Neonatologists performing nutrition studies in preterm infants usually express their results according to weight groups or to gestational age. Limited attention has been given to the effect of illness.

We will report data on nutrition and growth from a large cohort of more than 1400 preterm infants with a gestational age between 24 and 31 weeks. Growth and nutrition data will be presented according to the major conditions associated with prematurity such as bronchopulmonary dysplasia, sepsis, patent ductus arteriosus etc.

The effect own mother milk feeding vs formula on growth and neurodevelopment will also be discussed. Presented data support the paradox of the growth/neurodevelopment of human milk fed preterm infants.

EARLY PROGRAMMING OF ALLERGIC DISEASES



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*Head of Div. of Paediatric Gastroenterology and Hepatology,
 Dr. von Hauner Children's Hospital, Ludwig Maximilians
 University of Munich, Germany*

Atopic dermatitis is the most common allergic manifestation in the first decade of life, while allergies of the respiratory tract dominate thereafter. Genetic factors are predominant as risk for atopic disorders. Since it has been recognized that early contact with food allergens plays a role in the development of both tolerance and sensitization to food antigens, nutritional interventions strategies have been suggested for primary allergy prevention.

MATERNAL DIET DURING PREGNANCY AND LACTATION

Randomized controlled trials (RCT) have proven that maternal elimination diets during pregnancy and lactation do not reduce the allergic risk in the offspring¹.

BREASTFEEDING

The potential allergy preventive effect of exclusive or partial breastfeeding cannot be properly assessed because randomization of breastfeeding is not possible for ethical considerations. Irrespective of atopic risk breastfeeding is strongly recommended because of its nutritional, immunological, psychological and potential allergy preventive benefits⁵.

SOY FORMULA

Analysis of studies comparing soy to a hydrolyzed formula found a significant increase in infant and childhood allergy cumulative incidence, infant eczema cumulative incidence and childhood food allergy period prevalence². Soy formulas cannot be recommended for prevention of allergy and should not be used in the first six months of life.

HYDROLYZED FORMULA

In case of insufficient breastfeeding cow milk formula (CMF) is the standard formula for infants. Formulas based on partially or extensively hydrolyzed proteins have been investigated in RCT compared to CMF. By far the largest trial, the German Infant Nutritional Interventional (GINI) study randomly assigned at birth to one of four formulas: partially hydrolyzed whey (pHF-W), extensively hydrolyzed whey (eHF-W) and extensively hydrolyzed casein (eHF-C) or standard CMF. Follow up data of this cohort at the age of 3, 6, 10, and 15 years of age support the concept of hydrolyzed formulas in high risk children particularly for reduction of eczema^{3,4}. Since other studies did not show a preventive effect recommendations from different countries are controversial.

COMPLEMENTARY FOODS

For many years it was recommended to delay the introduction of solid foods with higher allergenic potential (e.g. egg, fish, nuts, and peanuts) beyond 1 year of age. However, observational cohort studies and recent randomized studies do not support that delaying these food beyond 4 -6 months prevents atopic diseases. The recommendations have changed accordingly⁵.

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OXIDATIVE AND NITROSATIVE STRESS IN THE NEONATAL PERIOD: CONSEQUENCES IN INFANCY AND CHILDHOOD

Máximo Vento MD PhD
Scientific Director Health Research Institute La Fe, Valencia, Spain



Fetal life elapses in a relative hypoxic milieu in utero while the antioxidant defense system matures only very late in gestation. Infants born prematurely, have to face a pro-oxidant and pro-inflammatory environment during the neonatal period. Hence, resuscitation, mechanical ventilation, infections, radiation, phototherapy, or parenteral nutrition among other factors generate a burst of free radicals that overcome preterm infant's buffering capacity leading to oxidative and nitrosative stress. This situation favors the development of free radical associated conditions in the newborn period such as bronchopulmonary dysplasia, intraventricular hemorrhage, necrotizing enterocolitis etc. Among changes induced by free radicals, damage to DNA has been widely assessed. Given the reduced ability of preterm infants to repair structural and functional DNA changes there is a significant risk of permanent mutations that may have an influence on later health status.

Moreover, recent studies have also shown that oxygen in the neonatal period induces epigenetic changes that may alter basic cellular functions and if persistent lead to long term conditions. Of note, epidemiological studies have linked oxidative and very recently nitrosative stress in the postnatal period to conditions such as increased bronchial hyperreactivity and specific types of cancer especially leukemia.

Our presentation aims to characterize the aggression in the early neonatal period and update the information regarding long-term consequences in infancy and childhood.





SYMPOSIUM 2: ROLE OF EARLY NUTRITION ON THE DEVELOPMENT OF MALNUTRITION

CHAIRS

Dr.^{Ma} Jesús Cabero
Prof. Antonio Muñoz





EARLY PROGRAMMING OF FAT ADIPOSE TISSUE CONTROL: ROLE OF LEPTIN



Andreu Palou, PhD
*Professor at the Department of Biochemistry and Molecular Biology,
University Illes Balears, Spain*

Nutrition during critical stages of development is crucial in programming susceptibility to obesity and the metabolic syndrome in adulthood. At this respect, little is known about the role of a number of proteins present in human milk that, beyond contributing as a source of essential amino acids. However, in recent years, leptin, which is a protein present in breast milk and not in infant formula, is increasingly recognized to play a role in the postnatal programming of a healthy phenotype in adulthood.

Besides its primary function in controlling body weight discovered in 1994, leptin is now emerging as an essential nutrient required during lactation to ensure that the system controlling fat accumulation and body composition is well organized from the early stages of development. Cause-effect evidence has been reported in rodents, as well as indirect evidence in humans.

Orally taken leptin is absorbed by the immature stomach and has been demonstrated to directly and indirectly affect excess of weight gain in rodent offspring. It has also been shown to exert beneficial effects by reversing perinatal programming for an unhealthy phenotype in animal models, revealing that the benefits of breastfeeding in early life are related, at least in part, to the leptin content of milk. Other milk components may limit the beneficial effects of leptin, as it appears to be the case in the milk from obese lactating mothers, which is under investigation (Palou, M. Picó, C and Palou, A.: Nutrition Reviews 2018. doi: 10.1093/nutrit/nuy046).

INDONESIA PERSPECTIVE OF CHILDHOOD MALNUTRITION: INFANT FEEDING PRACTICES AS NUTRITION DETERMINANT TO REDUCE STUNTING

Damayanti Syarif SpA(K), MD, PhD

*Chair of Div. Pediatric Nutrition & Metabolic, Department of Paediatrics, Faculty of Medicine,
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In 2017, globally there were 151 million children under five year of age have stunted growth due to chronic nutrition deprivation and more than half of them lived in Asia. Chronic undernutrition in early life is causally linked to adverse later-life economic outcomes. The largest proportion of stunting in developing countries occurs during the complementary feeding periods. In Indonesia, the prevalence of stunted under-fives tends to persist at around 37% from 2007 to 2013, therefore became the fifth largest global contributors of stunted children. Though the government had recommended principles of infant feeding practices conferring to WHO Infant and Young Children Feeding Guidelines.

Working Group on Nutrition and Metabolic Diseases-Indonesia Pediatrician Society performed several studies to look for nutrition determinant of stunting as a method to develop a strategy to reduce stunting in Indonesia

A cohort study of breastfeeding practices in Jakarta showed that among 100 mother-baby pairs recruited, 84% breastfed exclusively until 6 months but proportion weight faltering among them was increased from 33% in 3 months of age to 70% in 6 months of age. Analysis of food consumption 200 toddlers (1-3 years) stunted versus non-stunted showed that the stunted toddlers consumed significance lower energy, total protein, animal source protein, and milk compare to non stunted toddlers with the same age and gender. The National Health Research Indonesia 2010, demonstrated that only 37,8% of children age 6-23 months consumed meat and/or egg and only 37,2% consumed dairy or its product.

In the developing countries, stunting mostly begin with weight faltering at 3-4 month old. Without interference, chronically undernourished in early life firstly will deprived brain development linked to poorer cognitive skills, reduced schooling, lower earnings and a higher likelihood of living in poverty, and further will reduce linear growth (linked to stunted growth) and fat oxidation (linked to metabolic syndrome in the future). Studies showed that consuming animal source food was a protective factor of stunting. Due to the source of high-quality protein plus a variety of micronutrients linked to growth and cognitive development that are difficult to obtain in adequate quantities from plant source foods alone. So, it is important that infants eat high-quality and easily digestible proteins, which are found in breastmilk and in animal products in complementary foods. Unfortunately, traditional cultural practices among rural people and the inflation in food prices resulted in a low frequency of consumption of animal source foods. Chicken, ducks, eggs or fish were kept in many households; however, they did not consume them often, because they usually sold them for income. To make worse, the examples of good complimentary food created by the Ministry of Health consist of no animal food sources at all.

Based on these findings, in 2014 Indonesian Pediatrician Society delivered the recommendation strategy to prevent stunting to the Ministry of Health by early detection and prompt treatment weight faltering during the first 2 years of life by regular growth monitoring in the community and performed long-term planning to change community behavior and practice toward consuming animal source food since complementary food is the most effective health education which is a critical means to reduce stunting in Indonesia.



EARLY DIETARY INTAKE AND OBESITY DEVELOPMENT

Luis A. Moreno, MD, PhD

GENUD research group, Universidad de Zaragoza, Instituto Agroalimentario de Aragón (IA2), Instituto de Investigación Sanitaria de Aragón (IIS Aragón), Centro de Investigación Biomédica en red de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Zaragoza, Spain



Obesity develops early in life and it is considered one of the most relevant public health issues worldwide. On top of genetic predisposition, the presence of lifestyle risk determines its presence during childhood and adolescence.

Early dietary intake is considered one of the most important lifestyles related with obesity. During early periods of life, starting at conception and until the end of the second year, there is a large number of factors that could influence the development of obesity later in life: pre-pregnancy maternal body mass index (BMI), gestational weight gain, gestational diabetes, maternal malnutrition, maternal smoking during pregnancy, alcohol consumption during pregnancy, free sugars intake during pregnancy, low polyunsaturated fat (omega 3) intake during pregnancy, low physical activity levels during pregnancy, antibiotics consumption during pregnancy, high or low body weight at birth, lack of breast feeding, consumption of high protein content infant formulas, rapid infant weight gain, high protein, fat or free sugars intake during infancy, early introduction of complementary feeding and short sleep duration.

From all these candidate risk factors, the ones more strongly associated with obesity development during childhood are maternal obesity before pregnancy, low birth weight and rapid weight gain during infancy. Interventions consisting on promoting a healthy dietary pattern during pregnancy alone and associated with physical activity are effective to reduce body weight gain.

High protein intake during the first months of life is also related to obesity development. Free sugars intake could also be related with obesity in children. Interventions trying to prevent obesity should start as early as possible as the possibility to positively influence the early programming of the condition is the highest in this period.





MALNUTRITION: FROM UNDERNUTRITION TO OVERNUTRITION

Rosaura Leis, MD, PhD

Full Professor of Pediatrics. Coordinator of the Pediatric Gastroenterology, Hepatology, and Nutrition Division at the Clinical Hospital of Santiago de Compostela, Galicia, Spain. IDIS. CiberObn. Atlantic Diet Foundation. University of Santiago de Compostela.



Nowadays, non-healthy lifestyles, diets with low nutrient density, and the increase of sedentarism particularly caused by screen use, are all avoidable factors and major causes of morbi-mortality. Recently, the Lancet journal has published a systematic review on the global burden of disease in 195 countries from 1990 to 2017, evidencing the change in trend among the main causes of mortality, with infections and congenital problems replaced by cardiovascular diseases, cancer, and diabetes. These non-communicable disease (NCDs) originate in the pediatric age, which opens a door of opportunity, especially during the first 1000 days of life, for their prevention, improving the health and quality of life of the infant in the short, medium, and long term.

Obesity is today the most frequent nutritional and metabolic disease in the pediatric age, affecting 1 in every 3 infants, and presenting its prevalence in Europe a positive North-South gradient, most likely related to the loss of adherence to traditional, healthy diet models, both Mediterranean and Atlantic.

The transition in recent years from lack of food to excess of it is the base of these changes. Galicia, an Autonomous Community of the northwest of Spain is an example of this. During the 70s, the nutritional deficit resulting from the lack of food was a frequent reason for consultation, particularly regarding Iodine and Vitamin D deficiencies.

The improvement of socio-economic conditions improved the increase of food availability, resulting in an important secular trend in size. However, concurrently, there was an increase in body weight, even greater, reflected in the body mass index (BMI), a measure of body fat. Changes in the body fat distribution were also observed, with an increase in the waist circumference, sign of cardiovascular and metabolic risk. Today, the children in Galicia, as in the rest of Spain, have a high prevalence of overweight and obesity. This increase of body fat affects all organs and body systems. It is related to high blood pressure, altered lipid metabolism, insulin resistance, non-alcoholic fatty liver disease, or metabolic syndrome -even in the prepubertal age- but also with other important comorbidities such as psycho-emotional alterations, higher rate of academic failure, higher suicidal tendencies, lower self-esteem, depression, nutritional alterations, etc.

Due to poor diets, rich in energy but with low nutritional density, we observe iron, iodine, and calcium deficiencies in children who are otherwise overfed. In addition, the new great pandemic, hypovitaminosis D, appears, probably related to its sequestration in body fat. Rather than a vitamin, D vitamin is more a hormone with pleiotropic effects, which deficiency may cause major health issues.

Currently, it is important to bear in mind that another important cause of nutritional deficits is malnutrition caused by the disease, which acquires great relevance, since nutritional treatment is sometimes the only treatment and always second line add-on treatment.

Therefore, it is necessary to identify the risk groups and establish prevention and intervention strategies that foster healthy lifestyles, adequate nutrition in women of childbearing age, pregnant, and lactating women, to promote breastfeeding, a regulated introduction to complementary feeding, the establishment of adequate dietary patterns, and the increase of physical activity and reduction of inactivity.

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CLOSING

CHAIR
Prof. Cristina Campoy







GUT FEELINGS: IMPACT OF EARLY-LIFE DIET-MICROBIOME INTERACTIONS ON BRAIN DEVELOPMENT AND BEHAVIOUR

John Cryan, PhD
*Dept. of Anatomy & Neuroscience,
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The microbiota-gut-brain axis is emerging as a research area of increasing interest for those investigating the biological and physiological basis of brain development and behaviour during early life. The routes of communication between the gut and brain include the vagus nerve, the immune system, tryptophan metabolism, via the enteric nervous system or by way of microbial metabolites such as short chain fatty acids.

Studies in animal models have shown that the development of an appropriate stress response is dependent on the microbiota. Developmentally, a variety of factors can impact the microbiota in early life including mode of birth delivery, antibiotic exposure, mode of nutritional provision, infection, stress as well as host genetics.

Recently, the gut microbiota has been implicated in regulating the stress response, social behaviour and attachment responses. Moreover, fundamental brain processes from adult hippocampal neurogenesis to myelination to microglia activation have been shown to be regulated by the microbiome. Further studies will focus on understanding the mechanisms underlying such brain effects and how they can be exploited by nutritional means.





ORDESA SYMPOSIUM:

NEW ADVANCES IN INFANT FEEDING

CHAIRS

Dr. Joan Permanyer
Dr. Jesús Jiménez





USE OF RICE PROTEIN BASED INFANT FORMULAS FOR THE TREATMENT OF MILK PROTEIN ALLERGY IN THE INFANT



Antonio Nieto, MD, PhD
*Head of the Unit of Pediatric Neumology and Allergology,
University Hospital La Fe, Valencia, Spain*

The allergy to cow's milk protein (CMPA) is a relatively common problem in the first years of life, with prevalence rates around 2%. As CMPA embody all the adverse reactions mediated by an immunologic mechanism, it is common to find in the daily practice two different clinical manifestations very well defined:

- **IgE-mediated CMPA:** normally, children that show symptoms immediately after a very small intake of milk. These reactions can be cutaneous, respiratory or digestive, and could be very severe. These patients undergo skin tests and positive specific IgE to cow's milk protein (CMP).
- **Non IgE-mediated CMPA:** Volumes required to trigger the allergic response are usually larger, or would need of several hours of breastfeeding, and symptoms will often be exclusively digestive, while reactions are not as severe as in the first profile group. These patients present skin tests and specific IgE negative to CMP.

Very frequently, when experts discuss about CMPA, they open a generic topic, which leads in many aspects to confusion. However, the distinction is important when we are discussing nutrition in the first stages of life, as this nutrition is exclusively based on milk and the indication may considerably vary depending on the type of CMPA, patients' age, the severity of the allergy, etc. Although there is general consensus that hydrolyzed formulas are the best indication for non IgE mediated allergies, the communications of adverse reactions to extensively hydrolyzed cow's milk formulas in children with severe forms of IgE-mediated CMPA are not rare.

In the treatment of allergic problems, there is an axiom: to avoid the cause. Nevertheless, the extensively hydrolyzed CMP do not avoid the cause, since the protein source is cow's milk.

They can help to reduce considerably (never reverse) their allergenicity, so that even when they do not trigger clear clinical reactions, this does not mean that they cannot cause other undesirable effects. For example, there are data suggesting that the presence of low molecular weight (LMW) peptides from milk proteins in those protein hydrolysates may contribute to delay the tolerance acquisition in these infants up to 80% of the cases or more.

For all these reasons, in the cases of IgE-mediated CMPA, the correct treatment is to use a formula obtained from an alternative protein source, different to the one causing the problem.

For several decades, those formulas were based on soy proteins but in recent times, the development of rice protein formulas has allowed to diversify the options while avoiding some drawbacks related to the use of soy.

Several studies have demonstrated the hypoallergenicity of rice formulas, as well as their safety and adequacy for nutritional purposes, positioning these formulas as a first choice for infants with IgE-mediated CMPA.



LONG-TERM EFFECTS OF AN INFANT FORMULA ENRICHED WITH MILK FAT GLOBULE MEMBRANE (MFGM) COMPONENTS, SYNBIOTICS AND OTHER BIOACTIVE COMPOUNDS ON CHILDREN'S GROWTH AND NEURODEVELOPMENT

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Increasing evidence demonstrates that early nutrition and lifestyle have long-term effects on later health and on the risk of developing non-communicable diseases. Therefore, World Health Organization (WHO) recommends exclusive breastfeeding during first 6 months of life, and in combination with complementary feeding up to 2 years old. Despite its multiple health benefits, occurrence of breastfeeding worldwide has remained low, and the use of infant formula for non-breastfed or partially breastfed infants is widely extended in high income countries. Current infant formulas are supplemented with new bioactive ingredients to closely mimic nutritional composition of breast milk, trying to obtain similar potential beneficial effects on infant growth and neurodevelopment. The COGNIS study is a prospective double-blind, randomized controlled trial (registered at www.clinicaltrials.gov, identifier NCT02094547) aimed to evaluate the effects of a new infant formula on children growth and neurodevelopment up to 6 years of age. A total of 170 Spanish healthy term infants were randomized at 0-2 months of age to receive, until 18 months of age, a standard (SF) (n=85) or an experimental infant formula (EF) (n=85) enriched with new bioactive components {milk fat globule membrane (MFGM), synbiotics (oligofructose enriched inulin (0.4 g/100 ml) and probiotics (Lactobacillus rhamnosus LCS742 and Bifidobacterium longum subsp. infantis CECT7210), long-chain polyunsaturated fatty acids (LC-PUFAs), gangliosides, nucleotides and sialic acid}. As control group, 50 exclusively breastfed infants (BF) were also involved in the study. Children underwent different examinations at 3, 4, 6, 12, 18 months, 2.5, 4, and 6 years. Main study variable was cognitive function, but other variables related to behaviour and psychosocial factors, infant growth and infant health have been collected as secondary variables. Data on growth and body composition (anthropometry, BIA, Plethysmography), neuroimaging (EEG/ERP, fMRI, DTI and Resting State), neurocognitive development (K-BIT, BENC1, PLON-R...), and behaviour {Children Behavioural Check List (CBCL)} have been obtained at different time points.

RESULTS:

No significant differences were observed between the 3 study groups in growth and body composition up to 6 years. Growth velocity was different in formula feeding groups respect to BF one; however, there was no differences in catch-up growth between the 3 groups, but showing different long-term consequences during childhood. At 2.5 years old, children from the EF group also showed less incidence of behavioral problems than those fed SF. Respect to cognitive findings, the EF determined long-term benefits, similar to breastfeeding, on language development at 4 and 6 years of life respect to SF. At 6 years, children fed with the EF showed higher intelligence quotient (IQ) compared to children fed with SF. EEG/ERP showed better memory development in EF group than SF one. Neuroimaging data obtained at 6 years of age showed differences in brain volumes, cortical thickness and connectivity favoring EF group, and especially in those children who received some human milk (<25% of total daily intake during less than first 2 months of life). Breastfeeding, independently of EF or SF, determined better axonal health at 6 years old. EF determined long-term effects on brain volumes and cortical thickness in boys, but not in girls. Children fed EF showed higher connectivity in the Hypothalamic networks, which is related to better feeding control, respect to those from the SF group; these effects were significantly higher in boys than in girls.

CONCLUSIONS:

Our findings favoring EF are related to optimal growth, less behavioral problems, higher IQ, better language development. EF determined long-term changes in brain structure and function associated to better attention, perception and memory, and better feeding control. These effects on the brain are greater in boys than in girls.

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OSTEOPONTIN IN HUMAN MILK AND INFANT FORMULAS



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Human milk contains immune-stimulating factors that are absent or only scarcely present in infant formula. They mature the immune system and protect breastfed infants against pathogenic infections. One such bioactive component is the whey protein osteopontin (OPN).

OPN is an acidic, phosphorylated and glycosylated multifunctional protein present in most tissues and body fluids. However, the highest concentration is found in milk, with significant higher concentrations in human milk than in bovine milk^{1,2,3}. As a result, formula fed infants have a limited intake of OPN compared to breastfed infants.

OPN levels in human milk varies across countries and within lactation period. A multicenter study showed that human milk OPN concentration differed significantly between women from China, Korea, Japan and Denmark².

At birth, immune cells are relatively insufficient in numbers and function, making the infant immune system functionally immature. Therefore, the ability to resist infections is impaired in early life. During this period of immunological immaturity, breastfeeding provides effective protection. The immune system matures and differentiates towards a balanced Th1/Th2 profile in the first years of life. This balance and protection is mediated by bioactive components such as OPN⁴. The high concentration of OPN in human milk suggests that OPN has a role in maturing infant immunity. For this reason, infant formula with an OPN level similar to human milk may provide an important signal contributing to the maturation of the infant immune system.

OPN has been evaluated in several pre- and clinical trials. In an infant clinical trial it was demonstrated that adding OPN to infant formula resulted in fewer days with fever, compared to a control group fed standard infant formula. Furthermore, OPN supplementation shifted gene expression and cytokine patterns to be more similar to breastfed infants^{5,6,7}.

Recently, there has been an emerging focus on OPN in early cognitive development. Mice studies have demonstrated that milk OPN can increase OPN expression in the brain, and thus promote brain myelination and cognitive development⁸.

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CLOSURE OF THE 6th ORDESA INTERNATIONAL SCIENTIFIC SYMPOSIUM ON CHILD NUTRITION

Joan Permanyer Fabregas, Ph D / Jesús Jiménez, PhD



The 6th edition of the **Ordesa International Scientific Symposium on Child Nutrition** comes to an end, introducing, for another year, the latest scientific advances regarding early nutrition and its impact on health, development, and quality of life of child population.

We had the honor of relying on **Prof. Berthold Koletzko** for the opening speech of this meeting, an international expert on pediatric nutrition, who has led numerous projects focused on child nutrition and its effects on developmental and metabolic levels.

Likewise, the sessions have included the subjects of infant nutrition and the challenges posed towards the future of health improvement, both conducted by **Prof. Virgilio Carnielli** and **Prof. Máximo Vento**.

Other area covered in this symposium has been food allergies, and the current recommendations for their treatment, with the lectures delivered by **Prof. Sibylle Koletzko** and **Prof. Antonio Nieto**.

Malnutrition, which unfortunately affects a very significant percentage of children around the world, has been discussed during the second round table regarding both growth retardation, by **Prof. Damayanti Syarif SpA (K)**, and the issues of overweight and obesity, covered by the lectures of **Prof. Luis Moreno** and **Prof. Rosaura Leis**.

During this open discussion has also broadened the discussion around the role of certain components of mother's milk in the development of the infant, thanks

to the lectures presented by **Prof. Andreu Palou**, **Prof. Cristina Campoy**, or **Prof. Lotte Neergard**. Some of these components, such as osteopontin, MFGM, or long-chain polyunsaturated fatty acids have already been incorporated into infant formulas, while others such as leptin are still at research phase.

Finally, the role of microbiota and the new health perspectives opened by this field of research have been the subjects chosen by **Prof. John Cryan** to close these sessions.

Through all these lectures, we have tried to offer a vision of the new paths of scientific research in this field, and how these can they be applied to the improvement of the health and nutrition of children around the world.

We want to thank you to all those who made possible the celebration of this Symposium by Cátedra Ordesa, and its Director, **Prof. Cristina Campoy**, and **Dr. Montserrat Rivero**, who have designed the scientific program of this event. Of course, we also want to thank in a special way the speakers, who have prepared lectures of great scientific level, and attendees from different parts of the world, who have fostered debate and scientific discussion during this event.

We hope that you all may have found useful these sessions for your research field in child nutrition, as well as establishing professional bonds and sharing experiences and opinions with your colleagues.

We will be also hoping of welcome you again in future editions of the Ordesa Symposium.

