Effect of diet on the mental performance of children (NUTRIMENTHE)

Resumen: There is evidence that early nutrition may affect later mental performance. The idea that the diet of mothers, infants and children could affect later mental performance has major implications for public health practice and policy development and for our understanding of human biology as well as for food product development, economic progress and future wealth creation. However, much of the evidence to date is from animal, retrospective studies and short term nutritional intervention studies in humans. NUTRIMENTHE aims to significantly improve knowledge in this area by studying the role, mechanisms, risks and benefits of specific nutrients and food components on the mental performance of children. The age of children addressed by NUTRIMENTHE ranges from fetal stage to childhood, from large, well characterized prospective studies. The nutrients that NUTRIMENTHE is addressing include long-chain polyunsaturated fatty acids (LC-PUFAs), minerals (iron and zinc) and B-vitamins as these have previously been indicated as important in mental performance. Current evidence on the effect of diet on mental performance (MP) is largely based on animal, retrospective studies, and short-term nutritional intervention studies in humans. NUTRIMENTHE will significantly improve this knowledge through studying the role, mechanisms, risks & benefits of specific nutrients & food components to respond to specific needs and improve the MP of children. The research will include quantification of the nutrient effects of early programming on later cognitive and mental disorders, effects of food on mental state and MP such as mood, activation, attention, motivation, effort, perception, memory & intelligence and the effects of food on mental illness. 1. Estimate the importance of nutrition for the neurodevelopment in contemporary European populations by examining the associations between early nutrition and later outcome in large well-characterized population-based prospective studies with detailed measures of diet in pregnancy and the first years of life (WP1-2). 2. Quantify the effects of prenatal maternal diet on fetal early programming and subsequently on later cognitive development, mental and behavioral disorders (WPs1-3). 3. Specify and understand the role and mechanisms of specific nutrients effects on early programming and different genetic polymorphisms, and how the nutrients interactions within the maternal, infant and childhood diet influence the child’s neurodevelopment, mental performance and behavior disorders (WPs 1-6, 8). 4. Explore the quantitative requirements and role of some nutrients in improving mental performance in children and their subsequent outcomes (WPs 5, 6, 7) 5. Develop an appropriate standard neuropsychological battery to improve a comparable methodology for cognitive assessment in EU children (WPs 2, 3, 4, 5, 6, 7). 6. Explore the public health impact of how knowledge about diet affects mental development on the consumer behavior and its impact on the economic progress of EU countries (WPs 10, 11). 7. Establish a multi-disciplinary training program and disseminate the results to ensure that the project promotes best practice in dietary advice to pregnant women and parents with newborn babies, infants and children in Europe, optimizing as far as possible future brain health, mental performance, behavior and well-being (WP13). NUTRIMENTHE will establish: - A team of leading international scientists (pediatricians, neuropsychologists, psychiatrics) from top academic centers and a leading Food Multinational, providing a critical mass of experts in the effect of diet on children's MP Epidemiologic studies to analyze the long-term effects of pre- & early postnatal diet on children's mental performance & illness. - Follow-up of randomized clinical intervention trials with specific nutrients initiated during pregnancy, infancy & childhood Quantitative requirements of n-3 LCPUFAs in children with restricted diet Quantitative assessment of the interaction between nutrition & genetic variation with respect to MP. - Development of a neuropsychological battery for an EU common assessment of MP Consistent & clear pan-European recommendations on dietary requirement for children. - An increase the EU public knowledge, specifically parents, teachers & industry, laying the basis for appropriate health claims about how diet influences MP in children.

Objetivos: There is evidence that early nutrition may affect later mental performance. The idea that the diet of mothers, infants and children could affect later mental performance has major implications for public health practice and policy development and for our understanding of human biology as well as for food product development, economic progress and future wealth creation. However, much of the evidence to date is from animal, retrospective studies and short term nutritional intervention studies in humans. NUTRIMENTHE aims to significantly improve knowledge in this area by studying the role, mechanisms, risks and benefits of specific nutrients and food components on the mental performance of children. The age of children addressed by NUTRIMENTHE ranges from fetal stage to childhood, from large, well characterized prospective studies. The nutrients that NUTRIMENTHE is addressing include long-chain polyunsaturated fatty acids (LC-PUFAs), minerals (iron and zinc) and B-vitamins as these have previously been indicated as important in mental performance. Current evidence on the effect of diet on mental performance (MP) is largely based on animal, retrospective studies, and short-term nutritional intervention studies in humans. NUTRIMENTHE will significantly improve this knowledge through studying the role, mechanisms, risks & benefits of specific nutrients & food components to respond to specific needs and improve the MP of children. The research will include quantification of the nutrient effects of early programming on later cognitive and mental disorders, effects of food on mental state and MP such as mood, activation, attention, motivation, effort, perception, memory & intelligence and the effects of food on mental illness. 1. Estimate the importance of nutrition for the neurodevelopment in contemporary European populations by examining the associations between early nutrition and later outcome in large well-characterized population-based prospective studies with detailed measures of diet in pregnancy and the first years of life (WP1-2). 2. Quantify the effects of prenatal maternal diet on fetal early programming and subsequently on later cognitive development, mental and behavioral disorders (WPs1-3). 3. Specify and understand the role and mechanisms of specific nutrients effects on early programming and different genetic polymorphisms, and how the nutrients interactions within the maternal, infant and childhood diet influence the child’s neurodevelopment, mental performance and behavior disorders (WPs 1-6, 8). 4. Explore the quantitative requirements and role of some nutrients in improving mental performance in children and their subsequent outcomes (WPs 5, 6, 7) 5. Develop an appropriate standard neuropsychological battery to improve a comparable methodology for cognitive assessment in EU children (WPs 2, 3, 4, 5, 6, 7). 6. Explore the public health impact of how knowledge about diet affects mental development on the consumer behavior and its impact on the economic progress of EU countries (WPs 10, 11). 7. Establish a multi-disciplinary training program and disseminate the results to ensure that the project promotes best practice in dietary advice to pregnant women and parents with newborn babies, infants and children in Europe, optimizing as far as possible future brain health, mental performance, behavior and well-being (WP13). NUTRIMENTHE will establish: - A team of leading international scientists (pediatricians, neuropsychologists, psychiatrics) from top academic centers and a leading Food Multinational, providing a critical mass of experts in the effect of diet on children's MP Epidemiologic studies to analyze the long-term effects of pre- & early postnatal diet on children's mental performance & illness. - Follow-up of randomized clinical intervention trials with specific nutrients initiated during pregnancy, infancy & childhood Quantitative requirements of n-3 LCPUFAs in children with restricted diet Quantitative assessment of the interaction between nutrition & genetic variation with respect to MP. - Development of a neuropsychological battery for an EU common assessment of MP Consistent & clear pan-European recommendations on dietary requirement for children. - An increase the EU public knowledge, specifically parents, teachers & industry, laying the basis for appropriate health claims about how diet influences MP in children.

Objectivos contribución: 1) Increased knowledge, including quantification, of the effects of nutrition on mental performance and mental illness, including assessments of risks and benefits of nutrition at various age groups. 2) Sound scientific data to substantiate health and nutrition claims and to develop harmonized dietary recommendations for specific population groups (pregnant women, lactating mothers, infants and children). 3) Cooperation and dialogue between different scientific disciplines, particularly between neuroscience, pediatrics, nutrition, food science and child psychology/psychiatry.

Entregables: Two biannual meetings Two biannual reports One annual ENA Course Description of the work 33 publications

Impacto: NUTRIMENTHE Project will impact through: 1. The extent to which they are suitably ambitious in terms of its strategic impact on reinforcing competitiveness (including that of SMEs) or on solving societal problems (Competitiveness and Society); 2. The extent to which innovation-related activities and exploitation and/or dissemination plans are adequate to ensure optimal use of the project results (Communication and Outreach); 3. The extent to which they demonstrate a clear added value in carrying out the work at European level and takes account of research activities at national level and under European initiatives (EU Added Value).

19 Participantes

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- INSTITUT FUR MARKTFORSCHUNG STRATEGIE & PLANUNG GBR GERMANY
- MARTEK BIOSCIENCES CORPORATION UNITED STATES
- INSTYTUT POMNIK CENTRUM ZDROWIA DZIECKA POLAND
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Presupuesto: 6,000,000.00

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