

# **INVESTIGACION EN NUTRICION Y ALIMENTACIÓN PEDIÁTRICAS (Revista on-line)**

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## **ARTÍCULOS**

**M. Moya. IN MEMORIAM PROF. ANGEL BALLABRIGA 1920-2008. *INVEST NUTR ALIM PEDIATR (Rev on-line) 2007; 5. #1. <http://www.seinap.org>***

Professor Ballabriga's scientific and human course is longer than his vital life cycle. Personally, I came close to this at a precise moment, in the 60s and on the occasion of the National Pediatric Congress held in Torremolinos. In front of a group of friends and important people in this field, to which I did not belong, he expressed some very impressive and determined statements on national pediatrics. His constancy with these ideas and his personal courage was proved a short while later at the Plenary Session of that classic congress. I remember how on later occasions he said that all fear was lost while serving in the Republican Demolition Brigade. If we add to this that I had just read a couple of his papers (phototherapy and tritabile acidity) in *The Lancet*, then it is not hard to assume that his personality took on a dimension that grows with time. From that moment onwards we have kept in touch despite geographical distance. All this perhaps allows me to be able to express some thoughts

about him and his duties.

In Spain, in the health care field his model for the children's hospital of Valle Hebrón with its subspecialties working autonomically was new and had a very positive effect at diagnostic and therapeutic levels, a pattern which was followed by newly built large hospitals in the country. At a teaching level, and as consequence of the authoritative panorama of that time, he had to start as George Armstrong in the 18 century London instructing the doctors with a series of conferences, often not fully understood by an audience which became more and more faithful but was not used to the presentation of elaborated personal data. We should remember how the complex mass spectrometer allowed him to quantify organic acids in the 60s which still remains a tricky task today at a time when, what we now know as basic biochemistry, was what prevailed. Part of his work was dedicated to organising high quality specific symposiums at home and these formative aspects were completed with the founding of the Spanish Society of Neonatology and also, abroad, with a series of international workshops giving way to reputed monographs. His becoming Professor of pediatrics was welcomed with great satisfaction and a sense of justice by the Spanish academics dealing with pediatrics. His dedication to investigation was probably inseparable from his very life. More modestly at first and then after the 70s became centred round the newborn and nutrition with very important chapters on the newborn metabolic system (*Helvetica Paediatrica Acta*) or myelinization of the forebrain, and composition of the retina. This recognised time of investigation could have its zenith with the works on Brain Research. In the field of investigation its contribution to the Spanish panorama could be exemplified by his thrust to the Spanish Society of Investigation, on Nutrition and Childrens' Food. His idea was to build an independent, frugal society with a fundamental and active role of research. Perhaps now it is his international career that stands out. It is remarkable that being so close to what today is called translational investigation, he never disregarded pure health aspects: Colloquium of Brazzaville 1950; IPA Congress 980, UMEMPS.... Nevertheless, the most important milestone in this activity beyond borders is setting up with Professors E. Rossi, P. Royer, J. Jonxis, E. Schwartz-Thiene amongst others of the European Club of Pediatric Research which was the seed of today's ESPR. His drawing near to the International Pediatric Association as consequence of his expertise in pediatric nutrition is well known and materialized in several panels personally expressed by some of his presidents such as Professors I. Dogramaci, J. Dobbing, T. Stapleton, J. Haggerty, Jane G. Schaller or Chok Wan Chan today's President.

In the Tribute to him held the 27<sup>th</sup> June in Barcelona Autonomous University, all this and other aspects of his life were warmly covered and acknowledged by the people who had the good fortune to be work with him, either clinically or otherwise..

But the human aspects are those which perhaps rouse more interest. His cartesian intelligence and his swiftness made one always on guard, even in casual situations, his absolute dominance of sarcasm perhaps initially gave him an aura of intimidation, nothing further from the truth, his affection and his willingness to help was easily gained. It can be said at first hand how he helped the presence of young pediatricians in International forums, investigation programmes or concrete projects, something not always made the most of.

Lastly I would like to mention such a heartfelt aspect as was his hospitality which undoubtedly includes very specially Doña Lina and also his daughters Maria Jose and Adelina. I have some personal memories of this warm atmosphere which will always survive in me. In our lengthy conversations mainly in the last years Don Angel always showed me his aversion to final pomp and exaggerated recognitions, I think have tried to respect this wish but also it is true that feelings naturally expressed give comfort both to those who express them and those who may receive them and at this moment it is perhaps time to say goodbye... a hard goodbye.

# ABSTRACTS SEINAP 2008

J. Aranceta. **STRATEGIES FOR PEDIATRIC OBESITY PREVENTION IN SAPIN. THE PERSEO PROJECT.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #2.* <http://www.seinap.org>  
Sociedad Española de Nutrición Comunitaria

The Bases for a nation-wide project for overweight and obesity prevention are assessed from different point of action.

Aranceta J. El Programa PERSEO como modelo de prevención de la obesidad en la edad escolar. *Nutrición Hospitalaria 2008 (en prensa)*

JM. Moreno Villares. **EARLY INFLUENCES ON TASTE AND CHOICE FOR FOOD.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #3.* <http://www.seinap.org>  
Unidad de Nutrición Clínica. Hospital 12 de Octubre. Madrid.  
[jmoreno.hdoc@salud.madrid.org](mailto:jmoreno.hdoc@salud.madrid.org)

Early influences on feeding practices in infants and toddlers have a relevant role on later food preferences. There is a natural preference for sweet tastes and dislike for strong bitter tastes, and this characteristic is an adaptative advantage. Infants present a preference for food flavours experienced in their mother's milk. These flavours reflect her food choices and the food choices of her culture. As the infant grow up, other influences on food preference will come into play, so these early effects cannot be expected to lead to exclusive preferences. In the first few months of life, infants do accept unusual flavours more easily than when they are offered later on life. Following these early influences it seems advisable to suggest some practical recommendations for the introduction of complementary foods in the infant diet. Educational strategies involving attempts to impart basic nutritional information have not been successful in decreasing obesity or in achieving healthy eating habits. An alternative strategy would be to teach parents more about child development that may help both to promote start healthy feeding guidelines for infants and toddlers and to decrease parental anxiety related to infant feeding.

Carrascosa A\*, Fernández JM\*\*, \*\*\*Fernández C, \*\*\*\*Ferrández A, \*\*\*\*\*López-Siguero JP, \*\*\*Sánchez E, \*\*\*Sobradillo B, \*Yeste D y Grupo Colaborador Español<sup>a</sup>.  
**SPANISH CROSS-SECTIONAL 2008 GROWTH STUDY: II.- HEIGHT, WEIGHT AND BODY MASS INDEX (MBI) VALUES IN 32.064 SUBJECTS (16.607 MALES AND 15.457 FEMALES) FROM BIRTH TO ADULTHOOD.**  
*INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #4.* <http://www.seinap.org>

<sup>a</sup> \*\*\*Aresti U, \*\*\*\*Bager L, \*Copil A, \*\*de Luna JD, \*Gussinyé M, \*\*\*\*\*Jurado A, \*\*\*\*Labarta JI, \*\*\*\*Mayayo E, \*\*Moreno JA, \*\*\*Moreno JA, \*\*\*\*\*Ruiz C. \*Servicio de Pediatría y Endocrinología Pediátrica. Hospital Universitario Vall d' Hebron. Barcelona. Universidad Autónoma Barcelona. \*\*Servicio de Pediatría y Endocrinología

Pediatría. Hospital Universitario de Granada. Universidad de Granada. \*\*\*Servicio de Pediatría y Endocrinología Pediátrica. Hospital Universitario de Basurto. Universidad del País Vasco. Fundación Faustino Orbegozo. Bilbao. \*\*\*\*Servicio de Pediatría y Endocrinología Pediátrica. Hospital Universitario Miguel Servet. Universidad de Zaragoza. Fundación Andrea Prader. Zaragoza. \*\*\*\*\*Servicio de Pediatría y Endocrinología Pediátrica. Hospital Universitario Carlos Haya. Málaga. Universidad de Málaga.

**Introduction.** In developed countries a secular trend in growth has been reported. Our aim was to evaluate weight, height and body mass index values in a Spanish population coming from Andalucía, Barcelona, Bilbao and Zaragoza, and to compare these values with those obtained before 1988 (BIB 88 and CAT 87 studies).

**Subjects and methods.** Cross-sectional evaluation of height, weight and body mass index in 32.064 subjects (16.607 males and 15.457 females) from birth to adulthood between the years 2000 and 2004. Three subpopulations were evaluated: a) 5.796 (2.974 males, 2.822 females) at term newborns from normal gestations; b) 23.701 (12.358 males, 11.343 females) children and adolescents 0.25-18 years old, and c) 2.567 (1.275 males, 1.292 females) young adults 18.1-24 years of age. All were healthy, caucuses and their parents from Spanish origin. The LSM method was used.

**Results.** Mean, standard deviation, Skewness index and percentiles values with a 0.25-0.5 year-period intervals from birth to adulthood are reported. Respect to data obtained previously in Spanish populations, an increase of 1.8 cm, 1.4cm and 3.3cm were observed in adult height for percentiles 3, 50 and 97 in males respect to BIB 88 and 2.5cm, 3.3cm and 3.8 respect to CAT 87. In females these values were 3.5cm, 2.5cm and 4.2 cm respect to BIB 88 and 3.5cm, 3.1 cm and 3.9 cm respect to CAT 87. The corresponding values for weight, in males, were increased in 5.4kg, 6.2kg and 11.7kg respect to BIB 88 and 6.7kg, 6.3kg and 10.1kg respect to CAT 87; in females these increased were 1.7kg, 2.2kg and 8.3kg respect to BIB 88 and 1.8kg, 2.4kg and 3.6kg respect to CAT 87. The corresponding increased for BMI values, in males, were 2.0, 1.4 and 3.9 respect to BIB 88 and -0.1,-0.2 and 5.3 respect to CAT 87; in females these values were 0.9, 0.4 and 3.7 respect to BIB 88 and -1.8, -0.1 and 4 respect to CAT 87. In young adults, 25 and 30 BMI values correspond to percentiles 80 and 97 in males and 85 and 97 in females.

Mean values of adult height were similar to those observed in other longitudinal and cross-sectional Spanish, European, and American studies, but lower than those reported for German, Swedish and Netherlands populations.

**Conclusions.** A secular trend of growth was observed in our population with a non-proportional increased of weight to height ratio (BMI) values, particularly for those corresponding to the 97 percentile. The need of periodical actualisations of growth data used in the evaluation of children's and adolescents is required.

**Key words.** Secular trend in growth, height, weight, body mass index.

Pedron Giner C <sup>1</sup>, Alonso-Ojembarrena A <sup>2</sup>, Azcorra Liñero I <sup>3</sup>. **FEEDING DISORDER IN INFANTS AND TODDLERS.** *INVEST NUTR ALIM PEDIATR (Rev on-line)* 2008; 6. #5. <http://www.seinap.org>

<sup>1</sup> Gastroenterology and Nutrition. <sup>2</sup> Pediatric Section. <sup>3</sup> Clinical Psychology, Hospital Infantil Universitario Niño Jesús (Madrid).

**Introduction:** Feeding problems are present in 25% of infants and toddlers at any time of their lives, but a standard classification and treatment is still being developed. These disorders make parents increasingly worried and demand many complementary exams. The objective of our study is to analyze the characteristics of children with feeding disorders, as well as their evolution after being followed-up in our section.

**Patients and methods:** We studied retrospectively 129 children who had been referred for diagnosis and treatment of feeding or nutritional problems to the Nutrition and Dietetics section of our centre since 2001 until 2005. Their feeding disorder was classified according to Chatoor diagnostic criteria (2002), and information about epidemiology, symptoms, diagnosis, treatment and evolution was gathered.

**Results:** In 84% of cases, the feeding disorder became apparent before 18 months of age, but only 30% were diagnosed before this age. The prevalence was higher in girls (53.5%). 17.9% were preterm or low-weight birth, and 31% had a concurrent chronic disease. Referring to symptoms, those more frequently observed were parents concern (93%), discussions during meals (81.4%), taking more than 30 minutes per feeding (76.7%) and crying, vomiting or abdominal pain while eating (78.3%). In 82.1% of children there was a clinical desnutrition at the time of diagnosis according to Waterloo index. 75.2% were diagnosed of infantile anorexia.

All parents were provided with behavioral techniques and 52.1% were also evaluated by the Infantile Psychology section. Almost half of the sample needed a nutritional support during the follow-up (27.9% oral and 20.9% enteral). One third were cured (30.2%) and the average time was 11.3 months, but 22.5% did not improve at all. The evolution was different depending on the moment of diagnosis: 90% of patients diagnosed before 18 months of age improved, but only 68% of those diagnosed later did ( $p < 0.05$ ).

**Conclusions:** Feeding disorders are more frequent in infants, but usually is a familiar problem. The diagnosis is not easy, but must be as early as possible because it improves the evolution.

D. Infante, R. Tormo. **PANCREATIC ENZYMES ACTIVITY IMPROVEMENT WITH SODIUM BICARBONATE ENTERIC PILLS.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #6.* <http://www.seinap.org>

Unidad de Gastroenterología, Hepatología y Soporte Nutricional. Hospital Infantil Vall d'Hebrón. Universidad Autónoma .Barcelona

**Goals.** To evaluate the effectiveness in CF patients, the acidic resistant layered sodium bicarbonate enzyme containing enteric pills administration achieving a breaking up pH 5, focused to increase the duodenal pH and to improve the pancreatic enzymes activity. This improvement would drive to a better nutrient absorption, a decrease on the quantity of the pancreatic enzymes to be given to the patient and a cost reduction.

**Patients- Method.** We studied 21 patients (66% males and 34 females); mean age 11 years (interval 13- 23) Fueron incluidos 21 pacientes ( 66 % varones y 34 % mujeres), con una media de edad de 11 años ( intervalo 13-23). Acidic resistant layered 225 mg of sodium bicarbonate 7 mm diameter enteric pills allowing a pH 5 breaking up, were manufactured.

We evaluated in the stools, at the starting time (patients treated with standard enzymes) and after 15 days receiving the acidic resistant layered sodium bicarbonate

enzyme enteric pills, at a dose of 15 gr of bicarbonate /m<sup>2</sup>/24 hours, with the same enzymatic replacement :

Amilase ( colorimetric enzymatic test - Merk diagnostica N° 19718 )

Lipase (Lipase-PS . Sigma Diagnostics .P.O Box 14508 , St Louis, MO 63178 ).

Chymotripsine (Colorimetric test, Boehringer Mannheim GmbH Diagnostica. N° 718211 ).Fat, sugar, nitrogen in stools ( FECAL NEAR INFRARED ABSORPTION, FENIR

8820- infrared Analyzer .Perten, Hamburg, Germany).

Through the study no changes in the diet were allowed.

## RESULTS

	ONLY ENZYMES	ENZYMES + BICARBONATE	p
AMILASE U/ l	5.273 ± 3.825	4.779 ± 3.147	ns
LIPASE U/ l	268 ± 189	224 ± 167	ns
CHYMOTRIPSINE U/ l	32 ± 33	31 ± 28	ns
FAT, gr %	7, 3 ± 3	7,79 ± 3,28	ns
NITROGENE, gr %	1,6 ± 0,26	1,7 ± 0,32	ns
SUGAR, gr %	1,71 ± 0,61	1,9 ± 0,64	ns

## Conclusions.

1. The patients showed at the starting point a mean stool fat of 7. 3 ± 3 gr %, and received a mean lipase units of 2. 812 ± 1.567 / Kg / día. About 750 U lipase / Kg / meal, can be enough to keep control of the patients steatorrhea. A linear negative correlation between the administered enzymes and the steatorrhea (r= 0.16) has been found.
2. The 775 mg of mean sodium bicarbonate added to the enzymatic replacement, did not improve the pancreatic enzyme activity. The stool amilase, lipase, chymotripsine and fat decreased in some patients but without statistical significance.
3. A pill sodium bicarbonate increase with a pH below 5 breaking up point, would be advisable, and a subject for future studies.

Sierra C, Blasco J, Navas V, Barco A. **CEREALS: FORTIFICATION AND FUNCTIONAL ACTION.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6.* #7. <http://www.seinap.org>

Unidad de Gastroenterología, Hepatología y Nutrición Infantil. Hospital Materno-Infantil. Málaga.

The complementary feeding period is critical for growth. Nutritional factors during this stage might have not only short-term effects on growth, but also in health of adults, a phenomenon called metabolic programming. The nutrients with functional effect on growth, neurodevelopment and the efficiency of the immune system, include vitamins (A,D,C,E, B<sub>6</sub>, B<sub>12</sub>, folic acid) and the essential fatty acid and long-chain polyunsaturated fatty acids (arachidonic acid and docosahexaenoic acid). Recently also the prebiotics and probiotics have been added to the list of functional nutrients. The period of the

complementary feeding represents a key period in which the nutrients selected having positive effects on biological processes and functional mechanisms, leading to a general advantage later in adult life.

In most developing countries the main or even only available weaning foods are represented by the local basic cereal as maize, rice or tapioca. In these communities, where the energy-protein malnutrition is endemic, the period of weaning is the most critical for nutritional interventions. The specific supplements of micronutrients, mostly iron and less often zinc, can reduce the harmful consequences of the malnutrition. In general, the growth is not seen influenced by the supplement of micronutrients in the complementary feeding period since the energy and protein deficiencies represent the major limiting factors. In developed countries the situation of the infants during weaning period is very different, not only by leaving from a good nutritional status of the mother and of the baby. The different food offering to the milk (maternal or starting formula ) is various and with sufficient nutrients as to permit an adequate or excessive growth. Exclusive breastfeeding beyond the age of 6 months does not allow to meet their energy and protein requirements as well as some micronutrients as iron and zinc. The fortification of cereals and meats are excellent sources of bioavailable iron and zinc. Fortified cereals provided multiple micronutrients (trace elements, vitamins, fatty acids) so iron, zinc and vitamin A requirements are met.

The addition of functional components such as prebiotics and probiotics to infant cereals is now a novel possibility to target health problems that are not caused by a simple nutritional deficiency. The gut microflora modulates mucosal physiology, barrier function and systemic immunologic and inflammatory responses. The realization that the intestinal flora modifies the function of the gut immune system has led to the concept of prebiotic and probiotic therapy as possible means to reduce the risk of infections and allergies, but more studies are needed to assess these effects.

Trials of functional components in infant cereals:

Author	Country	Component(s)	Conclusion
Moore (2003)	USA	FOS	Softer, more frequent stools
Duggan (2003)	USA	FOS	No prevention of diarrhea
Shamir (2005)	Israel	S. thermophilus, B.lactis, L. acidophilus, FOS, Zn	Shorter duration of acute gastroenteritis
Moro (2006)	Italy	GOS-FOS	Prevention of atopic eczema
Zavaleta (2006)	Peru	MFGM, protein fraction	Prevention of diarrhea
West (2007)	Sweden	Lactobacillus F19	Prevention of atopic eczema; no prevention of diarrhea

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A Bataller Alberola, P Codoñer Franch. **INFLUENCE OF DIETARY LIPIDS ON THE ANTIOXIDANT DEFENCE OF HYPERCHOLESTEROLAEMIC CHILDREN.** *INVEST NUTR ALIM PEDIATR (Rev on-line)* 2008; 6.

#8. <http://www.seinap.org>

Servicio de Pediatría. Hospital Universitario Dr Peset. Departamento de Pediatría, Obstetricia y Ginecología. Universidad de Valencia.

**Introduction.** Atherosclerosis and cardiovascular disease (CVD) remain the leading causes of morbidity and mortality in industrialized nations. Classic cardiovascular risk factors are hypercholesterolemia, hypertension, diabetes and smoking, which enhance the atheroma plaque formation. It is clear that the mechanism which renders low-density lipoprotein cholesterol (LDL-C), a substrate for the production of foam cells and the initiation of atherosclerotic events, is the oxidative modification of circulating LDL. Various enzymes and antioxidants in the body, including superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx), glutathione (GSH) and vitamins control the oxidative status. As oxidation plays a critical role in the development of atherosclerosis, diminished activity of this antioxidant system may lead to the accelerated progression of this process. Treatment of hypercholesterolemic children is based in the diet with reduction of fat to 30 % of energy (10 % saturated fat, 10% monounsaturated fat, and 10 % polyunsaturated fat) and intake of cholesterol  $\leq$  300 mg/day (Diet step I, American Academy of Pediatrics). In order to investigate the influence of dietary fat on markers of the antioxidant defence system, we have analysed the catalytic activities of SOD, CAT, GPx and GR, and GSH in the erythrocytes of hypercholesterolaemic children.

**Subjects and methods.** Thirty-four children (14 boys and 20 girls) between 6 and 14 years of age ( $8.8 \pm 2.6$  y), followed at the Paediatric Gastroenterology and Nutrition outpatient section of the Dr. Peset University Hospital, with an established diagnosis of hypercholesterolaemia (total cholesterol  $\geq$  200 mg/dl, LDL-C  $\geq$  130 mg/dl) were included in the study. All children were otherwise in good health, and were not affected by hypothyroidism or any other chronic disease. We recruited 28 normolipaeamic



children of comparable sex (16 boys and 12 girls) and age (8-10.5 year, mean  $9.3 \pm 1.2$ ) as a control group. They assented to the procedures and their parents signed an informed consent. We obtained anthropometric parameters (height and weight), and the Body mass index (BMI: weight/height<sup>2</sup>). After a 12-h overnight fast, blood specimens were obtained to determine the serum total cholesterol, LDL-C, high-density lipoprotein cholesterol (HDL-C) and triglycerides. In addition, another sample was collected in vacutainers containing heparin as the anticoagulant to analyse SOD, CAT, GPx, GR and GSH. Dietary intake at baseline was estimated in all children as the mean of a 24-h diet recall, filled out by a paediatrician in the presence of the subject, and a prospective seven-day record completed by the parents at home according to a questionnaire that was returned to the paediatrician. A dietician gave standard instructions on how to complete it, and to show illustrative portion sizes. Intakes of energy, carbohydrate, protein, total and saturated (SFA), monounsaturated (MUFA) and polyunsaturated fat (PUFA), cholesterol, vitamins and oligoelements were calculated using OCAH software (University Hospital Dr Peset). We proposed an intervention period of 6 months with a fat-modified diet in the hypercholesterolaemic children. Each patient and their parents received instruction on nutrition by a dietician. The instructions included practical methods of reducing fat, SFA and cholesterol in the diet to meet the recommendations of the AHA step I diet. Children were clinically followed prior to commencement of the diet and throughout the study at weeks 2 and 4 and monthly thereafter to assess compliance and to obtain anthropometric parameters. Dietary records were evaluated at the outpatient visits. These records were kept at the start, in the middle and at the end of the study. Fasting blood samples were collected at week 0 (basal), and after 6 months of dietary intervention (final) in children who met the instructions properly and were adequately supervised during follow-up.

**Results.** At the basal study we found that with respect to dietary intakes, the mean total and saturated fat intake was higher, and polyunsaturated fat was lower in relation to the recommended intake. The correlation coefficients between dietary intake and markers of antioxidant defence showed that energy was negatively correlated with the erythrocyte values of SOD, CAT, GR and GSH. Intakes of total fat, cholesterol and the percentage of energy as fat were strongly and significantly inversely correlated with CAT activity. GPx and GSH were also negatively correlated with cholesterol intake. The only indicator of enzymatic activity which was significantly positively correlated with the percentage of calories as PUFA was GPx. In the patients on the modified-fat diet (15 children), the activities of antioxidant enzymes were significantly higher at the end of the intervention period when compared with baseline values (paired test). SOD was increased by 44% and CAT by 70%. The greatest increment was noted in the activity of GPx (91%).

**Conclusion.** There was a negative correlation between energy, total and saturated fat and the activity of antioxidant enzymes. The intake of polyunsaturated fat was positively correlated with the GPx activity. The activities of antioxidant enzymes were significantly higher after the 6-month low-fat diet. We have shown that the diet can modulate the antioxidant defence system and, in particular, that an excess of energy as saturated fat and cholesterol has a negative influence on the antioxidant enzymes. These effects can be reversed by modifying the fat quantity and quality.

**Introduction:** Aerobic organisms have developed enzymatic and non-enzymatic antioxidant systems known as "scavengers" capable of neutralizing free radicals. It should be noted that maturation of the antioxidant system occurs at the end of intrauterine development and, therefore, prematurity is burdened with an important antioxidant deficit. Thus, superoxide dismutase, catalase and glutathione peroxidase, the major antioxidant enzymes, are not fully expressed until the end of gestation. Seemingly, one of the components of glutathione, specifically L-cysteine, is insufficiently synthesized before 34 weeks gestation because  $\gamma$ -cystathionase, the limiting enzyme for its synthesis, is not fully expressed so far.

Preterm infants are immersed in an oxidant environment. Thus, oxygen therapy, parenteral nutrition, certain drugs, ischemia-reperfusion, infections, etc., altogether enhance pro-oxidation. Of note is that when generation of free radicals exceeds the body's antioxidant capacity oxidative stress ensues. Moreover, oxidative stress is involved in most diseases linked to prematurity.

Previous studies suggest that breast milk could have a high antioxidant capacity.

**Objetives of the study:** To evaluate with a non-invasive technique if feeding preterm infants exclusively with human milk is able to reduce oxidative stress produced by hydroxyl radicals.

**Materials and methods:**

**Design:** This is a prospective and blinded clinical study performed in a tertiary referral center.

**Population:** Clinically stable premature infants below 36 weeks gestation were enrolled in group LM exclusively fed breast milk (n=17), and group LA(n=10), exclusively fed special preterm formula. Inclusion criteria were:

- (i) To be exclusively fed breast milk or formula.
- (ii) Absence of acute or chronic diseases, severe malformations, chromosomal abnormalities or surgery.
- (iii) Not being on intravenous fluids, oxygen, having received transfusions or pro-anti-oxidant medication.
- (iv) Stable weight gain in the previous week.

**Method:** Urine samples were collected in sterile conditions and frozen at  $-80^{\circ}\text{C}$  until processed. Orto-tyrosine/Phenylalanine and 8-hydroxy-deoxyguanosine/2 dihydroguanosine quotients were used as markers of the pro-oxidant action of the hydroxyl radical on amino acids (Phenylalanine) and nucleic acids (DNA) respectively. Markers were determined by high pressure liquid chromatography coupled to mass spectrometry tandem hexapolo.

**Results:** The orto-tyrosine/phenylalanine (LA:  $12.58 \pm 1.7$  vs. LM:  $10.61 \pm 2.66$ ,  $p < 0.01$ ) and 8-oxodG/2dG (LA:  $11.0 \pm 2.9$  vs. LM:  $8.4 \pm 1.8$ ,  $p < 0.02$ ) ratios were significantly higher in the group receiving formula. In addition, the orto-tyrosine/phenylalanine ratio showed a statistically significant linear regression coefficient ( $r^2: 0.4373$ ) when correlated to gestational age, while 8-oxodG/2dG ratio did not ( $r^2: 0.1402$ ).

**Conclusions:** Premature infants with lower post-concepcional age have an increased tendency towards oxidative stress.

Human milk provides greater defense against oxidative aggression as evidenced by a reduced elimination of urinary markers of oxidative damage to nucleic acids or amino acids.

It would be desirable an increase in antioxidant capacity of special formulas for preterm infants to avoid consequences of oxidative stress in the first weeks of and later on.

B. Bonet Serra. **OBESITY IN CHILDREN: BENEFITS OF DAIRY PRODUCTS SUPPLEMENTED WITH CONJUGATED LINOLEIC ACID.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #10.* <http://www.seinap.org>  
*Servicio de Pediatría y Neonatología .Hospital Can Misses. Ibiza.* [bonets@hcm-ibiza.es](mailto:bonets@hcm-ibiza.es)

Obesity is one of the leading health problems in developed countries, with an incidence close to 15% of the populations. Probably, what is even more relevant is the fact that the consequences of this modern epidemic will show up in the near future, when an increased incidence of dyslipidemia, hyperinsulinism, type 2 diabetes, cardiovascular diseases (as well as the complications linked to these process), decreased fertility, bone diseases will show up (1, 2).

The treatment of obesity is extremely difficult; very few studies have show up a weight reduction over a long period of time, unless radical surgery is employed (intervention linked to a high morbidity and mortality). Nevertheless there is data suggesting, in obese adults, that a mild weigh reductions of 4-6 kg, leads to relevant health benefits decreasing the metabolic and hormonal alterations associated to obesity and reduces the risk of developing type 2 Diabetes (3).

Therefore, it seems that in obesity, any intervention decreasing both the degree of adipose tissue as well as the metabolic (hipertriglyceridemia, low HDL-cholesterol, hyperglycemia) and hormonal (hiperinsulinism, insulin resistance, low adiponectin levels) alterations linked to obesity may have relevant health benefits. Several years ago we focused our research on studying the potential benefits of the administration of different isomers of conjugated linoleic acid (CLA) (Tonalin<sup>®</sup>) upon the adiposity and on the metabolic alterations associated to obese and overweight adolescents. A population, were the reduction of the metabolic and endocrine alterations linked to obesity may have a relevant health impact in the future by decreasing the complications associated to obesity.

Why CLA administration? There was data in the literature, mainly in animal models, suggesting that CLA administration could help to decrease the adipose tissue mass, body weight and insulin resistance. Although, the results published in humans were somehow uncertain (4-6).

Study 1. Our first study focused on the effects on CLA intake upon the insulin resistance in obese adolescents followed in our endocrine clinic. All of them had BMI z-score above 4, which could be equivalent in adults to a BMI above 30 kg/m<sup>2</sup>. The study was performed in 39 adolescents. The patients were divided in two groups of similar characteristics, one of then received daily during 16 weeks, 200 g of fat free yogurt containing 3.5 g of CLA; the control group received the same amount of yogurt without CLA. Anthropometric, metabolic and hormonal parameters were studied at the beginning and at the end of the study. To study whether the effects of CLA administration remained over time, a third study was performed 16 weeks after ceasing the administration of yogurt. In the three points of the study anthropometrical parameters were determined (weight, height, body mass index (BMI)), a one week dietary of caloric intake and physical activity was performed. Biochemical and hormonal parameters were determined in the three points of the study (cholesterol, triglycerides, HDL-cholesterol, glucose, insulin, insulin resistance index (IRI)) (7). In this study we showed that the CLA administration neither had any effect upon the growth, weigh and BMI nor the parameters related with lipid metabolism including total, LDL and HDL cholesterol and triglycerides. In contrast a decrease in plasma glucose, insulin and IRI was observed. These results show for first time that CLA

administration in obese adolescents decreases insulin resistance. When the study was repeated 16 weeks after stopping the CLA administration, the values of insulin, glucose and IRI returned to the values found at the beginning of the study, further emphasizing that the effects observed during the study were secondary to CLA ingestion (7).

The clinical relevance of these findings is unknown at present, keeping in mind that the consequences of the insulin resistance will show up after many years of evolution.

Nevertheless, it is worthwhile to keep in mind that in other studies performed in adults, using other methods a reduction of blood glucose, insulin and the IRI, was associated with a reduction in the rate of developing type 2 diabetes. It is attractive to speculate that the consequences of these changes, would they remain over a long period of time, may have a relevant clinical impact in this adolescent population with obesity and a high risk of developing type 2 diabetes.

Study 2. It seems the effects of CLA administration leading to a reduction of body fat only show up in overweight subjects, rather than in an obese population. In this second study we wanted to determine in overweight adolescents, whether the CLA administration reduces body fat content. Therefore we studied a group of 26 overweight adolescents, which were divided in two groups, one received a daily dose of 3, 5 g of CLA mixed with 200 ml of skim milk during 16 weeks and the other group received the milk without any supplementation. The body fat content was determined using densitometry by air displacement (BODPOD). This method allows studying the body volume and density in a similar way as with immersion in water, one of the best methods to study body composition. Our results show that the group of overweight adolescents treated with CLA did not show any changes in the fat content, in contrast an increase in fat content was observed in the placebo group. These results show that CLA administration to overweight adolescents prevents the fat increase that takes place so often in this population during the pubertal development.

In summary, present results suggest that both obese and overweight adolescents could benefit from CLA intake, in the overweight group avoiding the further accumulation of fat and in the obese group decreasing the insulin resistance and blood glucose, two alterations linked with the development of type 2 diabetes.

The benefits observed with the CLA intake are small. Nevertheless, we should keep in mind that the fight against obesity and the complications linked to this process may benefit of interventions that lead to small changes in anthropometrical as well as metabolic and hormonal parameters. It does not look like, we are going to find in the near future an easy and safe way to induce major changes in body weight and in the metabolic alterations linked to obesity.

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L. Fontana Gallego. **MITOCHONDRIAL DYSFUNCTION IN NONALCOHOLIC STEATOHEPATITIS ASSOCIATED TO OBESITY.** *INVEST NUTR ALIM PEDIATR (Rev on-line)* 2008; 6. #11. <http://www.seinap.org>

(1) Institute of Nutrition and Food Technology, Biomedical Research Center, Parque Tecnológico Ciencias de la Salud, Granada; and (2) Dept. Biochemistry and Molecular Biology II, School of Pharmacy, University of Granada.

Nonalcoholic steatohepatitis (NASH) has become a very serious public health problem due to the rise in the incidence of obesity that is taking place in most developed countries, including Spain. This pathology is characterized by fatty infiltration of the liver, inflammation, hepatocellular damage and fibrosis, and may evolve to cirrhosis and hepatocarcinoma.

The current accepted mechanism to explain the development of NASH includes a first “hit” carried out by the accumulation of triglycerides (steatosis), which “primes” the liver to progress toward more severe hepatic pathologies, because this organ becomes more vulnerable to other “hits”, among which hyperglycemia, hypertriglyceridemia and hypercholesterolemia may be cited, all of them being related with the metabolic syndrome. Furthermore, oxidative and nitrosative stress, as well as mitochondrial dysfunction, are key molecular events that accelerate and worsen steatosis.

This communication will review the relevant role played by mitochondrial dysfunction in NASH.

E. Lurbe. **OFFICE AND AMBULATORY BLOOD PRESSURE VALUES IN YOUTH: THE IMPACT OF THE DEGREE OF OBESITY.** *INVEST NUTR ALIM PEDIATR (Rev on-line)* 2008; 6. #12. <http://www.seinap.org>  
Pediatrics Department. Consorcio Hospital General. University of Valencia.

The prevalence of obesity is continuously increasing, particularly in developed western countries, and this is the case even among children. The adverse effects of weight gain on metabolic and cardiovascular functions, also in young and middle-aged subjects, and the association of weight gain with a higher incidence of health problems later in life, represent major issues in health care, which have generated great concern over the last few years. Indeed, because of the increasing tendency of obesity to appear during childhood and to track, to some extent, into adult life, as well as because of the well established relationship between obesity and hypertension in adults, obese children appear to be at particularly high risk of becoming hypertensive with increasing age.

These considerations call for greater diagnostic care in young subjects at risk. In this context, it is important to emphasize that, despite the known variability of blood pressure readings and the uncertainties related to their accuracy and their interpretation in young subjects, blood pressure values in children represent the most important measurable marker of the potential level of cardiovascular risk later in life. This strongly supports the importance of performing careful and repeated blood pressure measurements during childhood and adolescence. Use of ambulatory blood pressure monitoring in this setting appears therefore to be of particular value.

Solid evidence collected over the last 20 years has demonstrated the high prognostic power of ambulatory blood pressure monitoring. Indeed, 24-hour blood pressure values have been shown to represent significantly better predictors of cardiovascular risk than casual office blood pressure measurements do. In addition to its potential to predict cardiovascular risk more accurately than office blood pressure measurements can do, ambulatory blood pressure monitoring has contributed significantly to our understanding of hypertension, by revealing conditions such as white-coat and masked hypertension that were not readily apparent using traditional techniques of blood pressure measurement in clinical practice only.

In spite of these potential advantages, however, ambulatory blood pressure values in obese children and adolescents have been collected and reported in only a few studies focusing on the assessment of the impact of obesity on ambulatory blood pressure levels. **The prevalence of office hypertension ranged from 0.6% in the non-obese to 37.5% in the severely obese, with the majority of the hypertensive subjects having systolic hypertension. Ambulatory hypertension was generally present in a higher proportion of subjects than office hypertension. From a clinical point of view it may be important to identify subjects in whom office and ambulatory blood pressure behave differently.**

M Juste. M Moya. E.Cortés.**SEINAPTRACKER USEFULNESS IN THE CLINIC CONTROL AND EVOLUTION IN OBESE CHILDREN AND ADOLESCENTS.**  
*INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #13. <http://www.seinap.org>*

## **INTRODUCTION**

Control of treatment response of obese children and adolescents is difficult to measure because of the large number of auxologic variables obtained in consecutive visits over a certain period of time. This, besides of the possibility of having Z Score instead of percentiles, generated the option of using Seinaptracker. This is a new computer programme created to make the control of nutritional problems easier, and the statistic treatment of obtained data once exported to appropriate programmes.

**AIMS:** To study the usefulness of SEINAPTRACKER in the clinical evaluation of the patients and for the posterior statistic treatment of data obtained in the multiple visits. This can be done once they have been exported to an external programme.

## **METHODS**

Data obtained in the consecutive visits of 61 obese children and adolescents (BMIr > 121 %), whose ages were between 5 and 18 years were included. They belonged to the population of a bigger study to evaluate the efficiency of CLA in the treatment of obese children and adolescents. A control group of 26 patients, with similar clinic characteristics, was included also. Patients of the study group, received apart from usual recommendations, 47.7 mg / kg /day of added CLA in milk or other diary products.

In the initial visit previous data as weight and height at birth, height of parents and menarche age in girls are included. Variables of the nutritional and growth parameters at this moment were: weight, height arm circumference, waist and hip circumferences blood pressure, puberal stage and bone age and all of them were included. Patients were revisited every 2 months and the same measures were taken and then added in SEINAPTRACKER, and percentages, percentiles and z score were calculated by the programme.

Once complete data were introduced, a list was designed. In the list together with the identification of the patient we included those somatometric and other figures obtained in the visits and those we wanted to work with and those generated by the programme. Subsequently we established the “filters” (CLA versus Control) and this allowed us to separate patients belonging to each group in order to perform descriptive statistic studies and comparison between both groups. In the same way we could obtain new relations between data included as waist to height or waist to hip.

## RESULTS

**TABLE 1.- Clinical data in both groups**

	CLA (n= 61 )	Control Group (n= 26)	p
Age (years)	11.7 (2.8)	11.2 (2.7)	ns
Weight at birth gr	3.43 (5.8)	3.53 (6.1)	ns
P.	59.8 (31.3)	59.8 (27.5)	
Height at birth cm	48.6 (9.2)	50.7 (2.4)	ns
P	63.1 (26.2)	51.8 (28.9)	
Weeks Gestational age P	39.3 (1.4)	39.8 (1.3)	ns

**TABLE 2.- Evolution of clinical data**

	Basal			6 months			CLA n=17
	CLA n = 61	Control n=26	p	CLA n=38	Control n=20	p	
BMIr %	<b>146.6(25.6)</b>	<b>151.5(20.5)</b>	ns	<b>140.3(14.8)</b>	<b>133.8(35.8)</b>	ns	<b>139.8(14.8)</b>
ZS	3.7(1.4)	3.7(1.4)	ns	2.9(1.1)	2.8(1.3)	ns	2.8(1.3)
Arm Circumf. ( cm )	30.0 (7.2)	30.0 (4.2)	ns	29.3(6.3)	29.8(6.3)	ns	29.8 (6.3)
P	94.8(1.3)	94.3(12.0)	ns	92.0(17.0)	95.7(3.7)	ns	94.8(1.3)
ZS	2.8(1.5)	2.6(1.3)	ns	2.3(1.2)	2.3(1.4)	ns	2.2(1.3)
Waist C. cm	87.1(10.6)	86.2(11.2)	ns	85.4(10.5)	84.2(11.3)	ns	84.2(11.3)
P	97.0(6.1)	94.3(12.0)	ns	95.7(7.1)	94.4(5.8)	ns	92.9(11.3)

	ZS	2.8(1.5)	2.6(1.3)	ns	2.3(0.8)	2.1(1.2)	ns	2.2(1.1)
Hip.C.	cm	99.5(12.1)	95.4(13.2)	ns	97.5(11.1)	94.7(14.2)	ns	101.9(12.1)
	P	93.9(10.4)	91.2(4.5)	ns	89.1(16.7)	86.8(15.3)	ns	88.7(11.1)
	ZS	2.3(1.19)	1.9(1.1)	ns	1.7(1.0)	1.6(1.1)	ns	2.7(3.1)
Waist/Hip		0.88(0.07)	0.91(0.05)	ns	0.88(0.07)	0.89(0.05)	ns	0.86(0.05)
Waist/Height		0.57(0.05)	0.58(0.05)	ns	0.55(0.04)	0.55(0.04)	ns	0.54(0.04)

## DISCUSSION:

Management of the large number of figures obtained in the visits in treatment of obese patients has been simplified by the use of SEINAPTRACKER. It allows us to include in the same visit to the outpatients clinic the data obtained and this avoids the later use of clinical documentation. BMIr is a good tool because it is easy to understand for the parents and the patient and because of its quick use. Z-Score of the different variables is accepted as the best way of defining the situation of a patient in that moment and so it is of great utility in clinical investigation because it allows us to evaluate the evolution in a better way that percentiles do. Both allow us to determine variations related to other standard populations.

**CONCLUSIONS.** CLA has not been useful in the control of BMIr in obese patients in this moment of study. Seinaptraker has been a great help in the following of these obese patients when there is a long term control and it has simplified the clinical investigation . It allows the evolutive control of multiple clinic variables and the figures calculated.by itself

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Baldellou Vázquez A. **NUTRITIONAL ASSESSEMENTS OF THE INBORN ERRORS OF METABOLISM.** *INVEST NUTR ALIM PEDIATR (Rev on-line)* 2008; 6. #14. <http://www.seinap.org>

Unidad de Enfermedades Metabólicas. Hospital Infantil Miguel Servet. Zaragoza.

In spite of the recent advances in the treatment of the Inborn Errors of Metabolism (IEM), often the cornerstone of treatment is dietary.

In the epigenetic of the IEM, the diet is one of the most important agents. The pathological conditions in the metabolic diseases are usually a source of malnutrition. In the management of more than a half of the IEM, the dietary interventions go on being one of the most important key. Finally, the various dietetic approaches may involve deficient nutritional intakes in many of these patients.

Hyperphenylalaninaemia due to phenylalanine hydroxylase deficiency it's helpful to understand the problems involved in nutritional treatment, to assess our current knowledge and the new approaches in the nutrition of the inborn errors of metabolism. The newborn screening and the phenylalanine restricted diet from the first days of life have changed the clinical picture of this disease and ensure a "normal" cognitive development in most of the children. Almost 50 years after the beginning of this treatment, many and complex dietary questions remain unsolved by the fact that right



treated patients show lower intellectual and achievement test scores than their healthy brothers do and, in some cases, they develop light, but evident, neurological alterations. There isn't universal consensus concerning to the phenylalanine (Phe) blood level that forces to begin the dietetic treatment, or the goal blood Phe level at every age. Advantages of the BH4 therapy *versus* dietetic therapy are not assessed yet. The Phe blood levels can not easily relate to Phe levels in the brain. The physiopathological mechanism of the disease is not very well known. The advantages of the breastfeeding and how to use it in the newborn must be established. The protein intake and the its way of supply go on controversial. It is well known the risk of such diets to develop deficiencies in the essential fatty acid, minerals (Ca, Fe, Se, etc.), and vitamins (Folates, B12, etc.); the accurate answer of such dietetic modifications are not known in the regulation of the gene expression of this pathology and in its clinical manifestations. It is needed the identification of reliable biomarkers that allow to define the risk profile of each patient, and to assess the therapeutic response.

T. Durá\*/\*\*, J. Hualde\*\*, I. Garralda\*\*, E. Cabello\*. F. Gallinas\*\* Nutritional situation in Navarre: longitudinal study of a cohort of children born in 1993. *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #15. <http://www.seinap.org>*  
 (\*)Department of Pediatrics. University of Navarre.  
 (\*\*)Hospital Virgen del camino. Servicio Navarro de Salud. Pamplona

**Objective:** To study the prevalence and tracking of overweight and obesity in a cohort of children born in 1993.

**Material and methods.** Anthropometric measures (weight, height and BMI) registered during health check-up visit at a 2, 3, 4, 6, 8, 10 and 12 years of age from 930 healthy children have been analyzed. Longitudinal (B. Sobradillo, 2004) and transversal (A. Carrascosa, 2008) growth reference curves have been applied.

**Results.**

Overweight and obesity prevalence						
Age (years)	MALES			FEMALES		
	Overweight	Obesity	Total	Overweight	Obesity	Total
2	5,8	1,5	7,3	10,2	1,6	11,8
3	9,4	4,3	13,7	9,1	3,6	12,
4	12,8	5,2	18,0	10,3	2,8	13,1
6	10,8	7,2	18,0	7,6	2,9	10,5
8	11,1	8,9	20,0	9,7	4,2	13,9
10	15,5	7,4	22,9	9,2	3,3	12,5
12	14,3	5,8	20,1	8,9	3,9	12,8
14	12,4	7,5	19,9	5,7	5,4	11,1

Tracking of overweight/obesity					
Age younger	Age older	MALES		FEMALES	
		Tracking (%)	Persistente (%)	Tracking (%)	Persistene (%)
4	6	10,6	58,9	7,9	60,3
-	8	13,8	76,7	6,1	46,6

-	10	12,2	67,8	6,6	50,4
-	12	9,8	54,4	5,4	41,2
-	14	10,5	58,3	4,6	35,1
6	8	13,8	76,7	6,1	58,1
-	10	12,6	70,0	6,5	61,9
-	12	11,5	63,9	4,9	46,7
-	14	10,9	60,6	5,3	50,5

**Conclusiones.** Our results show that 60,6% of the boys and the 50,5% of the girls that were overweight at age 6 years were still overweight at the 14 years, respectively. This finding suggests that overweight prevention strategies could be implemented before children start their compulsory schooling.

C. Ruipérez, C. Castaño, M. Juste, M. Moya. **ALTERATIONS OF LEFT VENTRICULAR MYOCARDIAL CHARACTERISTICS ASSOCIATED WITH OBESITY IN CHILDREN.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #16.* <http://www.seinap.org>

Hospital Clínico Universitario de San Juan Alicante.

**Background**— Obesity is associated with hypertension and myocardial dysfunction, but an effect of weight, independent of comorbidities, on cardiac structure and function in children, is not well established. We sought whether body mass index (BMI) with subclinical myocardial disturbances.

**Methods and Results**— Transthoracic echocardiography, Using pulsed-wave Doppler, mitral inflow velocities, peak early diastolic velocity (E), peak late diastolic velocity (A), E/A ratio, and isovolumetric relaxation time (IVRT) were measured. Were obtained in 40 overweight or obese subjects (rBMI > 121%) and 30 controls (rBMI < 111%). BMI correlated with left ventricular (LV) mass and wall thickness ( $P < 0.05$ ). LV wall thickness, diameters, volumes and LV mass indexed to height increased with increasing BMI. These morphological measures, except for Left ventricular end-diastolic dimension, were significantly different in obese groups as compared with the referents. In obese groups the LV ejection fraction remained normal. The arterial pressure were <P90 in obese groups.

**Conclusions**— Overweight and obese children have subclinical changes of left ventricular structure. Ejection fraction did not differ significantly. These changes were independent of arterial pressure.

C. Martínez Costa. **ANTIINFECTIOUS PROPERTIES OF BREAST MILK.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6.*

#17. <http://www.seinap.org>

Sección de Gastroenterología y Nutrición Pediátrica. Hospital Clínico. Departamento de Pediatría, Obstetricia y Ginecología. Universidad de Valencia. [cecilia.martinez@uv.es](mailto:cecilia.martinez@uv.es)

Breast milk is the optimal source of nutrients and an unmatched supply of indispensable protective substances for the infant. These protective components include the following: Immunoglobulins (particularly secretory IgA), complement proteins, cellular elements, cytokines, growth factors, lactoferrin, lysozyme, lactadherin, mucins, enzymes and several substances with antioxidant capacity. Other components such as

oligosaccharides inhibit bacterial adhesion to epithelial surfaces and promote the development of bifidus flora, thereby hindering the multiplication of pathogens. This prebiotic effect, added to the benefits of endogenous milk flora, make human milk the main natural synbiotic.

As a result of the increasing interest in promoting breastfeeding and ensuring it even when an infant is unable to ingest milk directly (due to prematurity, admission to hospital, etc...), refrigerated storage techniques that preserve milk properties as much as possible are being developed.

Some contributions to the knowledge on the bactericidal activity of human milk are cited below:

1. Protection against rotavirus infection: In order to ascertain the real role played by human milk in the protection against rotaviral infection, we analyzed anti-rotavirus antibodies in human milk, determined their isotype and quantified their neutralizing capability. A number of 173 milk samples collected from 65 mothers (65 were colostrum, 55 transitional milk and 53 mature milk) were analyzed along with 49 maternal serum samples. The quantification of antibodies in milk and serum was executed by ELISA. The evaluation of neutralizing activity was accomplished with the reduction of immunoperoxidase-revealed infectious focus. Class A antibodies and anti-rotavirus immunoglobulins were detected in all serum and milk samples. Both milk and serum samples evidenced neutralizing activity against three rotavirus strains: SA11, Wa and VA70 (stronger against Wa). The major inner capsid protein VP6 and the nonstructural protein NSP2 suffered the greatest precipitation by anti-rotaviral IgA. Among human milk and serum, no correlation was found between their neutralizing activities against rotavirus and their respective concentrations of IgA and anti-rotavirus antibodies, thereby suggesting other substances with neutralizing activity must be present in human milk too (Asensi MT et al, 2006).

2. Bactericidal Activity of Human Milk: The aim of this study was to analyze the bactericidal activity of human milk and how it is influenced by refrigerated storage. Nine samples of mature human milk were collected and divided into 3 aliquots: One was analyzed immediately, while the other two were refrigerated at 4-6°C for 48 and 72 hours, respectively. All fresh samples exhibited bactericidal activity. Refrigeration during 48 hours did not cause significant modifications, while storage beyond 72 hours significantly lowered the degree of bacteriolysis versus fresh milk. In conclusion, human milk possesses bactericidal activity that remains stable during the first 48 hours of refrigerated storage, but it is significantly reduced beyond 72 hours (Martínez Costa C et al, 2007; Silvestre MD et al, 2006).

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M. Sánchez Luna. **NUTRITION OF PRETERM NEWBORN AND ITS RELATION WITH MORBIDITY.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6.*

#18. <http://www.seinap.org>

Hospital Materno Infantil “Gregorio Marañón”. Universidad Complutense de Madrid.

The important role of nutrition in survival of preterm newborn is a well-studied and recognized issue, but its direct implication in all morbidities related to preterm birth is something to be defined. One of these morbidities is Bronchopulmonary Dysplasia (BPD). The new expression of this disease is related to the stop of lung growth, pulmonary vessels and airway. There is enough evidence to correlate nutritional status with lung growth in experimental studies done in mature starved rats, and human adults died with severe malnutrition where low alveolar count with emphysema was found. In experimental models of preterm animals, exposure to under nutrition and high oxygen concentration prevent normal lung growth with low alveolar counts. It is clear that nutrition plays a roll in lung development of premature infant, but don't know exactly how nutrition can benefit this growth or how it can interference if it is wrong. Excessive amounts of fluids during the first days of life has been proposed as a promoting factor of BPD, but controlled trials have a high variability of designs and do not demonstrated this relation. Birth weight reduction during the first days of life in retrospective studies has been related with a lower BPD ratio, but these patients with a decrease in birth weight during the first 10 days of live were born in better conditions, and there are no prospective studies analysing this effect. Early and aggressive feeding has been proposed to prevent metabolic shock and induce better growth but again there are no data to support any effect decreasing BPD rate. Recent studies do not support this higher growth with earlier and higher protein administration. Intravenous lipids given very early after birth were proposed as a risk factor for death and morbidity, recent data support a beneficial effect of early administrated intravenous soy or oleic derived lipids and are well tolerated. There are no data to support any benefit of this approach in reducing BPD, as with the administration of high doses of Vitamin C and E. But high doses of Vitamin A given intramuscularly during the first weeks of life has demonstrated a benefit decreasing BPD with a NNT of 12-14 in newborns with a birth weight of less than 1000 grams. Other nutrients have demonstrated no effect in preventing the development of BPD.

So even a close relation between nutrition and lung growth is proven, there are no well clinical trials in human designated to show how nutrition acts, being necessary more trials to better define how we can decrease chronic lung injuries in preterm newborns improving nutrition.

N.M. Díaz-Gómez. **BREASTFEEDING: FACTS AND FANCIES.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #19.* <http://www.seinap.org>

Nursing School. University of La Laguna. Tenerife. Spain.

We will summarize the recent scientific evidence that supports the superiority of breast milk versus formula, both for children (lower risk of infectious diseases, allergic diseases, obesity, diabetes, celiac disease, leukaemia, sudden infant death syndrome, necrotizing enterocolitis), and for maternal health (type 2 diabetes, breast and ovary cancer, postpartum depression), and thus justifying its consideration as the gold standard in infant feeding.

The studies on breastfeeding face some methodological difficulties. On one hand, there are differences between women who choose breastfeeding and those who do not, and on the other, due to ethical reasons it is not possible to conduct randomized studies on breastfeeding vs. artificial feeding. Most of the epidemiological evidence comes from systematic reviews / meta-analysis, from clinical trials on the effects of an intervention to promote breast feeding, randomized to intervention or to non-intervention group, from cohort studies on the benefits of breastfeeding, applying techniques to control confounding variables and from studies which show a dose-response relationship, meaning that the benefit of the breastfeeding observed is proportional to breast feeding quantity, duration or exclusivity, suggesting a causal link between the two. Currently the debate concerning issues such as the relationship between breastfeeding and: cognitive development or cardiovascular disease in children, osteoporosis or postpartum weight loss of the mother continues, but nobody doubts that breastfeeding is the optimum food for the child. In practice, however, it is not without difficulties: it represents an important effort for the mother, especially in the early weeks of breastfeeding and when she returns to her the working life, it requires learning by observation, because contrary to what is generally thought, it is not entirely instinctive and also implies a greater effort by healthcare professionals, who have to dedicate time, both to improve their training in this field, such as providing information and support to mothers who breastfeed. In addition, the images and messages used in the advertising world or the magazines for parents, tend to idealize breast feeding and contribute to generating unrealistic expectations on parents, this may lead to experience feelings of guilt, anxiety and frustration when they have to face the earliest difficulties. To provide in-advance and realistic information about the more frequent problems during lactation and how to prevent or solve them, and facilitating contact with mother-to-mother support groups are some interventions that have proved to be effective in order to achieve the goal of exclusive breastfeeding during the first 6 months of life, as established by organizations such as WHO and UNICEF, whose performance in our area is low.

Bousoño García C. **NUTRITIONAL MANAGEMENT OF INFANT FUNCTIONAL DISORDERS: AR, AE, AC, COMFORT, AND DAY/NIGHT FÓRMULAS.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #20.* <http://www.seinap.org>  
Medicine Department. University of Oviedo.

**Abstract:** There are continuous advances on scientific knowledge about human milk characteristics, which represents the excellence patrol and reference on infant nutrition, thus favouring the appearance of new milk formulations designed *ad hoc* in order to resolve different functional disorders of infants such as gastroesophageal reflux, constipation, colic, diarrhoea and insomnia. The recent evolution of those milk substitutes has been so fast and spectacular that we are talking of *functional specialized formulas* just as a tailor's design could be. Nevertheless under such titles claiming a functional advantage such as *anticolic, antireflux, comfort, day/night, etc.*, maybe there could be scarce or null scientific support based on randomized clinical trials, so Paediatrician must be alerted, because efficacy is not universal, and possibly not innocuous, because it has recently been shown that new functional formulas proportion a significant enrichment of mineral and trace elements in respect normal infant

formulas, associated to decreased relations of Ca/P, Zn/Cu and Fe/Cu, representing nutritional inconvenience in prolonged nutritional use.

ESPGHAN has recently draw out some recommendations about basic data that must be taken into account on studies designed to value efficacy of milk infant formulas in terms of growth and development.

Actually there is only limited evidence grade B, indicating antiregurgitation (AR), anticonstipation or anticolic (AC) milk formulations.

It is mandatory to design future studies well conceived, free of commercial interests, with rigorous methodology, randomized and controlled. Otherwise indiscriminate consumption carries along with uncertain but potentially negative risks for infants.

M, Juste M, Castaño C, Gea Mestre JL, Moya JM, González R. **CHILD OBESITY AND LUNG FUNCTION.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #21.* <http://www.seinap.org>

**Background.** The most common form of malnutrition in the Western World is obesity (1). Overweight and obesity may involve 15% of adolescents between 12 and 17 years old, and may alter the respiratory mechanism in such a way that symptoms as dyspnea, wheezing or coughing may achieve a better response by losing weight than using bronchodilator therapy (1,2). Asthma, the most prevalent chronic disorder in pediatrics is increased by 50% in obese children (3). Obesity, sleep apnea and central hypoventilation are clearly related (1,4).

**Objectives.** Study lung function with Mini-Wright PEAK FLOW in children with obesity and overweight and no asthmatic antecedents attending to the pediatric outpatient clinic. And evaluate those with a best value lower than the 80% of the score for his or her age and height and make a correlation with his or her body mass index (BMI).

**Material and methods.** Maximum expiratory peak has been measured con Peak Flow Meter in 13 children with obesity and overweight attending to the nutrition outpatient clinic. A maximum of 6 measures were made, noting to the highest value. That value was then related with age and height in that moment. The relative body mass index in kg/m<sup>2</sup> (RBMI) was then calculated viewing that percentage for the P50 for his or her age it signified.

**Results.** Thirteen children (eight male and five female) between 5 and 16 years were studied (mean 11.5 years). Mean age for male was 12.6 years and for female 9.6 years. Mean RBMI was 158% (156% male and 161% female). Mean best Peak Flow value was 337.5 L/min in male (P25-50) and 268 L/min (P50-75) in female. The RBMI in children with Peak Flow lower 80% of its theoretical value was higher (161%) than in patients with Peak Flow over 80% of its theoretical value (141%). When children with Peak Flow lower than 80% for his or her height is studied, a 20% of males and 25% of females are found. But if Peak Flow is compared for age, percentage rises to 50% for males and 60% for females.

Overall, a 46% and 23% of the studied patients had a Peak Flow lower 80% of its theoretical value for age and height respectively.

**Discussion.** Obesity and overweight are growing problem in our society and they represent the main cause of malnutrition in the developed world (1). Its influence on sleep apnea and the syndrome of central hypoventilation is well know (4) and both constitute a risk factor for developing of persistent asthma (5,6,7). We have studied the maximum expiratory flow with a Peak Flow Meter in a population of 13 children with

no previous antecedents of asthma attending to the Child Nutrition Clinic for obesity or overweight.

Forty-six percent of these patients had a highest value inferior to the 80% of its theoretical value adjusted to age and 23% if adjusted to height. Female patients obtained worse values adjusted either to age or height, although no statistically significant.

RBMI was also superior (161%) in those patients with a Peak Flow inferior to 80% of its theoretical value respect to those ones achieving expiratory flows superior to 80% (RBMI of 144%).

### **Conclusions.**

1. Obesity and overweight affect the lung function assessed by Peak Flow
2. The higher RBMI is, the worse the maximum expiratory peak
3. Age influences more than height on the relationship between RBMI and maximum expiratory flow
4. It appears essential to evaluate lung function in all those children with obesity and overweight, whether or not they have antecedents of asthma

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G. Bueno Lozano<sup>1</sup>; Luis Antonio Moreno Aznar<sup>2</sup>, Manuel Bueno Sánchez<sup>1</sup>

**CHRONOGRAM AND MACRONUTRIENTS AND TYPE 1 DIABETES.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #22.* <http://www.seinap.org>

<sup>1</sup>Departament of Paediatrics, University of Zaragoza, Zaragoza (Spain). <sup>2</sup>University School of Health Sciences, University of Zaragoza, Zaragoza (Spain).

Medical nutrition therapy is important in preventing type 1 diabetes, managing existing diabetes, and preventing, or at least slowing the rate of development of diabetes complications The goals of medical nutrition therapy in children with type 1 diabetes are: to achieve blood glucose levels in the normal range or as close to normal as is safety possible, to maintain blood pressure and lipid and lipoprotein profile and to meet the adequate nutritional needs of each period in the life. The recommendations on nutritional intervention in diabetes have changed over the years. Before the discovery of insulin, the concept of dietary management relied on severe restriction of caloric intake

leading to starvation and cetogenics diets. Actually, nutrient recommendations are based on requirement for all healthy children and adolescents. Calories should be adequate for growth and restricted if child become overweight. Since the early 70s the recommendations have been 50 to 55% carbohydrate (7% from natural fiber), 15 to 20% protein and 30% fat with limitation of saturated fat and cholesterol to less than 10%. More recent recommendations suggest that 45 to 65% of the calories are derived from carbohydrates. Although the relationship between blood glucose and insulin is linear, not all types of carbohydrate are fully metabolized to blood glucose. Glycemic index and glycemic load concepts are attempted to use these carbohydrate availability and amount issues for controlling postprandial glycemia. Food exchange lists have been created to help patients deal with the heterogeneity of nutrient composition of different foods with the purpose of providing some sort of standardization when designing a meal plan. The introduction of carbohydrate counting is an attempt to allow greater flexibility in meals, taking into account larger and smaller carbohydrate intake. Low-glycemic index foods that are rich in fiber and other important nutrients such as legumes, cereals, fruits, vegetables and whole grain products are to be encouraged. The primary goal with respect to dietary fat in type 1 diabetes is to limit saturated fatty acids, trans fatty acids and cholesterol intake so as to reduce risk for cardiovascular disease. For individuals with diabetes and normal renal function, there is insufficient evidence to suggest that usual protein intake (15 to 20% of energy) to preserve normal growth should be modified.

**R. Tormo. AGE OF GLUTEN INTRODUCTION AND COMPLEMENTARY FEEDING. *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6.***

**#23. <http://www.seinap.org>**

Unidad de Gastroenterología Pediátrica y Nutrición, Hospital Quirón, Barcelona

It is hardly surprising, the increasing number of gluten intolerant and celiac patients that have been diagnosed the last years. The quick accurate and easy methods that have appeared recently, like IgA antitransglutaminase antibodies, providing a normal blood IgA levels, with the help of HLA DQ2, HLA DQ8 histocompatibility antigens, can be one of the explanations. Some authors like Ivarson have talked about an “epidemic of celiac disease” due to the late gluten introduction after the age of 6 months (Ivarson A. Epidemic of Coeliac Disease in Swedish children. *Acta Paediatr* 2000; 89: 165-71). Other authors like Norris, Barriga and Hoffenberg, observed a greater risk of suffering a celiac disease, if the gluten was introduced before the age of 3 months or after the age of 7 months, that was attributed to the lack of protection induced by a gluten introduction out of the “timing”, considered between 4 and 6 months of age (Norris JM, Barriga K, Hoffenberg EJ. Risk of celiac disease autoimmunity and timing of gluten introduction in the diet of infants at increased risk of disease. *JAMA* 2005; 293: 2343-51). According to these authors the risk will further decrease if the infants were breast fed during the time of gluten introduction (Ivarson A, Hernell O. Breast feeding protects against coeliac disease. *Am J Clin Nutr* 2002; 75: 914- 21)

The ESPGHAN COMMITTEE on NUTRITION have recently come to an end about these observations, stating: “...On the basis of current data, the Committee considers it prudent to avoid both early (<4 months) and late (at 7 or > 7 months) introduction of gluten and to introduce small amounts of gluten gradually while the infant is still breast fed” (ESPGHAN COMMITTEE ON NUTRITION. Medical Position Paper.

Complementary feeding: A Commentary by the ESPGHAN Committee on Nutrition. *J Pediatr Gastroenterol Nutr*, 46, 1, 2008: 99- 110).



Revisiting the first nutrition guidelines, issued by the first ESPGHAN COMMITTEE ON NUTRITION, on 1972, were very appropriate in all the subjects considered at that time, with the exception of the late gluten introduction recommendation at 6 months of age.

Taking into account the big number of celiac patients that we are diagnosing in our country the last years, not explained only by the easy and new diagnostic methods, I am of the opinion, as an old member of this ESPGHAN COMMITTEE ON NUTRITION, and as an old boss of a Unit of Pediatric Gastroenterology for many years, that we have enough evidence to recommend to all the medical team working on pediatric nutrition or pediatric gastroenterology, to introduce small amounts of gluten by the age of 5 months, for instance, a spoon of gluten flour (about 5 to 10 gr) together with the 4 to 6 spoons of the gluten free baby food, once a day, overall if the infant is breast fed, or if he belongs to a risk group (a brother or parents with celiac disease), trying to go on with breast feeding during the first months of gluten introduction. If there is a risk of suspension of breast feeding shortly after the age of 4 months of age (labor laws), could be advisable to introduce after the age of 4 months the gluten introduction taking advantage of the last weeks of breast feeding.

P. Cortés Mora, F. Salgado Rosado, MJ. Alcobas Cervantes. **NUTRITIONAL APPROACH OF THE FUNCTIONAL CONSTIPATION.** *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #24.* <http://www.seinap.org>  
**Area Especifica de Gastroenterologia Hepatologia y Nutricion. Hospital Universitario Santa Maria del Rosell. Cartagena. Murcia.**

Functional gastrointestinal disorders (FGIDs) involve more than a third part of pediatric gastroenterology consultation's demand. Constipation is the most common stomach functional upset which reaches to 25% of pediatric gastroenterology consultations.

The use of Rome III Criteria permits to standardize the diagnosis of this functional process despite their controversies and limitations. Functional constipation's pathophysiology is due to several factors and it is not exactly known. It is believed that individuals, genetics and family factors are involved in connection with muscular tone and intestinal motility. In some occasions, triggering factors such as nappy removal, resting in bed, family problems or a brother birth are detected. In most numbers of situations, dietetic and hygienic factors take part such as the excess of dairy products or the lack of water, fiber and physical activity. Defecation pain is a factor with regard to retention attitudes (fecal incontinence) and constipation persistence. Complex pathophysiology involves therapeutic measures of multiple approaches: pharmacological, behavioral and nutritional.

Data capture (anamnesis) of the dietetics habits of constipated patient allows us to detect and correct defects or excess of certain food groups. In this way, we will carry out an individualist nutritional intervention more efficient and lasting about constipation.

Taking into account the hygienic and dietetics characteristics of 25 patients (average age 4,51 years) who have been diagnosed with functional constipation according to the Rome III Criteria in the last 8 months, we could notice a high average ingestion of dairy products (750ml/day), 1,4 portions of pulses a week on average and only 0,5 portions of vegetables a day and hiding in 65% occasions, less than 1 piece of fruit a day, about 400ml average ingestion of water a day, 240ml juices a day. Only 3

patients (8%) have more than a glass of soft drink a day. About 15% had sweets (pieces of candy) or Snacks everyday and the others in a sporadic way.

From all nutritional measures proposed, we can highlight the following ones: baby's bottle replacement by glass, the reduction of the dairy products until (RDI) appropriate recommendations by his age, dairy dessert substitution for a piece of fruit, adding new kind of fruits in his diet, adding vegetables 2-3 times a week, to take part in cold dishes elaboration such as salad with nuts, prunes and asparagus, to replace juices or sweetening drinks by water or natural juices with flesh, to avoid taking sweets among meals or carrying out sedentary activities.

Nutrition is a really important **mainstay in the constipation treatment though it is not the unique. Laxatives use together with an anti-congestion standard diet may be useful in the short term but it is not efficient in the medium or long term. We suggest including healthy dietetics habits progressively adapting them as far as possible to the preferences and the culture of the family-patient** whole in order to get a lasting performance, to avoid new constipation episodes and promote the child and future adult health.

J. Argente. **PHYSICAL GROWTH AND NUTRITION. *INVEST NUTR ALIM PEDIATR (Rev on-line) 2008; 6. #25. <http://www.seinap.org>***

Departament of Pediatrics, UAM and Hospital Infantil Universitario Niño Jesús Madrid.

Human growth, is a physiological process that begins prenatally during intrauterine life and continues postnatally until the finalization of skeletal and sexual maturation. The potential maturational and growth rhythms of each specific child are genetically determined; however, the final result depends on a complex interaction of genetic and environmental factors. A good nutritional status, psychosocial environment and normal internal milieu and physical structures responsible for growth and their biological mechanisms of regulation, as well as the absence of disease in the mother, fetus and newborn, are necessary for normal growth. The relationship between these factors is very close and abnormalities in any one of them may produce short stature. Most of the factors implicated in the regulation of growth act simultaneously throughout the entire process. However, some factors assume a predominant function during specific periods of life. According to the "ICP" (*infancy, childhood, puberty*) proposed by Kalberg, the growth curve would be the result of the sum and overlapping of three components: fetus-infant, prepubertal and pubertal periods.

The study of clinical growth is based on the analysis of changes produced throughout time, in a series of anthropometric variables that permit the evaluation of different aspects of the process of growth: increase of size, nutritional status and the degree of maturation.

Chronic maternal malnutrition is the most frequent cause of children "small for gestational age" (SGA) in underdeveloped countries. In contrast, in developed countries its contribution to SGA is difficult to establish, due to the fact that it is usually associated with other factors also linked to the birth of newborns SGA.

Most SGA children, including both premature and full-term, will experiment a "catch-up growth", either partial or complete, during the first or second year of life, reaching a normal height. However, 10-20% will remain with short stature after 2 years and in at least 50% of them, the final height will be short.

Fetal under-nutrition plays an important role in a number of pathologies in the adult, including insulin resistance, diabetes mellitus type 2, dyslipemias, hypertension, cardiovascular diseases and short stature due to abnormalities in the GH-IGF axis. It is hypothesized that early malnutrition can generate diseases in the adult due to “reprogramming”, explaining why metabolic changes in critical periods of development produce metabolic imprinting that can modify the relationship between substrates, hormones and receptors throughout life.