

insulin resistance. The authors also postulate that obesity may be an additional risk factor during childhood. One of the most important findings was the close relationship observed between insulin resistant parameters and liver function tests; this suggests that the liver might be a target organ of the reprogramming process. The authors did not find any indications that the IGF systems (IGF1, IGF1BP-3, etc) are related to the insulin sensitivity status, at least during childhood. The latter data are in accord with those of at least two other authors.

Cianfarani S, et al. *Horm Res* 2001;55(suppl 1):7-10.

Editorial Comment: The authors have provided excellent data on a large number of small for gestational age infants. I have not used the term *intrauterine growth retarded children* as in the title of the article, as I believe

that term should be reserved for children who are <3rd percentile. I remain skeptical that one out of every 10 children is *intrauterine growth retarded*, which would be the case if one uses the 10th percentile as cutoff. The article as presented does not indicate to me what percentages of the children born <3rd percentile had insulin resistance. The authors and others are invited to comment to the Editor concerning which criteria are appropriate to use for determination of metabolic alterations in IUGR children, as much confusion now exists among data stated to be that of IUGR.

Regardless of what I consider this limitation, the data are worthwhile and provide interpretations to postulated metabolic alterations in children who are small for gestational age.

Robert M. Blizzard, MD

	G/I <6(n = 11)	G/I >6(n = 38)	p	
Age, years	10.3 ± 3.6	8.9 ± 3.3	n.s.	ALT = alanine aminotransferase
Birth weight, kg	2.16 ± 0.35	2.18 ± 0.38	n.s.	AST = aspartate aminotransferase
Birth length, cm	45.4 ± 2.8	45.8 ± 2.8	n.s.	AUC _{ins} = area under the curve of insulin during oral glucose tolerance test
Ponderal index, g/cm ³	0.002 ± 0.002	0.022 ± 0.004	n.s.	BMI = body mass index
BMI, kg/m ²	18.5 ± 4.0	16.2 ± 3.9	n.s.	HOMA-β-cell = homeostasis model assessment β-cell function
BMI, z-score	1.0 ± 2.6	-0.29 ± 1.8	n.s.	HOMA-IR = HOMA for insulin resistance
Height, z-score	-1.08 ± 1.29	-1.23 ± 1.3	n.s.	IGF = insuline-like growth factor
MPH, z-score	-1.4 ± 0.6	-0.8 ± 0.9	<0.05	IGFBP = IGF binding protein
Corrected stature, z-score	0.36 ± 1.1	-0.36 ± 1.3	n.s.	IUGR = intrauterine growth retardation
Fasting insulin, mU/l	12.4 ± 9.0	8.2 ± 3.3	n.s.	MPH = midparental height
HOMA-IR	3.5 ± 1.0	1.5 ± 0.8	<0.0001	n.s. = not significant.
HOMA-β-CELL	180 ± 139	43 ± 90	<0.01	
AUC _{ins} , mU/l	240 ± 113	164 ± 115	n.s.	
Proinsulin, pM	9.6 ± 11.2	5.0 ± 4.4	n.s.	
IGFBP-1, μg/l	83 ± 59	119 ± 50	<0.05	
IGF-I, z-score	0.41 ± 2.8	0.47 ± 3.0	n.s.	
IGF-II, z-score	0.56 ± 0.7	0.62 ± 0.9	n.s.	
IGFBP-3, z-score	0.35 ± 0.7	0.23 ± 1.3	n.s.	
IGF-I/IGFBP3 ratio	61.2 ± 23	63.5 ± 35	n.s.	
AST, U/l	29.1 ± 8.0	27.4 ± 6.7	n.s.	
ALT, U/l	27.4 ± 17.1	16.3 ± 7.2	n.s.	
γ-GT, U/l	15.7 ± 6.6	11.7 ± 3.8	n.s.	

Adapted from Cianfarani S, et al. *Horm Res* 2001;55 (suppl 1):7-10.

The Molecular Basis of X-Linked Spondyloepiphyseal Dysplasia Tarda

The gene for X-linked form of spondyloepiphyseal dysplasia tarda has been identified as SEDT, a protein that apparently plays a role in endoplasmic reticulum-to-Golgi transport and involves subcellular localization of normal sedlin constructs. The protein is relatively small with 140 amino acids. It is located in the non-X-inactivated part of Xp22. This suggests that female

carriers express sufficient normal gene to avoid the disease.

The present study looked at 36 unrelated cases and attempted to make phenotype/genotype correlations. Mutations could be found in 30 individuals. The 6 individuals in which mutations were not found either lacked a strong family history or convincing physical

features, and therefore, may represent other diseases. Twenty-one different gene mutations were observed among the 30 cases, and in those cases with several identical mutations, hupetype analysis suggests that they arose separately and, therefore, do not represent a founder effect.

Intrafamilial variation was certainly observed; however, mutations occurring toward the five¹ end of the SEDL gene (mutations in Exons 3 and 4) resulted in kyphosis and scoliosis with severe pain early in life and with more debilitating types of complications. This was observed while mutations in Exons 5 and 6 resulted in milder clinical features.

Mutations were spread throughout the gene, including point mutations, splice alterations, insertions, deletions, and complex rearrangements. The most common type of mutation was a deletion. There was a 10 fold greater occurrence of deletions than would be expected. This may represent slippage during homologous recombination between the Y and X chromosome.

The SEDL phenotype may be explained by reduction in endochondral bone formation in the epiphysis, particularly in the vertebral bodies. A timely switch to up regulate the endogenous expression of a pseudo gene on chromosome 19 might provide gene therapy. The authors are undertaking a study of SEDL mutations in premature osteoarthritis.

Gedeon, AK, et al. *Am J Hum Genet.* 2001;68:1386-1397.

Editor's Comment: *When genes are identified for the chondrodysplasias, the possibility of making phenotype/genotype correlations and understanding the basic molecular biology are very enticing. This paper is a lovely demonstration of how a great deal can be learned in rare disorders by large international collaborations. This work hopefully will lead both to a better understanding of disease and to potential therapies.*

Judith G. Hall, OC, MD

Postnatal Malnutrition and Growth Retardation: An Inevitable Consequence of Current Recommendations in Preterm Infants?

Intake of adequate nutrients in preterm infants is difficult at best, and most often does not accomplish meeting the recommended dietary intakes (RDI). A nutrient deficit therefore accrues, leading to postnatal malnutrition and growth retardation. This study assesses the dietary intake in a prospective single observer design in 105 preterm infants with a body weight of < 1750 grams and a gestational age of < 34 weeks who were admitted to the Neonatal Intensive Care Unit over a 6 month period. Actual intake was subtracted from the recommended energy intake (120 kcal/kg/day) and protein (3 g/kg/day), and nutritional deficits were calculated. Infants were weighed on admission and throughout the hospital stay.

Nutrient intakes meeting current RDI's were rarely achieved during early life. By the end of the first week, cumulative energy and protein deficits were 406 +/- 92 and 335 +/- 86 kcal/kg and 14 +/- 3 and 12 +/- 4 g/kg in infants < 30 and those at > 31 weeks, respectively. By the end of the fifth week, cumulative energy and protein deficits were 813 +/- 542 and 382 +/- 263 kcal/kg and 23 +/- 12 and 13 +/- 15 g/kg. The z scores were -1.14 +/- .6 and -.82 +/- .5 for infants at < 30 and > 31 weeks. Stepwise regression analysis indicated that variation in dietary intake accounted for 45% of the variation in changes in z-score. The authors concluded that preterm infants inevitably accumulate a significant nutrient deficit in the first few weeks of life.

Editor's Comments: *This study clearly demonstrated that there is an accumulated nutrient deficit in preterm infants in an NICU setup. It also clearly suggests that the nutritional approach to the care of these infants needs to be re-thought, perhaps with a more aggressive approach, i.e. enteral or parenteral feedings. However, even early parenteral or enteral supplementation might be limited as these infants might not be able to tolerate it. A more aggressive enteral feeding is also hard to attain in the first few days of life, and it could lead to necrotizing enterocolitis or other adverse effects. The long-term consequences of this accumulated nutrient deficit may be important. It is generally assumed that poor growth in the preterm low birth weight infants primarily reflects inadequate nutrient intake, and in this study there was a 45% variation in growth related to such. Nonetheless, despite poor growth during the initial stages of life, most premature infants grow well thereafter and attain a normal height, unless there are other complications. Once the infant matures, the nutrient deficits are recouped and there is nutritional recovery with catch-up growth. However it should be kept in mind that nutrient deficits in early infancy might have other devastating consequences. The data from this study suggest that the clinician is in a quandary and that a more realistic picture regarding the quantity and quality of nutritional care in low birth weight infants needs to be re-thought.*

Embleton NE, et al. *Pediatrics* 107:270-272, 2001.

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