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A-GLIADIN RELATED SYNTHETIC PEPTIDES AGGLUTINATE K 562 S CELLS AND AFFECT IN VITRO DEVELOPING FETAL RAT INTESTINE AND ATROPHIC COELIAC MUCOSA.

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Peptides from wheat gliadins, A-gliadin and prolamins from cereals toxic for coeliac patients agglutinate K 562(S) cells; they also damage in vitro cultured fetal rat intestine and atrophic coeliac mucosa. The largest common sequences among the in vitro active A-gliadin peptides were -Pro-Ser-Gln-Gln-and -$(Gln)_3$-Pro-.The following peptides all containing the aminoacid sequence -$(Gln)_3$-Pro have been synthesized: the pentapeptide Tyr-$(Gln)_3$-Pro, its dimer and tetramer and the eptapeptide Gln-Pro-Tyr-$(Gln)_3$-Pro in their free and N-acetylated forms and the Pyroglutamic derivate of the heptapeptide (Pyr7).Pyr 7 agglutinated cells and inhibited the in vitro development of fetal rat intestine (medium's concentration 0.5-2mg/ml);it was non toxic on the in vitro cultured coeliac atrophic mucosa. The N-acetylated form of the pentapeptide's tetramer (1mg/ml) also damaged the atrophic coeliac mucosa in 4 cultured biopsies.These results suggest that the sequence -$(Gln)_3$-Pro when part of a larger peptide may be toxic in vitro for the atrophic coeliac mucosa.

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DIET-INDUCED CHANGES OF LONG-CHAIN-POLYUNSATURATES (LCP) IN PLASMA PHOSPHOLIPIDS OF PREMATURE INFANTS

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In premature infants LCP (metabolites of linoleic (LIN) and α-linolenic acids) are required for membrane and prostaglandin synthesis and for brain growth. Human milk feeding supplies LCP in amounts matching intrauterine accretion. In contrast, conventional formulae contain almost no LCP. We studied the fatty acid composition of plasma phospholipids in 28 preterm infants (gest. age 33.9 ± 1.8 weeks, birthweight 1684 ± 185 g) fed human milk (HM; n=10), an adapted formula (F; n=10) or the same formula enriched with LCP (LCP-F; n=8) between days 4 and 21. Results on day 4 were similar in the 3 groups. By day 21, LIN increased in all infants, but more pronounced in F and LCP-F. Arachidonic acid (AA) and the sum of LCP remained stable in HM, but decreased markedly in F. LCP-F showed significantly higher AA-values than F, although not equal to HM. Docosahexaenoic acid (DHA) showed a similar trend.

MAJOR ESSENTIAL FATTY ACIDS IN PLASMA PHOSPHOLIPIDS (% WT/WT)
p<0.05 vs. *day4(paired t-test), +HM and ≡F(Bonferroni t-test)

	Day 4 (n=28)	Day 21: HM(n=10)	F(n=10)	LCP-F(n=8)
LIN	12.94±2.48	18.37±0.62*	23.60±3.13*+	22.06±2.36*+
AA	12.54±2.88	11.26±1.43	6.32±1.31*+	8.38±1.18*+≡
DHA	2.76±0.84	3.06±0.41	1.84±0.70 +	2.09±0.12*+

Conclusions: 1. Premature infants fed a conventional formula develop marked reductions of LCP in plasma phospholipids during early life. 2. Low AA-values despite high levels of it's precursor (LIN) in F suggest a low capacity for LCP-synthesis in preterm infants. 3. The essential fatty acid status of formula-fed preterm infants can be improved by LCP-enrichment of their diet. - Supported by Deutsche Forschungsgemeinschaft, Bonn, FRG

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ONTOGENY OF GLUCOSE KINETICS IN THE NEWBORN.

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Diminished glucose production is the adult response to glucose infusion. Persistent glucose production in response to exogenous glucose is evidence of a transitional homeostatic state in the first days after birth. Glucose production (Ra) was measured in 11 infants (BW 1716±48 gms; GA 33±0.3 wks) at 2-3 wks of age. In these paired studies, 4 ug·kg^{-1} min^{-1} D-(U-^{13}C)glucose tracer was infused by prime constant infusion in saline or glucose (5.3±0.2 mg·kg^{-1} min^{-1}) solution. Data was compared to that from 23 infants (BW 2017±69 gms; GA 34.±0.3 wks) previously studied at 1-2 days of age. The weights of the groups at time of study were comparable. When the results from the glucose turnover period were compared to the saline turnover period, plasma glucose concentration was elevated in the infants (97±vs. 64±5 mg/dl at 1-2 days and 101±4 vs. 88±3l mg/dl at 2-5 wks, respectively)($p < .001$). When a similar comparison was made, plasma insulin concentration was elevated only in the younger infants (19±3 vs. 11±1 uU/ml at 1-2 days ($p < .05$) and 12±5 vs. 8±3 uU/ml at 2-5 wks). Persistent Ra ($\geq$ 1 mg·kg^{-1} min^{-1} during glucose infusion was similar between the 2 groups (5/13 infants at 1-2 days and 6/11 infants at 2-5 wks).Control of glucose kinetics is transitional throughout the neonatal period which may partially account for the frequency of hyperglycemia noted clinically.

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LIPID AND FATTY ACID COMPOSITION OF RAT INTESTINAL BRUSH BORDER MEMBRANES (BBM) DURING MATURATION: THE BIOCHEMICAL CORRELATE TO CHANGES IN MEMBRANE FLUIDITY

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Looking for an in vitro membrane model for studies on membrane disorders, we examined BBM (which are homogenous biomembranes) by biophysical and biochemical means. BBM show a continuous increase in fluorescence anisotropy (measured with 7 fluorophores) in all depths of the outer leaflet of the lipid bilayer, i.e. a decrease in membrane fluidity. We determined simultaneously fluorescence anisotropy, the cholesterol/phospholipid molar ratio (C/P), and the distribution patterns of the major fatty acids of BBM during maturation.
C/P continuously increased: newborns .90±.16, sucklings 1.05±.13, weaned 1.33±.16, juveniles 1.33±.30, adults 1.45±.15. This increase closely paralleled the increase in fluorescence anisotropy measured with diphenylhexatriene as fluorophore. The relative contents of the fatty acid 16:0 decreased, while 18:0 increased. The fatty acids 14:1, 16:1, and 18:1 decreased. Our data indicate an elongation of saturated fatty acids during maturation. They demonstrate the rigidifying effect of cholesterol and the fluidifying effect of certain unsaturated fatty acids known from artificial membranes to apply also to biomembranes.

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BRANCHING ENZYME IN ERYTHROCYTES: DETECTION OF TYPE IV GLYCOGENOSIS HETEROZYGOTES.

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A 2 year-old boy with hepatosplenomegaly and muscular hypotonia showed a deficient branching enzyme activity (BE) in fibroblasts (diagnosis confirmed by B. Brown, USA).We have investigated BE in erythrocytes (erys) by determination of phosphates released from glucose-1-p in the mixture containing phosphorylase.BE in erys was well measureable as debranching enzyme and phosphorylases.BE in erys of the patient was deficient (0-0.2 umol/min/g Hb vs. 4-16 in controls, n=75). Glycogen was not elevated in erys of the patient(4 mg/dL; normal, 0-10). BE in erys from his mother was app. 50 % of the normal range (2.92). Type IV glycogenosis was suspected by the pathological examination in a female patient who died of the respiratory distress syndrome 1 day after birth. BE in erys of his parents was 2.55 and 2.22 and in fibroblasts 0.14 and 0.35 umol/min/mg protein respectively (control fibroblasts, o.4-1.4,n=8).These results show that easily accessible heparinized blood is an excellent source for the homo- and heterozygote detection of type IV glycogenosis.

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A RETROSPECTIVE ANALYSIS OF THE GROWTH PATTERN OF 110 CHILDREN WITH HYPERPHENYLALANINEMIA (HPA).

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Growth was assessed retrospectively in 110 children (49 boys, 61 girls) with HPA. They were 12.22 ± 4.74 years (mean ± SD) at the time of the last evaluation. 87 pts had the classical (type 1), 18 the mild form (type 2), 5 pts had persistent hyperphyenylalaninemia (type 3). Height was compared with the growth of normal children by calculation of the standard deviation score (SDS), using the data of Tanner et al. (1966).

The height-SDS was similar in all three groups with 0.40 ± 1.0 (type 1), 0.42 ± 1.06 (type 2) and 0.69 ± 0.46 (type 3). In 27 pts the dietary regimen was discontinued at the age of 8.81 ± 2.24 years with the height-SDS being 0.18 ± 1.19. At 16.02 ± 1.55 years the height-SDS had not changed significantly with 0.46 ± 0.10 SDS.

10 boys and 28 girls have reached final adult height. Boys measured 178.50 ± 8.53 cm, girls 164.51 ± 5.25 cm, which was 0.85 ± 4.74 and 3.64 ± 7.32 cm above target height with no significant difference between type 1 and 2.

Our data demonstrate that growth is normal in the different forms of HPA and is not affected by discontinuation of the dietary regimen.